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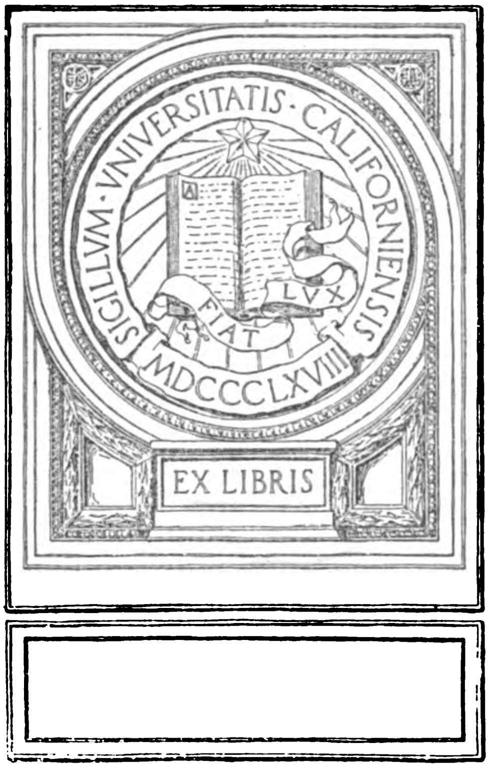
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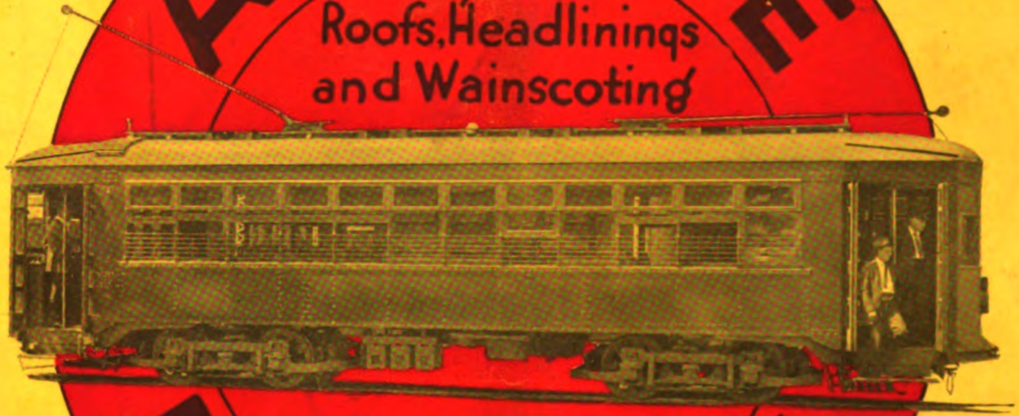

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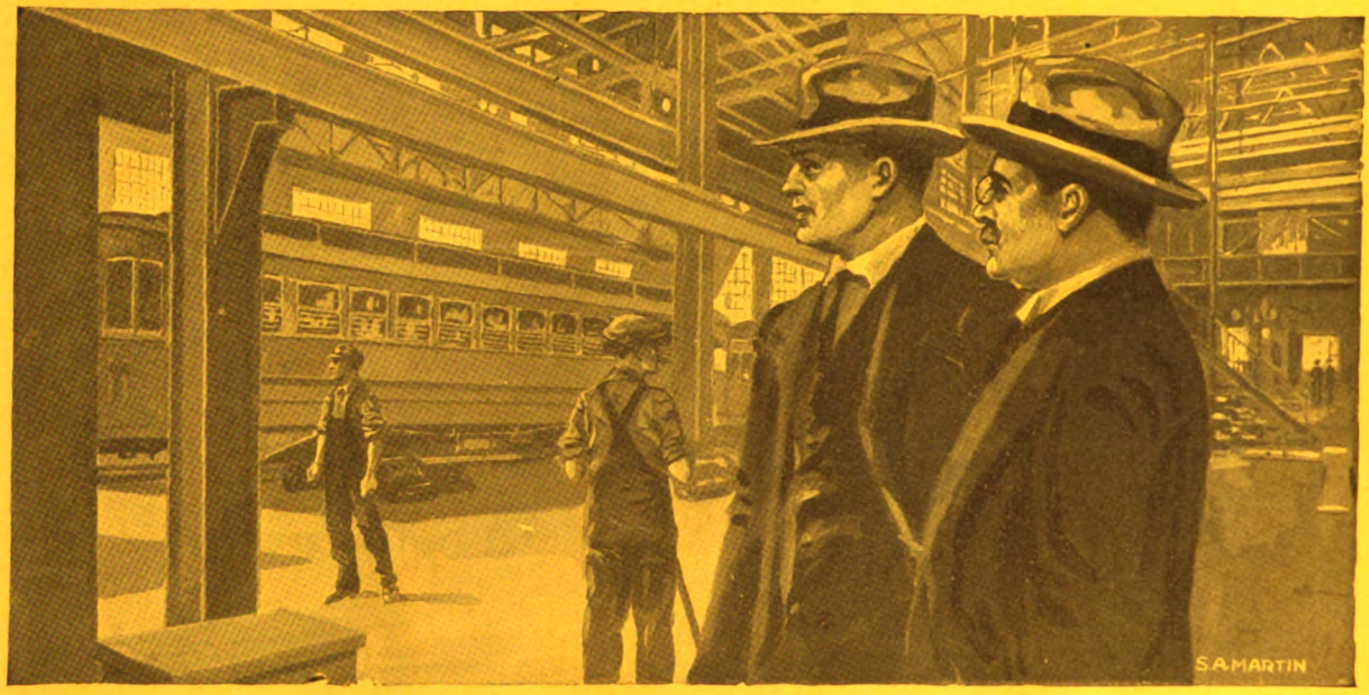

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Electric Railway Journal

Volume 60

July to December, 1922

McGraw-Hill Company, Inc.
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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index unless, like "employees," they appear also in small type. As an example of how to use the index, if a reader wishes to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only Special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION

Accident claim department
Accidents (including wrecks)
Safety work
Storm and fire damage

CARS AND OTHER VEHICLES

Automobiles
Cars (including car design)
Locomotives
Motor buses
Motor cars, Gasoline
Motor trucks
Service and tower trucks
Trackless trolley
Work and wrecking cars

CAR EQUIPMENT

Bearings
Brakes and compressors
Current collection
Electrical equipment
Fixtures
Gears and pinions
Motors
Trucks
Wheels and axles

EMPLOYEES

Employees
Labor
Strikes and arbitrations
Wage decreases
Wages and working agreements

FARES

Fare collection (including apparatus)
Fare decreases
Fare increases
Fares
Traffic investigations
Traffic stimulation

FINANCIAL, LEGAL AND STATISTICS

Abandoning of lines
Accounting
Appraisal of railway property
Financial
Franchises
Insurance
Legal
Legislation for railways
Market conditions
Operating records and costs
Public service and regulative commissions
Statistics
Taxes

HEAVY ELECTRIC TRACTION

Heavy electric traction (general)
Locomotives

MAINTENANCE OF EQUIPMENT

Insulating materials
Lubrication
Maintenance practice
Metals
Repair shop practice
Repair shops and equipment
Stores
Tests of materials and equipment
Welding

POWER

Energy checking devices
Energy consumption
Fuel
Overhead contact system
Power distribution
Power generation
Power stations and equipment
Substations and equipment

STRUCTURES

Carhouses and storage yards
Power stations and equipment
Repair shops and equipment
Substations and equipment
Terminals
Waiting stations

TRACK

Pavements
Rail joints and bonds
Rails
Special trackwork
Ties
Track construction
Track maintenance

TRAFFIC AND TRANSPORTATION

Freight and express
Interurban railways
Merchandising transportation
Publicity
Public, Relations with
Schedules and timetables
Signals
Stopping of cars
Traffic investigations
Traffic regulation
Traffic stimulation
Transportation, Metropolitan

MISCELLANEOUS

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Engineers
Living costs
Management
Municipal ownership
Radio telephone for railways
Railways (general)
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Standardization
Subways

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Volume 60 New York, Saturday, July 1, 1922 *Number* 1

Mr. Attwill's Objection to Some Forms of Regulation Appears Reasonable

THE high-water mark of the 1922 Bluff Point meeting of the New York Association was reached while Hon. Henry C. Attwill, chairman of the Massachusetts Department of Public Utilities, was explaining to the banqueters in the evening what he thinks of the interrelation between the utilities and the public. He believes that there should be as little interference as possible by a public service commission in the operation of a utility even in the matter of fares. The duty of the commission is simply to see that the utility management is doing a good job. Moreover, Mr. Attwill practices what he preaches and is highly gratified when the Boston Elevated, the Bay State, the Worcester Consolidated, or any other system in the State succeeds in furnishing good service in its community at a reasonable profit to the stockholders.

In his address, which is abstracted elsewhere in connection with the report of the meeting, the speaker stigmatized as "meddlesome interference" the unnecessary dabbling by commissions in utility management. These are strong and suggestive words. They were picked by the commissioner from the mass of English words at his disposal with a view to expressing exactly what he meant. While his remarks were addressed to electric railway men, he knew perfectly well that they would reach other commissioners in due course. It might be well for electric railway men to insure this. For this purpose Mr. Attwill's philosophy of commission regulation might be summarized as follows:

Make sure that the utility management is capable and honest, and bent upon carrying out the spirit of its contract with the public; this assured, encourage the management in its efforts, insuring an appreciation on the part of the public of what is being done in its best interest; with these two points covered properly, avoid meddlesome interference with the operation of the property.

All Work and No Play, Etc., But——

THE general good fellowship which pervades the gatherings of electric railway organizations, particularly those in which the feminine element is a factor, is highly commendable. This very element, however, if overemphasized, may cause the loss of some excellent opportunities for discussion of pressing problems. While the electric railways are in better condition than they were, say a year ago, they are far from being on "Easy Street," and it is safe to say that they need every scrap of information they can get to put them firmly on their feet.

These remarks are prompted by the fortieth annual meeting of the New York Electric Railway Association, held at Bluff Point, Lake Champlain, this week. The meeting was one of the most delightful that the association has held in its long and creditable history. It came at the end of a strenuous year's work, mostly done by committees. It furnished the recreational element lacking in the more serious quarterly meetings, held during the year in New York City. The features of the business session were carried out as advertised, but the technical papers were read by title only or postponed, and there was no discussion. This was a disappointment to a minority of those present, but an overwhelming majority favored the procedure. Fortunately, two of the advertised papers had been prepared in advance so that it is possible to give abstracts of them in connection with the report of the meeting, which appears elsewhere in this issue.

Data Published This Week Point to Better Times

A NUMBER of indications that the electric railway industry is in much better condition than for a number of years back have been cited in these columns. Perhaps the most striking proof yet offered to prove this contention is given in the table published in the department of Manufactures and Markets in this week's issue of this paper, giving the number of cars ordered by electric railway companies since the year began. As explained in the text accompanying this table, it has not been compiled in exactly the same way as that used in the statistical table published in the issue of Jan. 7. For that table the information was obtained directly from the railway companies themselves, whereas the data in the table on page 31 are simply of the cars built by the leading car builders. For this reason, this week's table does not include cars built in railway shops or those ordered from the smaller local car builders. Nevertheless, the total for the last six months is considerably in excess of the number given in the table covering the entire year of 1921.

A closer examination of the table shows that these car orders are pretty well scattered over the country and that they are made up of comparatively small orders. The largest order in the list is for 100 cars, and there is only one of these. There are two orders of ninety-five cars, one of seventy-five and one of fifty-two. All of the other orders are for fifty cars or less. This also indicates the feeling is general that the time has come when the financial condition of the companies, as well as the prices of cars, warrants the placing of orders. It should be noted that two or three large pending orders, such as that of the Interborough Rapid Transit Company for 100 cars and of the Detroit Municipal Railway for the same number of cars, are not included in this list because these orders have not yet been placed. These will help to swell the list of car orders during the latter half of the year.

Another significant group of figures which show the improved status of electric railways is the sixteen months figures given in the Financial and Corporate department of this issue. These figures represent the combined statistics of some eighty-one electric railway properties whose monthly earnings are corrected and compiled by the statistician of the American Electric Railway Association. While they indicate that the gross business being done by the electric railways is not increasing, as is hardly to be expected in these times, the operating ratio is decreasing. This means a larger net return. It is undoubtedly the better financial condition of the electric railways which has been established by these greater net earnings which has given the companies the additional credit which they have needed for the purchase of cars.

These and other indications prove that the industry is beginning to flourish again in spite of all the handicaps of the past and present.

It Can Be Done!

WHO says that all this talk about "selling transportation" is futile? It is being done! The pages of this and other papers have been carrying many interesting reports of late of successful publicity plans, weekly pass schemes, courtesy campaigns and other business-like merchandising methods adopted by the more progressive protagonists of selling transportation. Even the daily newspapers, ever critical and suspicious of public utility propaganda, recognize the new era.

Only the other day no less an authority than the New York *Herald* carried a half column editorial entitled "Transportation Salesmen," commenting favorably on the good work of the Eastern Massachusetts Street Railway and the Fifth Avenue Coach Company. These two originators have made a specialty of carefully training their platform employees who are in direct contact with the traveling public. These men are the logical candidates for salesmen. They are beginning to appreciate the fact that their own self-interest demands something more than just putting in their time. If any one doubts that the efforts of the Eastern Massachusetts company are bearing fruit, let the doubter take a few rides on the street cars of this Bay State road and note the more friendly attitude of the men toward passengers who ask questions, watch the accurate timing of cars on schedules and other evidences of good service.

Speaking of these things the New York *Herald*, in a recent issue, said:

> The sales idea brings home to the employee conciousness of his direct personal interest in increasing sales and in developing good will among purchasers. With every street car that competition puts out of business jobs are canceled. With every advance competition makes the hold on remaining jobs becomes more precarious. If the market, and with it the jobs, are to be held the goods delivered must be kept abreast with competition standards.

Although it may have been painful in many cases, perhaps this era of growing competition from jitneys, pleasure automobiles, and even walking, may prove to have been an evil not entirely unmixed with good. If it brings home to the railway man, whether he sits at an executive desk or collects fares on the end of a trolley car, a keener realization of his responsibility to the public for more efficient, economical, prompt and courteous service, it may yet prove to be the means of bringing the electric railway transportation industry back to its rightful place in popular esteem.

Restoration of credit with the riding public must precede restoration of credit with the investing public. The news of the day shows that "it can be done."

A Payment of $250 Increases the Interest from 4 to 6 per Cent

MONEY rates are coming down. Refunding operations are the order of the day. The 7 and 8 per cent short-term issues are being called in and replaced by long-term bonds at prevailing rates. These operations are being carried out mostly among the industrial issues, but not entirely so. The investor who placed his funds in a callable bond can get such measure of satisfaction as is possible out of his calculation of the saving to the corporation by the replacement of a 7 or 8 per cent issue with a 5½ or 6 per cent issue, but the pleasure is nearly all the corporation's, while the problem of disposing of his returned funds in the changed market is all the investor's.

It is very often a nice question to decide what shall be done in a refunding operation, but it is usually a comparatively simple one to settle. Not so, however, was the poser placed before investors by the United Railways & Electric Company of Baltimore. The proposal of that company set statisticians, bond men and investors to figuring. The railway made an offer to the holders of its first mortgage 4 per cent bonds due in 1949, wherein by the payment of $250 on each $1,000 bond the holder had the privilege of exchanging his 4 per cent bond for another bond of precisely the same issue but bearing interest at the rate of 6 per cent.

In April the company financed its maturing requirements by the issue of $6,000,000 first consolidated mortgage bonds bearing 6 per cent interest. These bonds are exactly the same as the first consolidated mortgage 4 per cent bonds except that coupons are added, representing the additional 2 per cent per annum. After the bonds bearing 6 per cent interest were sold the additional requirements of the company for the time being were small in amount; therefore, the recent tender of the company was limited to 40 per cent of the outstanding 4 per cent bonds. There are $26,450,000 of these bonds listed on the Baltimore Stock Exchange. With 40 per cent of them deposited under the plan the company would receive $2,645,000.

One of the banking houses which urged deposit of the securities said that while it was true that the company would benefit by such an arrangement it was also true that the company was receiving funds which in due process of time it would not have to repay. It was further true that these funds would cost the railway company, according to actuarial figures, about 6½ per cent over a period of twenty-seven years, and that while the investor would get 8 per cent on his additional payment, he would eventually twenty-seven years hence lose the extra sum he had been asked to pay in. The opinion of this expert was that by assenting to the plan the bondholder benefits equally with the company, and possibly gains more.

There are a number of other angles to the problem. One of them is the fact that the opportunity for enhancement in value of a 6 per cent bond was far better than that of a 4 per cent bond. This consideration would weigh particularly with the bondholder who had purchased at 75—either slightly more or slightly less. The company was ordered by the Public Service Commission to prorate the depositing bonds if more than 40 per cent were tendered for conversion. Altogether the problem presents a number of aspects which are quite different from those which have to be considered in the usual refunding operation.

A "FLY-BOAT" OR "BATEAU MOUCHE" ON THE SEINE, OPERATED BY THE UNIFIED TRANSPORTATION SYSTEM

Paris Popularizes Transportation

Under Unified System Urban and Suburban Trolley Lines and Omnibuses as Well as Seine Steamers Are Being Operated in Co-ordination to Give Best Possible Service

STREET car travel in France, taking the franc at pre-war exchange, has become very expensive of late, or about 11 cents for the average three or four-mile trip within the city walls. In terms of American money at current rates, however, it is about half of this sum, and the fare is higher once the fortifications are passed. Paris surface traffic is, however, essentially urban. An effort is being made to extend this surface traffic by feeders to the near-by countryside.

Recently the Department of the Seine purchased the systems operated by the six principal tramway companies in Paris (Compagnie générale des Omnibus de Paris, Compagnie des Tramways de Paris et du département de la Seine, Compagnie des Tramways de l'Est-Parisien, Compagnie des Chemins de fer Nogentais, Compagnie générale Parisienne de Tramways, Compagnie électrique des Tramways de la Rive gauche), as well as the omnibus system belonging to the Compagnie générale des Omnibus de Paris. This aggregation now constitutes a single system, called since Jan. 1, 1921, the Société des Transports en Commun de la Region parisienne. The same company also took over in 1921 the boat service on the Seine, which had been suspended during the war. The boats are rapidly being put back into condition. There has also been incorporated in the system, since Jan. 1, 1922, the Chemin de fer du Bois du Boulogne, purchased in 1921 by the department. There now remain outside the T. C. R. P. system only the following lines:

The Tramways de l'Ouest-Parisien, operated by a receiver, appointed by the court, the concessionaire company having abandoned its operation in 1918. The status of this system still remains to be determined.

The railway line between Paris and Arpajon, operated by an independent company. The purchase of this line, decided on in December, 1921, is subject to approval of the Conseil d'Etat.

The departmental railways de Grande-Banlieue (Seine and Seine-et-Oise), which, however, are to be turned over by the Department of the Seine-et-Oise to the Department of the Seine.

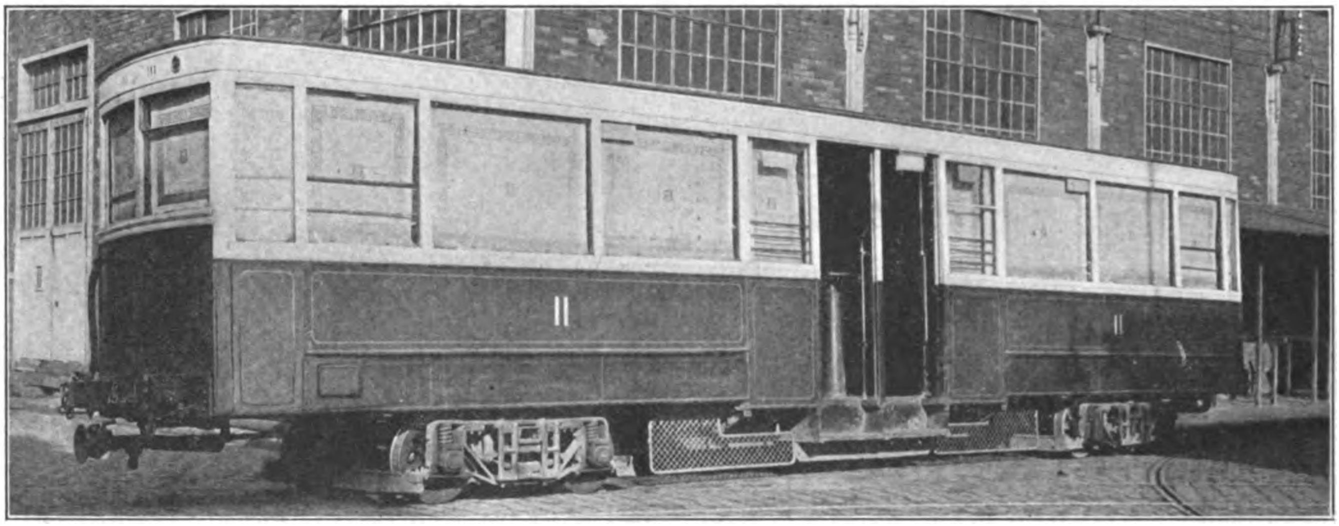
These different systems will be incorporated in the T. C. R. P. system, subject to the indispensable administrative approval.

SYSTEM IS OF GREAT MAGNITUDE

The new company is of impressive proportions, as well from the point of view of the capital involved as for the number of services operated and the number of employees. The value of the investment at pre-war figures of over 450,000,000 francs may be considered today, in view of present-day costs and values, as having been increased to 1,200,000,000 to 1,400,000,000 francs. In view also of the proposed rehabilitation and additions of material, equipment and rolling stock this will soon be still further increased. Various improvements are under way which will require the expenditure of 400,000,000 francs more, of which more than 100,000,000 francs was expended during the past year.

The combined system has five omnibus garages and twenty-five carhouses. The first cover a total ground area of 18.8 acres and the second of 73 acres, about one-half of these carhouses being of recent construction and equipment. There are thirty-five electric substations, the most important containing also the administrative offices of the company.

For the construction, repair and upkeep of cars the company has a central repair shop occupying 19 acres, with departments as follows: Wood-working and body shop, wood storage depot, general machine shop, electrical wiring shop, erecting shop, electrical appliance



TYPICAL DOUBLE-TRUCK TRAIL CAR, PARIS

shop, paint shop and mechanical and chemical laboratory. All of these installations are fitted with modern machinery.

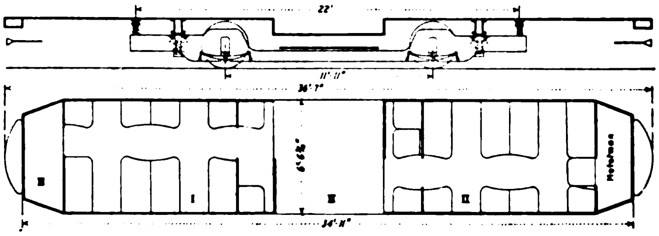
In addition there are four shops devoted to roadbed and other departments.

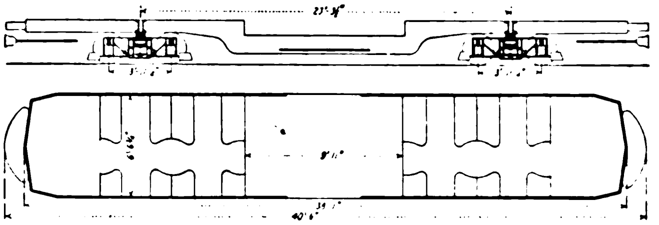
The length of track in operation is 621.4 miles. Of this mileage 93.21 miles has underground contact line and 528.2 miles has trolley contact.

The rolling stock is divided thus: Motor cars, 1,762; trailers, 832, and motor omnibuses, 1,050. Rolling stock under construction includes: Motor cars, 550; trailers, 300; motor omnibuses (four-wheel), 265; (six-wheel), 50; trackless trolley omnibuses, 6.

ELEVATION AND SEATING PLAN OF MOTOR CAR

Capacity, for first-class passengers, fourteen seats; second class, sixteen seats, nineteen standing places; total, 49. Weight, empty 32,700 lb., loaded 40,200 lb.; per passenger, 667 lb. dead weight.





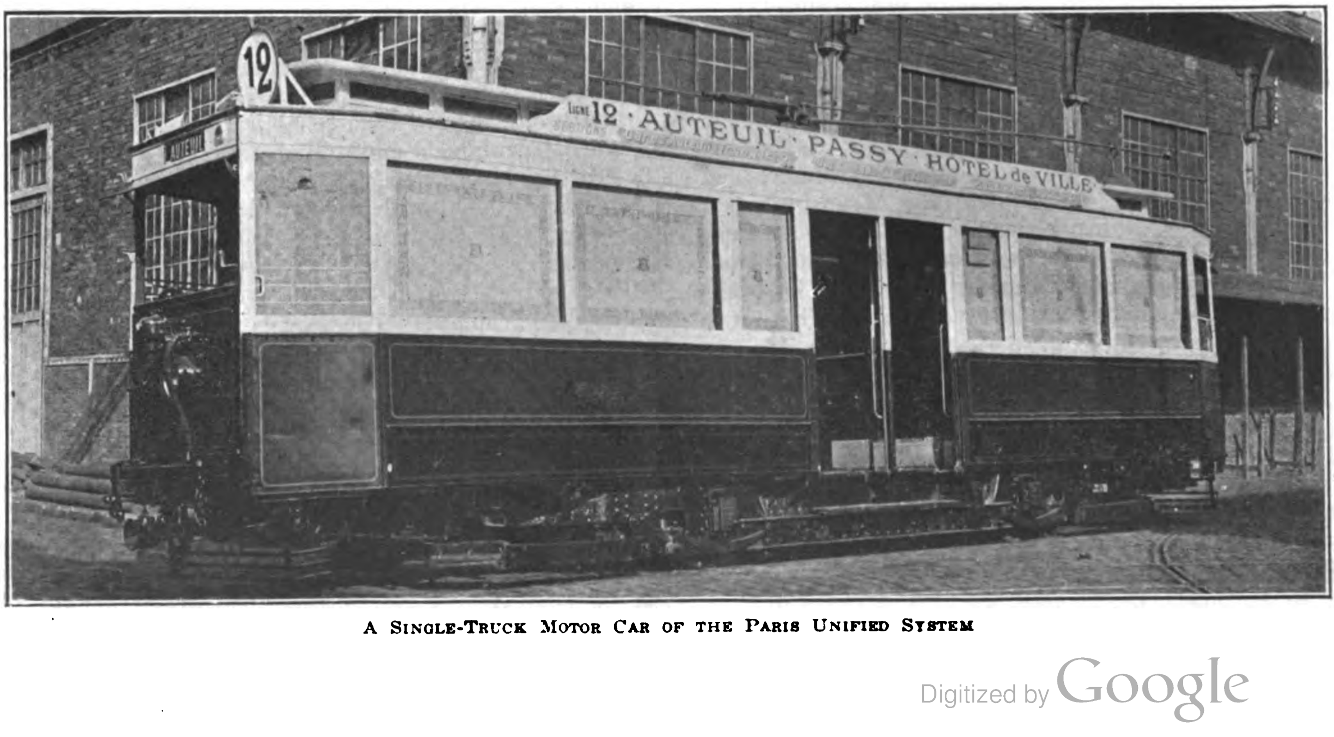
ELEVATION AND SEATING PLAN OF TRAILER

Capacity twenty-four seated and forty-five standing passengers, total sixty-nine, all second class. Weight, empty 18,500 lb., loaded 28,700 lb.; per passenger, 269 lb. dead weight.

The consumption of gasoline by automobile omnibuses per day is 15,852 gal. and the total energy consumption by electric cars is 200,000 kw.-hr. per day.

PARIS TRANSPORTATION FACILITIES INADEQUATE

Today, in spite of the half dozen lines of underground railway in the metropolitan district of Paris and the Belt Line Railway, which encircles the city along the old fortifications, omnibuses and street cars are full to overflowing. By the recent consolidation it has been possible to rearrange the lines to improve operating conditions and service at the same time. The practice was tried of charging higher fares in certain "luxury" neighborhoods, but this was not a success.



A SINGLE-TRUCK MOTOR CAR OF THE PARIS UNIFIED SYSTEM

Six of These Trolley Buses Are Used in the Suburbs of Paris

The same is true of fares of a franc or more from midnight on. The 1,050 omnibuses run on forty-two definite routes inside the city limits of Paris, and two supplementary lines are about to be put into service. The omnibuses do not now go outside the fortifications, but there are certain lines which are about to be extended into the suburbs.

Under the unified system it is possible to travel from Saint Germain and Versailles to the west of Paris, to Gourney and Montfermeil on the east, a distance of 22 miles. Another line runs from Montmorency and Pierrefitte to the north of Paris to Villejuif on the south, 17 miles or more. A change of cars in each case is necessary in the heart of Paris.

The river equipment was acquired from the old Bateaux Omnibus Company and included sixty-three boats, of which eighteen have been rehabilitated and are now in service between Maisons-Alfort above Paris and Auteil at the down-river limits. As this is written the service is about to be extended to Suresnes.

The latest figures available showing the data for a year's operation are given in the accompanying table.

DATA FOR ONE YEAR FOR PARIS UNIFIED TRANSPORTATION SYSTEM

	Vehicle-Miles (Approx.)	Total Receipts	Receipts per Mile, Cents	Passengers Carried	Receipts per Passenger, Cents	Passengers per Mile
Tramways........	53,000,000	$16,500,000	31.1	613,360,254	2.69	11.6
Omnibuses........	21,250,000	7,580,000	34.6	245,802,430	3.09	11.2
Seine boats.......	64,500	24,400	37.8	485,401	5.2	7.78

NOTE—Exchange in this table is taken at 9.2 cents per franc.

These figures worked out on a daily basis show that the motor omnibuses ran 60,000 miles per day and the tramcars 145,000 miles per day. The average number of passengers per day was 2,355,000, equivalent to practically 80 per cent of the entire Parisian population. The daily receipts were $69,000. The number of seats available is about 3,000,000 per day.

The entire services of the T. C. R. P. are under the direction of the president of a Council of Administration, M. Andre Mariage, assisted by a general secretary, a general manager of operation and a general manager of finance.

The personnel of the T. C. R. P. comprises a total of 28,000 persons, of which 6,500 are conductors and 5,500 are motormen.

Map Shows Power Stations and Transmission Lines

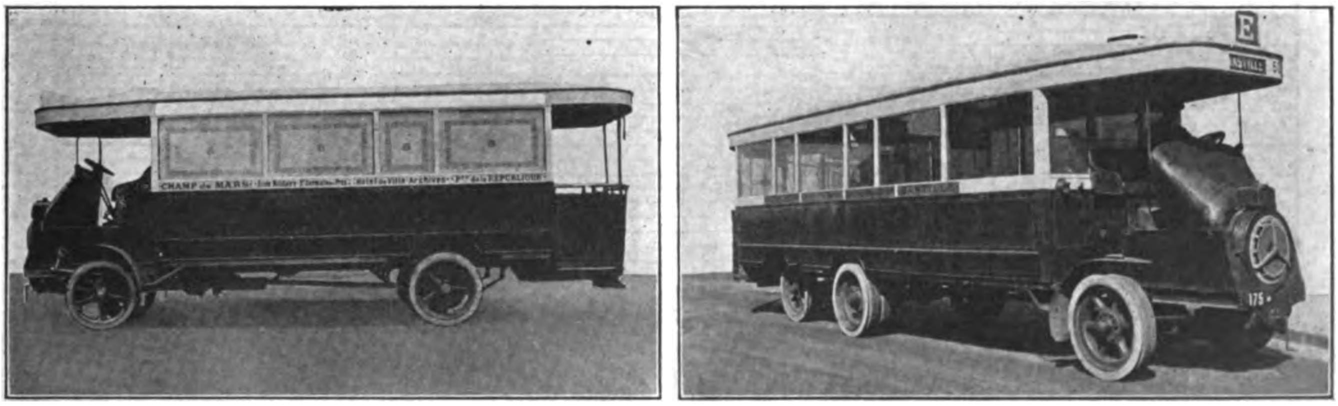
A NEW MAP of Virginia on a scale of 1:500,000, showing the location of the power stations and transmission lines used in public service and the names of the public utility companies, has just been published by the United States Geological Survey, Department of the Interior.

This map is one of the series of state power maps now being published by the Geological Survey. Maps have already been completed of New York, Pennsylvania, Massachusetts, Rhode Island, Connecticut, Maryland, Delaware, District of Columbia, Vermont, New Hampshire and New Jersey, and maps of Indiana, Maine and West Virginia are being prepared for publication. The maps available for distribution may be purchased from the Director of the United States Geological Survey.

These maps will be valuable to those who are interested in the interconnection of power plants, to manufacturers and many others.

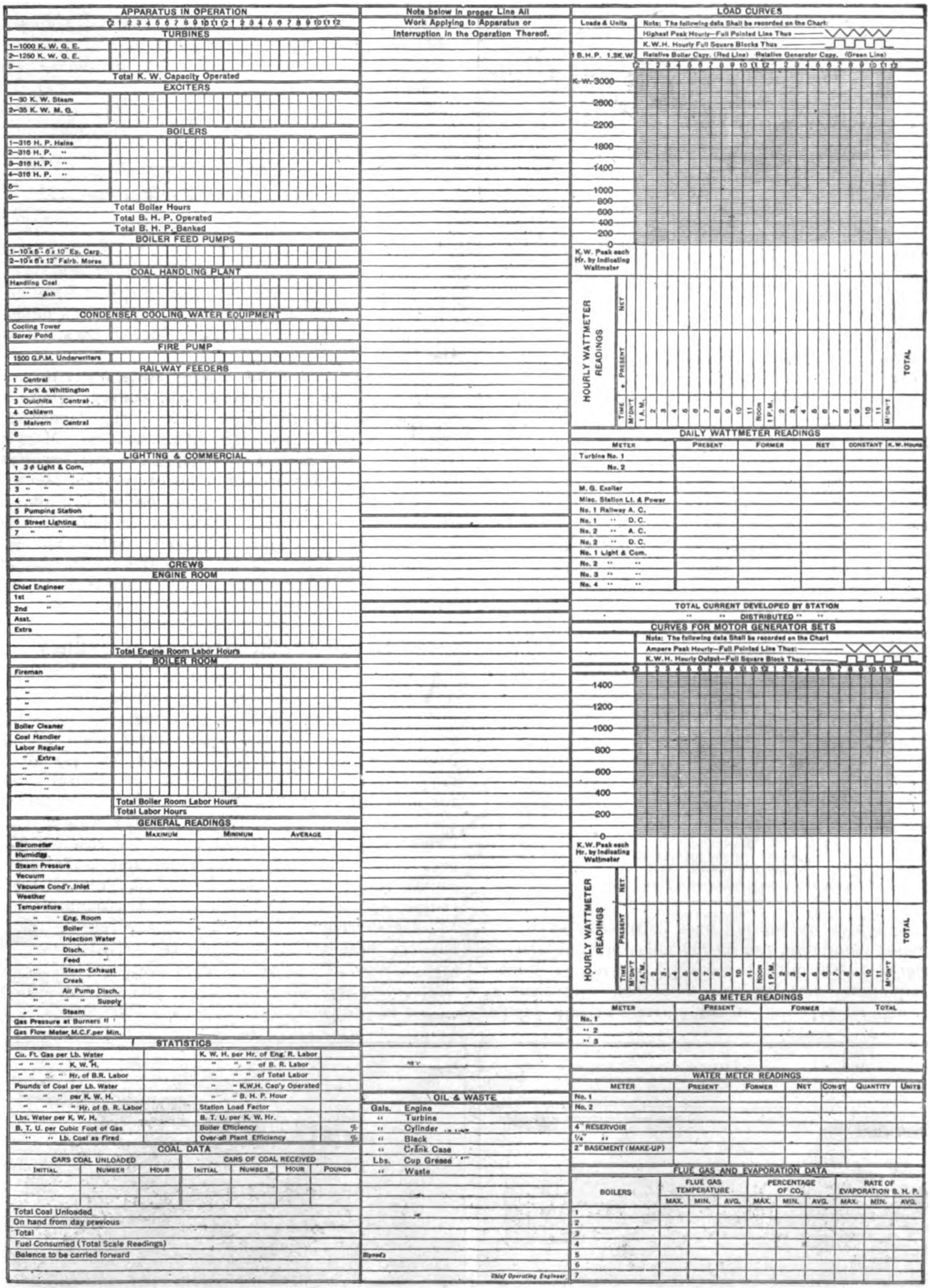
Large Traffic Records at Sydney

A FEATURE of the traffic at Sydney, New South Wales, is the business which comes for two weeks during the Easter period in carrying passengers to the racecourse and to the agricultural show grounds. There are meetings at the racetrack for four of these days and a special exhibit at the agricultural grounds for nine days. During the two weeks period this year the tramway system carried 13,075,925 passengers, the largest number ever carried and an increase of 187,286 over 1921. The fare to the racecourse is 2s. 3d. (54 cents) round trip, including 1s. 1d. entrance to the course, and to the agricultural show grounds it is 6d. (12 cents) round trip. The ordinary fare on the cars passing these places is 3d. (6 cents) each way. The system has 1,200 passenger cars available for this special service and also the ordinary city service, which of course has to be maintained during this period.



Motor Omnibuses Operated in Paris. At Left, Four-Wheel Bus Using Mixture of Benzole and Gasoline. At Right, Six-Wheel Bus, One of a Fleet of Fifty

Power Plant Log Sheet Used at Hot Springs, Ark.



APPARATUS IN OPERATION

12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12

TURBINES

1—1000 K. W. G. E.
2—1250 K. W. G. E.
3—
Total K. W. Capacity Operated

EXCITERS

1—30 K. W. Steam
2—35 K. W. M. G.

BOILERS

1—316 H. P. Heine
2—316 H. P. "
3—316 H. P. "
4—316 H. P. "
5—
6—
Total Boiler Hours
Total B. H. P. Operated
Total B. H. P. Banked

BOILER FEED PUMPS

1—10"x5"-6"x10" Ep. Carp.
2—10"x6"x12" Fairb. Morse

COAL HANDLING PLANT

Handling Coal
" Ash

CONDENSER COOLING WATER EQUIPMENT

Cooling Tower
Spray Pond

FIRE PUMP

1500 G.P.M. Underwriters

RAILWAY FEEDERS

1 Central
2 Park & Whittington
3 Ouichita Central
4 Oaklawn
5 Malvern Central
6

LIGHTING & COMMERCIAL

1 3φ Light & Com.
2 " " "
3 " " "
4 " " "
5 Pumping Station
6 Street Lighting
7 " "

CREWS

ENGINE ROOM

Chief Engineer
1st "
2nd "
Asst.
Extra
Total Engine Room Labor Hours

BOILER ROOM

Fireman
"
"
"
"
Boiler Cleaner
Coal Handler
Labor Regular
" Extra
" "
" "
"
Total Boiler Room Labor Hours
Total Labor Hours

GENERAL READINGS

	MAXIMUM	MINIMUM	AVERAGE
Barometer			
Humidity			
Steam Pressure			
Vacuum			
Vacuum Cond'r. Inlet			
Weather			
Temperature			
" Eng. Room			
" Boiler "			
" Injection Water			
" Disch. "			
" Feed "			
" Steam Exhaust			
" Creek			
" Air Pump Disch.			
" " " Supply			
" Steam			
Gas Pressure at Burners "			
Gas Flow Meter, M.C.F. per Min.			

STATISTICS

Cu. Ft. Gas per Lb. Water		K. W. H. per Hr. of Eng. R. Labor	
" " " " K. W. H.		" " " of B. R. Labor	
" " " " Hr. of B.R. Labor		" " " of Total Labor	
Pounds of Coal per Lb. Water		" " K.W.H. Cap'y Operated	
" " " per K. W. H.		" " B. H. P. Hour	
" " " " Hr. of B. R. Labor		Station Load Factor	
Lbs. Water per K. W. H.		B. T. U. per K. W. Hr.	
B. T. U. per Cubic Foot of Gas		Boiler Efficiency	%
" " Lb. Coal as Fired		Over-all Plant Efficiency	%

COAL DATA

CARS COAL UNLOADED			CARS OF COAL RECEIVED			
INITIAL	NUMBER	HOUR	INITIAL	NUMBER	HOUR	POUNDS

Total Coal Unloaded
On hand from day previous
Total
Fuel Consumed (Total Scale Readings)
Balance to be carried forward

Note below in proper Line All Work Applying to Apparatus or Interruption in the Operation Thereof.

OIL & WASTE

Gals.	Engine
"	Turbine
"	Cylinder
"	Black
"	Crank Case
Lbs.	Cup Grease
"	Waste

Signed:

Chief Operating Engineer

LOAD CURVES

Loads & Units

Note: The following data Shall be recorded on the Chart:
Highest Peak Hourly—Full Pointed Line Thus
K.W.H. Hourly Full Square Blocks Thus
Relative Boiler Capy. (Red Line) Relative Generator Capy. (Green Line)

1 B.H.P. 1.3K.W.

12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12

K. W. 3000 2600 2200 1800 1400 1000 800 600 400 200 0

K.W. Peak each Hr. by Indicating Wattmeter

HOURLY WATTMETER READINGS

NET
PRESENT
TIME M'DN'T 1 A.M. 2 3 4 5 6 7 8 9 10 11 NOON 1 P.M. 2 3 4 5 6 7 8 9 10 11 M'DN'T
TOTAL

DAILY WATTMETER READINGS

METER	PRESENT	FORMER	NET	CONSTANT	K.W. HOURS
Turbine No. 1					
No. 2					
M. G. Exciter					
Misc. Station Lt. & Power					
No. 1 Railway A. C.					
No. 1 " D. C.					
No. 2 " A. C.					
No. 2 " D. C.					
No. 1 Light & Com.					
No. 2 " "					
No. 3 " "					
No. 4 " "					

TOTAL CURRENT DEVELOPED BY STATION
" " DISTRIBUTED " "

CURVES FOR MOTOR GENERATOR SETS

Note: The following data Shall be recorded on the Chart
Ampere Peak Hourly—Full Pointed Line Thus:
K.W.H. Hourly Output—Full Square Block Thus:

12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12

1400 1200 1000 800 600 400 200 0

K.W. Peak each Hr. by Indicating Wattmeter

HOURLY WATTMETER READINGS

NET
PRESENT
TIME M'DN'T 1 A.M. 2 3 4 5 6 7 8 9 10 11 NOON 1 P.M. 2 3 4 5 6 7 8 9 10 11 M'DN'T
TOTAL

GAS METER READINGS

METER	PRESENT	FORMER	TOTAL
No. 1			
" 2			
" 3			

WATER METER READINGS

METER	PRESENT	FORMER	NET	CON-ST	QUANTITY	UNITS
No. 1						
No. 2						
4" RESERVOIR						
¼" "						
2" BASEMENT (MAKE-UP)						

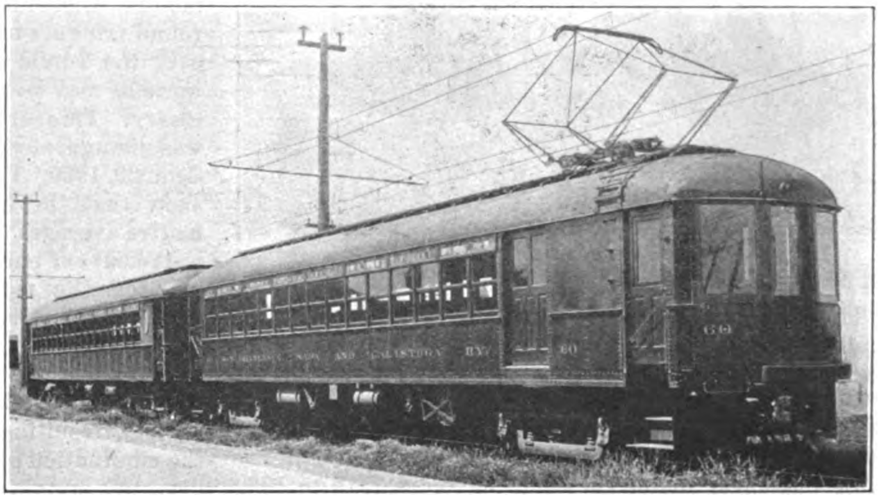
FLUE GAS AND EVAPORATION DATA

BOILERS	FLUE GAS TEMPERATURE			PERCENTAGE OF CO_2			RATE OF EVAPORATION B. H. P.		
	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
1									
2									
3									
4									
5									
6									
7									

This log sheet is used by the Citizens Electric Company, which furnishes power to the Hot Springs Street Railway, and by the other power companies controlled by the Federal Light & Traction Company. All of the data called for are entered on this blank and a copy of the sheet for each day is sent to the holding company in New York. The form makes a very complete one-sheet log. The sheet measures 13½ x 18½ in.

The Napa Valley Route

The San Francisco, Napa & Calistoga Railway Is a Successful Single-Phase California Electric System—In Connection with a Boat Line It Offers Through Service to San Francisco


Typical Passenger Train of Motor and Trailer Equipped with Four 100-Hp. Motors

THE San Francisco, Napa & Calistoga Railway operates 46.52 miles of electrified standard-gage track between the cities of Vallejo and Calistoga, Cal., in the Napa Valley, which is rich in agricultural and other natural resources. The southern terminal, Vallejo, is on the northern shore of San Francisco Bay, opposite the United States Navy Yard at Mare Island, the largest naval station on the Pacific Coast. At Vallejo, the railway company, under a long-term agreement with the Monticello Steamship Company, transfers passengers for San Francisco and points south to and from twenty trains daily. This is the quickest and most convenient service available to the traveling public in this territory. This is appreciated by the patrons of the road as is evidenced by the fact that although paralleled by a new state highway the full length of the route no material effects have been noticed in a reduction in passenger traffic.

The Mare Island Navy Yard, during the war, employed 9,000 people. Although somewhat reduced in activity at the present time, special commuters' trains are operated for those residing in Napa and other points along the line. The location of the line is shown on the map. The line from Vallejo to Napa was built in 1905. It was extended to St. Helena in 1908 and completed to Calistoga in 1912. The general office, shops and power house are located at Napa.

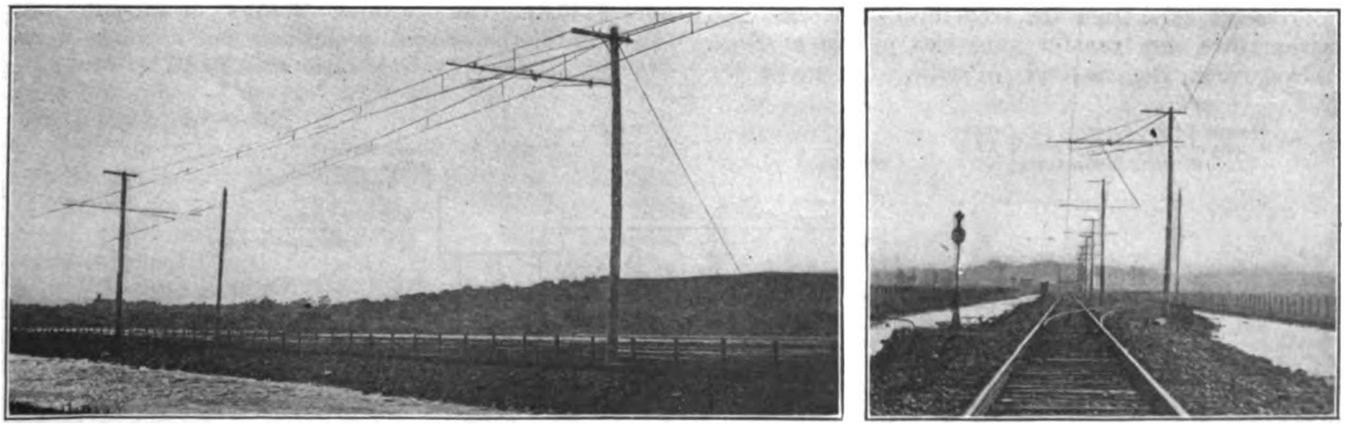
Trains consist of two to four cars, motors and trailers operated in multiple-unit trains. The power supply taken by the pantograph with steel slider from the No. 000 grooved overhead conductor is single phase, twenty-five cycle, 3,300 volts alternating current. The power is supplied at Napa by the Great Western Power Company at 2,300 volts, three phase, sixty cycles, to induction motor-generator sets and changed to single-phase, 25 cycles, 6,600 volts.

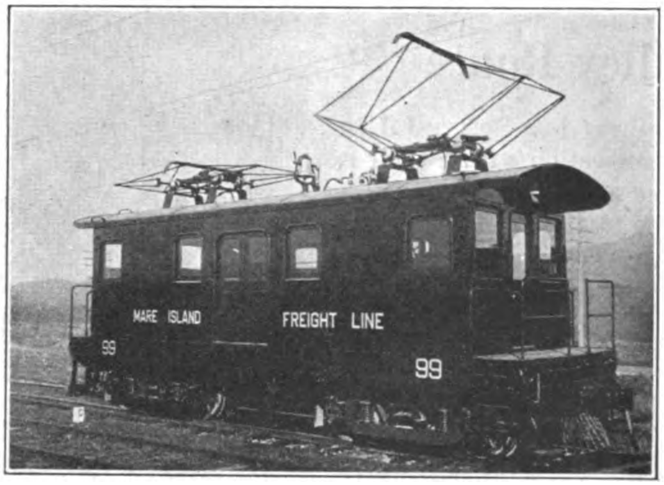
In the power station are one 800-kw. and two 400-kw. units. Transformers of 500 kva. capacity are located without attendance at Vallejo, 14½ miles distant, and at Rutherford, 15 miles distant. A similar transformer is located at Napa. Circuit breakers located at mid-points sectionalize the line so that section protection is afforded. The distribution system is shown in an accompanying illustration.

Recent records of power consumption show an average input of 102.4 watt-hours per ton-mile and average output of 64.8 watt-hours per ton-mile at the station, indicating a station efficiency of 63.3. The average power cost based upon the 1.06 cents per kilowatt-hour rate at the power supply busbar was for the same period 5.52 cents per car-mile of passenger service, which comprises most of the traffic.

The average cost of maintaining the No. 0000 feeders, No. 000 trolley, catenary suspension, poles, bonding, including labor and material, for the years 1915 to 1920 inclusive, was $68.60 per mile per year. This is an especially good record when the effects of the salt fog and marine climate are considered. No trouble is experienced from sleet or snow.

The rolling equipment consists of ten combination baggage and passenger motor cars, five trailers, two freight and express motor cars, one locomotive, one motor service car and twenty-two freight cars.


Typical Overhead and Track Construction on the New Cutoff Across the Vallejo Marsh


MARE ISLAND FREIGHT LINE
99
99

FIFTY-TON LOCOMOTIVE EQUIPPED WITH FOUR 100-HP. MOTORS

The standard passenger motor car is 56 ft. over all, seats fifty-four passengers and weighs 47 tons. The electrical equipment consists of four Westinghouse 132-A motors, 100 hp. each, with H.B. double-end control, capable of operating with one trailer at a speed of 50 to 55 m.p.h. The average cost of maintaining these passenger motor cars for the years 1915 to 1920 inclusive, I. C. C. accounts 30 and 33, was 2.83 cents per car-mile. The electrical equipment cost average for the same period was 1.12 cents per car-mile. These costs are shown by years in an accompanying table.

TABLE GIVING THE COST OF MAINTENANCE OF EQUIPMENT, PASSENGER MOTOR CARS, IN CENTS PER CAR-MILE

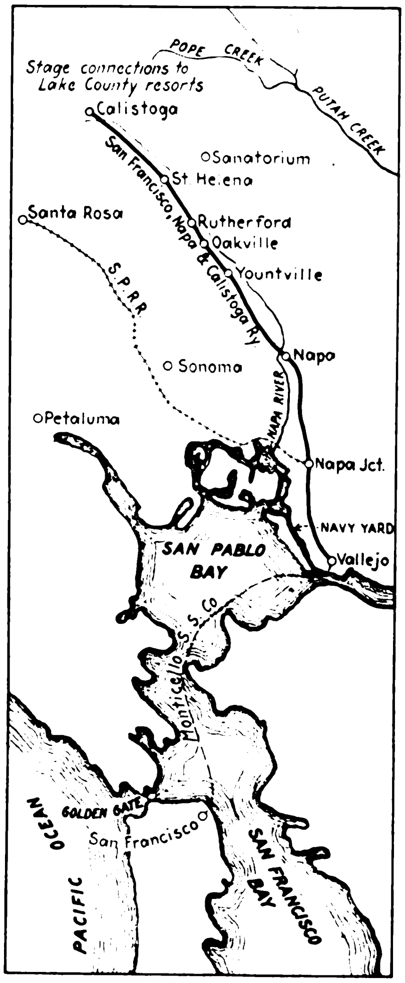
Year	I. C. C. Account 33 Electrical Equipment	I. C. C. 30 Bodies and Trucks	Total Cost
1915	1.29	1.45	2.74
1916	1.11	1.96	3.07
1917	0.76	1.72	2.48
1918	1.09	1.84	2.93
1919	1.26	1.41	2.67
1920	1.12	1.71	2.83

It has been necessary to purchase but two complete sets of armature coils for the forty 132-A motors since 1908, all necessary repairs being made in the company's shops. The motor cars have averaged about 500,000 miles each since being put in service.

To expedite freight movement to the Mare Island Navy Yard, a causeway was built by the U. S. government between Mare Island and Vallejo. To connect with this, the San Francisco, Napa & Calistoga Railway and the Sacramento Northern Railroad built a 3,000-ft. extension from North Vallejo connecting exclusively with the tracks on the causeway. This extension was electrified, as was also 6,000 ft. of terminal trackage on the island.

To receive cars from the transcontinental railroads a seventy-five car transfer yard was put in at Napa Junction with the Southern Pacific. To move the freight, a 50-ton locomotive was designed and constructed in the company shops. This is equipped with H.B. control and four Westinghouse 132-A, 100-hp. motors. One or more round trips are made over the 7-mile distance as may be necessary. This service was inaugurated on Sept. 20, 1920. Tests show that the locomotive averages 32.8 watt-hours of energy per ton-mile moved at the locomotive.

During 1921 a 3,200-ft. cutoff was constructed north of Vallejo, resulting in the elimination of 53 deg. of curvature. This track was rock ballasted and 75-lb. A. S. C. E. standard rail, continuous joints and bonds on both rails were used. The overhead trolley is of latest catenary construction, the conductor being 22 ft. above the rail.


Pope Creek
Putah Creek
Stage connections to Lake County resorts
Calistoga
Sanatorium
St Helena
Santa Rosa
Rutherford
Oakville
Yountville
San Francisco, Napa & Calistoga Ry
S.P.R.R.
Sonoma
Napa
Napa River
Petaluma
Napa Jct.
Navy Yard
Vallejo
San Pablo Bay
Monticello S.S. Co
Golden Gate
San Francisco
Pacific Ocean
San Francisco Bay

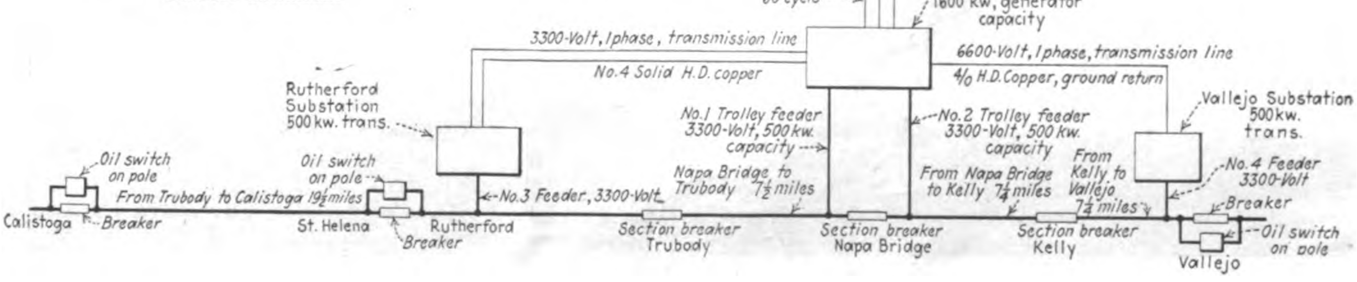
MAP OF ROUTE

In the general manager's office a Type M graphic wattmeter, 3,000 volts, 800 amp., 2,400 kw., with a curve sheet 2 in. per hour, is installed for checking power consumption. With this device it is possible to tell to the minute when trains leave the terminals and how they are handled by the engineers.

Six through trains are run each way from Vallejo to Calistoga and three additional trains each way between Vallejo and Napa. In addition there is a local service between Napa and Napa Heights, a thirteen-minute run.

Statistics for the year 1920 follow: 661,000 revenue passengers were hauled; the passenger car mileage was 367,000; the freight car mileage was 119,000; the passenger revenue was $298,184, with an average fare per passenger of 45.2 cents; the total operating revenues were $345,812; the operating revenue per car-mile was 71.19 cents; the operating expenses per car-mile were 40.1 cents; the operating ratio was 56.25.

DISTRIBUTION SYSTEM SHOWING LOCATION OF SUBSTATIONS AND CIRCUIT BREAKERS


G.W.P.Co. Input 2200-Volt, 2phase, 60 cycle
Napa Station 1600 kw, generator capacity
3300-Volt, 1phase, transmission line
No.4 Solid H.D. copper
6600-Volt, 1phase, transmission line
4/0 H.D. Copper, ground return
Rutherford Substation 500 kw. trans.
No.1 Trolley feeder 3300-Volt, 500 kw. capacity
No.2 Trolley feeder 3300-Volt, 500 kw. capacity
Vallejo Substation 500 kw. trans.
Oil switch on pole
Oil switch on pole
From Trubody to Calistoga 19½ miles
No.3 Feeder, 3300-Volt
Napa Bridge to Trubody 7½ miles
From Napa Bridge to Kelly 7¼ miles
From Kelly to Vallejo 7¼ miles
No.4 Feeder 3300-Volt
Breaker
Oil switch on pole
Calistoga
Breaker
St. Helena
Breaker
Rutherford
Section breaker Trubody
Section breaker Napa Bridge
Section breaker Kelly
Vallejo

Chinese Cities to Have Electric Railways

Tardy Development of Transportation Systems in the Far East Republic Is Due to the Social as Well as the Economic Conditions of the Country

WITH the exception of the international settlements, such as Shanghai, Tientsin and Hankow, there is no city in China which has electric tramway service. In the settlements mentioned the tramway services have been inaugurated by foreign companies in connection with their municipal concessions. The present condition exists in spite of the fact that there are many native cities in China estimated to have a population in excess of a million and the layout of which appears to be favorable to tramway service.

The greatest single obstacle to the development of street car service in China is said to be the rikisha coolies, who might be called a national institution. These men furnish the popular transportation by means of the two-wheel vehicle known as the jinrikisha.

THE SITUATION IN PEKING

Although Peking, the capital of China, has an estimated population of 2,000,000, including a large foreign population, the installation of a tramway has been prevented largely due to the opposition of the jinrikisha men, who are estimated to number 30,000. A French company has finally succeeded, however, in securing a franchise, in co-operation with Chinese, for a tramway system in Peking. The municipality has overcome opposition by furnishing municipal shops in which the jinrikisha coolies will be trained free in mechanical trades.

The last setback to the execution of the tramway plan was the failure of the Banque Industrielle de Chine, a French bank, which was backing the proposition. When the bank advertised the tramway stock for sale, the issue was immediately oversubscribed, but the bank soon after went into the hands of a receiver. Chinese interests have now succeeded in swinging the proposition, and specifications have been isued for the equipment. According to present hopes the tramway will be a fact within a year.

The Peking tramway system will draw its power from a new power plant to contain one 1,800-kva. and two 900-kva. turbo-generators, equipped with modern auxiliaries. Steam will be furnished by Babcock & Wilcox boilers, with superheaters and economizers. The stokers will be of the chain-grate type, also B. &. W. make. As the water available is liable to form scale, a special evaporator plant will be installed to insure a supply of make-up water of pure quality.

There will be at the outset two rotary converter substations, with rotaries of 225-kw. and 375-kw. capacity, drawing power from the central station at 5,250 volts, three-phase, 50 cycles.

The line to be equipped now will be single track and its length nearly 25 miles. It will be of one meter (3 ft. 3.4 in.) gage. The rails will be of the grooved type, weighing 90 lb. per yard. The entire line will be single track, with forty-six turnouts.

The initial rolling stock will comprise sixty motor cars of the single-truck type. These will be 29 ft. 6 in. long and 6 ft. 6 in. wide, and will have each a seating capacity of sixteen second-class and eight first-class passengers. Each car will be equipped with two 25-hp. motors and will be geared for a free running speed of 10.5 m.p.h. The company has a tender also for thirty 3¾-ton trailers.

The tramway system will be supplied with the necessary shops for maintenance work.

HARBIN WILL HAVE A TRAMWAY ALSO

The second large city in China which has prepared specifications and invited bids for a tramway system is Harbin. The company is Chinese and a Russian engineer is engaged on the details.

Harbin is made up of three sections, the Chinese city, the Russian city and the "new city," separated by considerable distances. The tramway will furnish much needed transportation from one part of the city to the other.

Harbin will also have a special tramway power plant, comprising two 2,500-kw., 6,000-volt turbo-generators, with the usual auxiliaries. Babcock & Wilcox boiler-plant equipment will be used here also.

One substation will be located in "New Town" and the other in the Russian city, while the central station will be in the Chinese city. Each substation will contain two 500-kw. rotary converters with the usual transformers and other accessories.

There will be in Harbin 8 miles of single track, with forty sidings, and meter gage will be used as in Peking. The initial equipment comprises ten forty-passenger motor cars and twenty trailers.

THE PROPOSED TSINANFU TRAMWAY

The third tramway proposition in North China has not yet reached the advanced stage of the two mentioned, but definite plans are in preparation for a system for Tsinanfu. This city is in the Province of Shantung and its population is about 1,000,000.

The promoters here are meeting considerable difficulty due to the fact that the streets are very narrow. Practically the only street wide enough at present to accommodate a tramway is the main street connecting the railway station of the Tientsin-Pukow line with that of the Tsinanfu-Tsingtau line. The present project is to widen the other streets to facilitate the building of the tramway and capital has already been subscribed for this purpose.

The present plan in connection with this project is to secure power from a distance, the idea being to build a power plant at the Shantung coal mines.

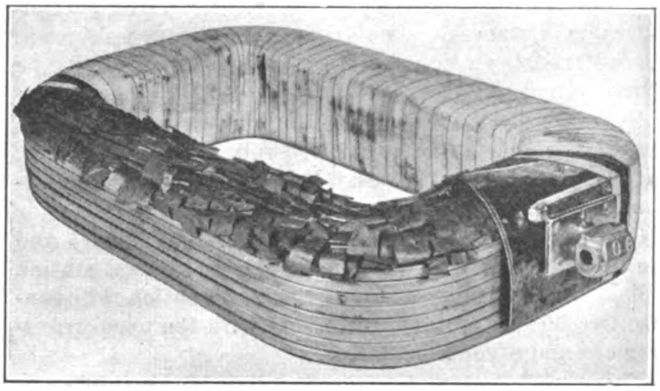
Information available leads to the conclusion that the equipment for the Peking and Harbin tramways will be supplied by American manufacturers, but the Tsinanfu contracts are likely to go to Germany on account of the still great German influence which is exerted in the Province of Shantung.

The information on which the above article is based was supplied from Tientsin by S. Grossbard, industrial and consulting engineer, who has offices in that city and in Shanghai, as well as in New York City.

In the description of the improved Thermit insert rail weld published in the *Electric Railway Journal* for June 3 an error occurred in the original manuscript in the paragraph headed "Nature of Test," under Test No. 2. In the sentence including the words "Two 10-ft. square billets," this should have read "Two 10-in. square billets."

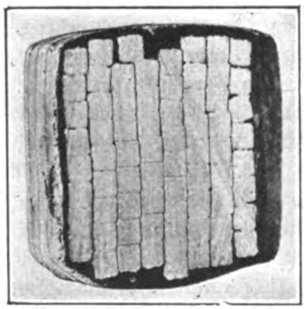
Aluminum Field Coils for Replacing Copper Save 60 per Cent Weight

WHAT is claimed to be an important step in the reduction of motor and car weights has lately been placed on the market in the form of an aluminum wire field coil insulated by a special process. The Lind aluminum field coil was manufactured in Sweden and Germany for nearly ten years before the war. The plants were closed out by the war and the manufacturer, about a year ago, re-established himself in Kansas City. Since that time some fifty electric railways have purchased these coils. The Economy Electric Devices Company, Chicago, has recently been made the general sales agent for this product, which will now be manufactured for general use in the electric railway field.



HOW COILS ARE WOUND WITH PAPER STRIP INSULATION BETWEEN LAYERS

The principal advantages claimed for this coil are high insulation qualities and low weight. It is easily possible, by renewing coils on some cars, to reduce the weight a ton on interurban equipment and 600 to 1,200 lb. on city equipment. The electrical characteristics of the coil are identical with the coils which they replace, coil for coil. The heat-carrying capacity is said to be higher and the external contours and dimensions and terminals are identical with copper coils. In other words, a copper coil may be lifted and an aluminum coil installed without any changes in motor characteristics or any connection or circuit adjustments.



SECTION THROUGH ALUMINUM FIELD COIL

The high insulating qualities are obtained by the use of square aluminum wire corresponding in carrying capacity with copper wire but insulated by a coating of aluminum oxide rather than by cotton. This is said practically to eliminate internal shorts due to overheating or moisture.

The accompanying pictures show the appearance of a main coil for a Westinghouse 306 motor, in section and opened up to expose the paper insulation between layers. This coil is first wound of bare square aluminum wire without separation between turns, but with the clipped paper separating each layer. The terminal arrangement and insulation with mica is similar to copper coils, a tinning with aluminum solder preventing electrolysis at the terminals.

COMPARISON OF COPPER AND ALUMINUM FIELD COIL WEIGHTS

Type of Coils	Weight per Coil: Copper, Lb.	Weight per Coil: Aluminum, Lb.
W. H. 306 Main	42½	17½
W. H. 306 Interpole	23	9
W. H. 506 Main	11	5
W. H. 506 Interpole	13	5½
W. H. 49 Main	46	21
W. H. 121 Main	62½	22½
G. E. 57 Main	103	33¾
G. E. 67-70-80 Main	53	21½
G. E. 55 Large	216	56½
G. E. 55 Small	127	32¾
G. E. 58 Main	68	28
G. E. 73 Large	147	38½
G. E. 73 Small	114	21
G. E. 201-G Main	44	20
G. E. 216 Interpole	25	10½
G. E. 203 Main	51½	20¾
W. H. 92-A Main	64	22
A. C. I. R. 50	69	29
G. E. 264-A Interpole	10	4½

After being wound, the bare coil is heated and then immersed in the oxidizing solution. Next it is heated and dipped in an insulating varnish solution. Then it is externally wrapped with webbing, oiled bias linen, and again with webbing. The final treatment is dipping and baking in the insulating varnish.

The manufacturer states that none of the more than 500 coils in service in this country during the past year has yet had an internal failure, and there have been but three cases of external failure, all of which were due to mechanical damage of the wrapping.

Letter to the Editors

Trackless Trolleys Don't Injure Pavements

CITY OF NEW YORK
DEPARTMENT OF PLANTS AND STRUCTURES
NEW YORK, June 26, 1922.

To the Editors:

My attention has been called to an anonymous letter in your issue of April 29, headed, "The Ruthless Trackless Trolley. It is is Destroying the Roads."

I am sure that you will be glad to be advised that this is absolutely untrue, and to print the facts.

The letter referred to is based upon appropriations for paving two public streets on Staten Island over which this department is operating trackless trolley lines. Here are the facts.

Bradley Avenue, over which a line to Sea View Hospital operates, has never been paved. It is a dirt road surfaced with macadam. The layer of stone is so thin that every spring the water from the hillsides wells up through the roadway. The trackless trolley cars did not destroy this road, they merely encountered an annual condition incident to the spring thaws. The Board of Estimate has decided to lay a concrete roadway on Bradley Avenue. This is an improvement that would have been necessary without the trackless operation.

Richmond Turnpike has a concrete roadway from Meiers Corner to Bulls Head. It was intended to continue this concrete highway to Cartaret Ferry Terminal at Linoleumville long before the trackless trolley system was thought of. The appropriation for this work, therefore, is not the consequences of the trackless trolley operation, but I did ask to have this work hurried in order to provide better going for trackless trolley cars.

This highway is one of the two arteries for automobile traffic crossing Staten Island to points in New Jersey and beyond and it would have to be properly paved whether or not there were any trackless trolley cars in existence.

The city of New York has not found that "there is virtue in trolley tracks." On the contrary, they are an obstruction. Good pavements cannot be maintained on highways on which trolley tracks are laid. It is misleading to argue that "good roads cost as much as good tracks." The cost of the tracks is an added factor. Why make this additional and unnecessary outlay? The trackless system developed by this department is a practical economy in that it saves the entire cost of track construction, reduces the cost of maintenance of the pavement and makes the whole area of the pavement available for vehicle traffic. GROVER A. WHALEN,
Commissioner of Plant and Structures.

The Passenger-Density Idea of Service Standards

NEW YORK, June 22, 1922.

To the Editors:

The difficulty of using any particular standard automatically to define good service is brought out not alone by the fantastic no-seat no-fare ordinances that mushroom occasionally, but also by regulations that have been most carefully thought out. As an example of the latter kind take Memphis, whose practices were detailed in the May 13 issue of the *Journal*. There the standard of service is set at "not less than 0.155 nor more than 0.185 passenger car-miles for each revenue passenger carried" or, stated conversely, the passenger density per car-mile is permitted to vary between 6.4 and 5.4.

Naturally, this was worked out only for Memphis conditions as to needed frequency of service, capacity of car and other factors. For general acceptance it would certainly not do even as well as the cruder rules which set service standards by defining the longest headways in off-peak hours and the permissible proportion of standing to seated passengers in rush hours. The trouble with these and other schemes is that they are likely to penalize a railway which discovers that there are ways and means of filling empty seats through building up off-peak travel.

The passenger car-mile effect of the weekly pass in Youngstown is a case in point. In the weeks of September, 1921, immediately preceding the pass, the rides per car-mile ranged between 4.90 and 5.11; by March and April, 1922, they had risen to 6.5. So far from representing a decrease in the quality of the service, there was actually a considerable improvement in the off-peak headway of certain routes through the addition of safety cars. What happened was this: Only 15 per cent more car-miles with smaller cars had been added to meet a 50 per cent increase in riding, but loading standards did not suffer because by far the greater part of the increased riding had come in the off-peak hours. While the density per car-mile indicates less service, the shortening of the headway really produced greater service. So, in this instance, recourse to the Memphis plan would be misleading. If the loading of electric railway cars was fairly consistent through all the hours of the day, the density plan would be self-explanatory, but as the loading of electric railway cars is of most disheartening inconsistency, we must seek supplementary methods for judging a management's ability as well as the character of its service. What better method can there be than its attraction of more and more customers at livable rates of fare? Surely, any demonstrated increase in traffic secured during the hours when people do not have to use the company's service is pretty good proof that the people are satisfied with that service. WALTER JACKSON.

Strict Discipline Advocated by Employee

PORTLAND, ORE., June 15, 1922.

To the Editors:

It seems to be a popular theory that most men engaged in operating trains or cars resent strict discipline and equipment examinations. This is a mistake. Judging from a twelve-year contact with fellow employees on street and interurban electric railroads, I wish to say that the majority of the men believe in strict discipline and technical examinations. I know this because I have talked with trainmen on this subject in various parts of the country.

There is a reason for this. A man working for a road that insists on its rules being obeyed and that also requires him to take technical examinations is more proud of his job. He feels it requires a special effort on his part to get and hold this job. However, if conditions are the opposite, he rapidly gets into a rut and is interested only in drawing his pay for the least possible effort. This of course is bad for the company and the employee as well, and never fails to end in time with the expenditure of many hard-earned dollars for accident claims, etc.

Furthermore, on a road with lax discipline, where say 75 per cent of the men disobey certain rules frequently, it is almost impossible for the other 25 per cent to obey them and get the trains over the road. In fact, many times it is impractical and unsafe for a minority of men to obey the rules. I have seen serious accidents caused by one train crew obeying the company's rules and another running its train according to its own ideas, the conflict between the two methods causing the wreck.

There are two kinds of discipline, the kind applied by a superintendent who believes in kindness and fairness and the kind where the superintendent rules with a mailed fist. I believe the first method is the best; that is, if the superintendent does not allow his kindness to supplant firmness!

I have always advocated strict discipline and equipment examinations, because that is the right way—the way that saves lives and dollars.

GEORGE W. BOOTH,
Interurban Motorman.

Trainmen's Guide Book

THE Pacific Electric Railway in the intensive operation of its 1,100 miles of interurban and local street car lines in four counties in southern California, in Los Angeles and some fifty-two surrounding cities and towns has just issued a new 260-page guide book containing the names and locations of stops, cross streets, churches, theaters, banks, parks, and all other points of interest on or adjacent to lines of the company. The book is being distributed to all conductors and agents to enable the furnishing of accurate information to the public. This guide was compiled by the passenger traffic department of the company under the direction of O. A. Smith, passenger traffic manager.

Electric Railway Publicity

Devoted to How to Tell the Story

Smoothing Over the Little Things

R. N. Hemming, Superintendent of Transportation of the Indiana Service Corporation, Tells How His Company Does It

By Frank H. Williams

When the Indiana Service Corporation, Fort Wayne, Ind., gets kicks on its service or anything of that sort, R. N. Hemming, the superintendent of transportation, makes personal visits to the kickers to iron out the difficulties. Visits of this kind take a lot of time. Moreover, they appear to be an expensive proposition until it is realized that on practically every such visit a kicker is turned into a booster for the company.

Recently when this corporation started its new weekly pass system some patrons felt they had real grievances when the car operators refused to give them transfers unless they asked for them at the time of paying their fares.

"Of course," said Mr. Hemming, "our side of the case was perfectly sound, but not all our patrons could see it. Before the start of the weekly pass system our car operators had been allowed to become quite lenient in the matter of giving transfers. In fact, in many instances this leniency got to the point where at transfer points the operator was not only busy taking in fares, but was also busy giving out numerous transfers to folks who forgot to ask for them at the time of paying their fares.

"But with the starting of the weekly pass system we had to stop all this. It is plainly evident that since we gave no transfers on passes, the operators could not be asked to distinguish among the passengers those who had come in by passes and those who had paid their fares in cash or tokens. So if the operators had been allowed to continue giving transfers after the time fares were paid it would have been an easy matter for persons with passes also to get transfers.

"Consequently we issued airtight rules that no transfers were to be issued except at the exact moment of paying fares.

"As the result of this ruling we got some kicks, but not such a great number at that. Among the kickers was a prominent Fort Wayne merchant who had been refused a transfer and who as the result of this refusal told us he was going to dispense with our light and power in his store. He declared that he had a perfectly legitimate kick because he had been riding on the same line with the same operator at the same hour of the day for months, the operator knew him perfectly and knew that he did not have a pass, but paid his fare by tokens.

"I went around to see this man and this is the way I put the proposition up to him:

" 'By forgetting to get your transfer at the time of paying your fare you are out 7 cents, or a token. But if that car operator had discriminated among all the passengers and given you a transfer when he refused it to other passengers under similar circumstances it might have cost him $15.

" 'You are a big employer of help. You realize that your business must be conducted in an orderly, systematic manner. You know that you must have certain rules and regulations which must be strictly followed by the people you employ. If they didn't follow these rules you know that your store would soon be disrupted and your business shot to pieces. The same thing holds true with us. We've put this rule into effect for good reasons and we are enforcing it with suspension which means real cash to the operators. So you can see just why that operator refused to give you that transfer. It meant bread and butter to him to abide by our rules and not discrimination in your favor. So you see that eliminates this operator and brings your kick right up to the company itself.

" 'Now I am going to tell you just why the Indiana Service Corporation has been forced to make the car operators live up to this rule of ours of refusing to give transfers to people after the time they pay their fares.

The Kicker Convinced

" 'I think you can plainly see that we cannot afford to give transfers to people who carry weekly passes. These passes entitle people to ride at any time, anywhere on local lines. Consequently it costs them nothing to transfer from one line to another. They simply show their passes a second time. Suppose, now, that we did give transfers to people who owned passes. What would then happen? These pass owners, having no use for the transfers themselves, might drop them on the street or give them to friends or relatives, thus allowing people who had paid no fares and bought no passes to ride on our car lines and in this way cut down our revenues.

" 'If operators were allowed to give transfers after the time passengers had paid their fares it is evident that pass owners might impose on the operators—who, of course, couldn't remember which passengers had paid cash and which hadn't—and in this way secure transfers to which they were not entitled.

" 'Now, further, I think you will agree with us when we say that this rule must be enforced strictly with all passengers. We cannot discriminate and say that the rule must not be enforced against YOU, for instance. To start such discriminating would soon arouse such a storm of protest that all the good will we have built up for the company would be swept away. If you, for instance, should issue orders that certain of your customers were to be discriminated against in favor of others, you'd soon drive away all your other customers, wouldn't you? You understand the point. It isn't necessary to say anything more about it.

" 'And now,' I concluded, 'I hope I've made the whole thing clear.'

" 'You sure have made it clear and your operators and your company are absolutely right about it. If I forget to get my transfers at the proper time after this I'll simply pay my extra 7 cents and forget it.'

"Of course we'll have no further kicks from this individual. And, in fact, it is pretty certain that from being a kicker he will now become a consistent and constant booster for our company.

"That's the big value we find in going out and having personal talks with folks who kick on our rules or regulations or on our service. By doing so we give the company a personality which it may never before have had to the kicker. The kicker may have considered the company merely a soul-less corporation and may never before have realized that the corporation is made up of a lot of earnest men trying to give the public good service. This makes the kicker sit up and take notice. And then when we go over his kick carefully and show him where he's wrong or how we have changed things so he has no further cause for kicking, or iron out the difficulty in some reasonable, satisfactory way, we nearly always make boosters out of the kickers."

The company has gone even farther than this. Recently it got out a little booklet giving the schedules for the different lines, telling when the first and last cars leave the ends of the lines, how frequently the cars run and so on. And this booklet is just to give the right information to the few people who still seem to believe that cars are run at the caprice of the operators or the executives and not on schedule.

"Personal calls on kickers," concluded Mr. Hemming, "are a splendid way of smoothing out knockers and increasing the good will of the general public for the corporation."

Aren't there some suggestions in all this for the executives of other companies?

Meet Mr. Passerkin of Youngstown!

WHEN the Youngstown (Ohio) Municipal Railway decided to introduce the unlimited-ride, transferable weekly pass, Garret T. Seely, president, must have suggested to Frank Wert, manager of the department of public relations, that he go ahead and push the pass as if the company really believed in it—and Frank did and has continued doing so with a new slant or slope every once in a while to keep interest at pass-buying heat.

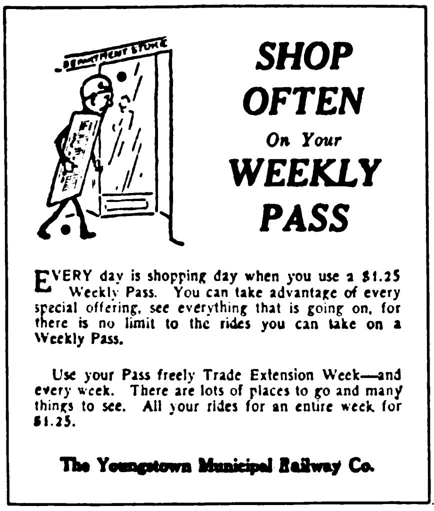
First, of course, came the introductory newspaper advertisements preaching the doctrine of a wholesale price for wholesale use. Just 4,211 patrons fell under the spell in the first week (Oct. 3, 1921) and put down their $1.25 in advance of a week's riding, and having done so, they naturally refrained from taking a jitney just because the street car was a block or two behind.

Second, came and continued a series of car-window placards through which Frank Wert finds new reasons for using the pass and for boosting every worth-while cause that comes along—be it go-to-church Sunday, the Community Chest, the ex-Service Men's Employment Bureau, the flowers that bloom in the spring at Idora Park, etc. And don't those boosts make friends! Just mention going back to the old "buy-a-ride-at-a-time" scheme and hear what the Youngstowner will splutter in protest.

Third, was a series of newspaper advertisements through the fall and winter, telling owners of private automobiles a great many sound reasons why a pass for all the rides they wanted at $1.25 a week was better than freezing their noses and batteries in the cold blasts. This advertisement must have been effective, for even as late as the week beginning May 1 the pass actually hit the record sale of 7,211. Seems to show that Frank's advice about "Your pleasure car for pleasure, your street car for business" has hit home. In fact, the pass has helped to make the street car a pleasure-riding proposition, too.

And now comes his latest idea—a personality whom we will name Mr. Passerkin, since he personifies the possibilities of a person with the pass. Observe the bright little newcomer. His body is rather rectangular and his legs rather spindly, but then he doesn't have to walk a block, you'll remember. His cap, being the famous Phrygian liberty top-piece, is decidedly apropos because freedom to board any car any time any distance is the pleasant privilege of every passholder. Mr. Passerkin is making his appearance in 4½-in. x 5-in. newspaper announcements. In one, he is seen enjoying 100 per cent Passerkin home cooking for luncheon; in a second, he is slipping into a department store to give some bargains the once-over or several times over, as it costs no more for fare to do the latter, and in a third he tells the Youngstown world that the pass is good for every purpose and that it is transferable, too.

Yes, sir, even the press-famed Mayor Oles has told the citizenry that the more they patronize the street railway, the better the chance of getting a lower fare. Selah!

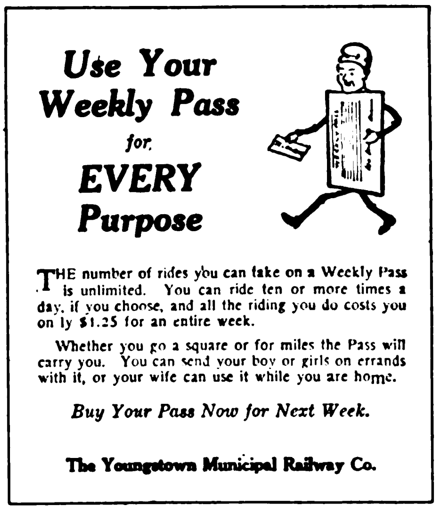


SHOP OFTEN On Your WEEKLY PASS

EVERY day is shopping day when you use a $1.25 Weekly Pass. You can take advantage of every special offering, see everything that is going on, for there is no limit to the rides you can take on a Weekly Pass.

Use your Pass freely Trade Extension Week—and every week. There are lots of places to go and many things to see. All your rides for an entire week for $1.25.

The Youngstown Municipal Railway Co.



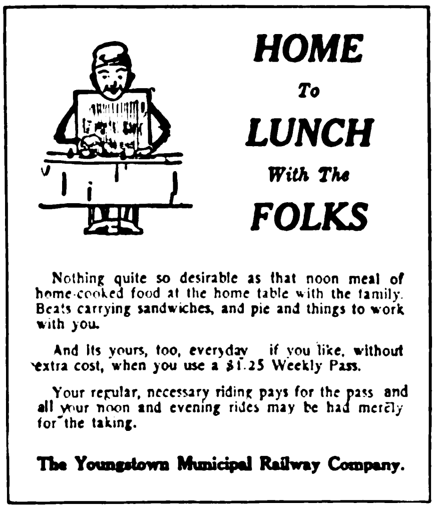
Use Your Weekly Pass for EVERY Purpose

THE number of rides you can take on a Weekly Pass is unlimited. You can ride ten or more times a day, if you choose, and all the riding you do costs you on ly $1.25 for an entire week.

Whether you go a square or for miles the Pass will carry you. You can send your boy or girls on errands with it, or your wife can use it while you are home.

Buy Your Pass Now for Next Week.

The Youngstown Municipal Railway Co.



HOME To LUNCH With The FOLKS

Nothing quite so desirable as that noon meal of home-cooked food at the home table with the family. Beats carrying sandwiches, and pie and things to work with you.

And its yours, too, everyday if you like, without extra cost, when you use a $1.25 Weekly Pass.

Your regular, necessary riding pays for the pass and all your noon and evening rides may be had merely for the taking.

The Youngstown Municipal Railway Company.

A FEW OF THE EFFECTIVE ADVERTISEMENTS USED IN THE YOUNGSTOWN CAMPAIGN

Transit Planning for Cities*

The Author Declares that Transit Development Should Precede Population and Outlines the Extent and Nature of Transit Routes for a City

BY DANIEL L. TURNER
Consulting Engineer to the Transit Commission of New York City

FROM a transit standpoint, our cities are planned today very nearly as they were 100 years ago, when people were living in a man-and-horse civilization. When street railway transit superseded foot transit, then the street railway system rather than the street system should have been accepted as the principal circulating medium of the town, and the town should have been planned and constructed accordingly. But this was never done. The town authorities in the old days failed to recognize this principle—and even today in our time, those responsible for the planning and development of our cities have not grasped the full significance of this principle and its importance with respect to the comfort, health, happiness and economic welfare of the community.

City transit should precede the population—not follow the population. This is the fundamental basis of a proper transit development. This principle means that when it becomes necessary to open up a new area for the growing population, the transit system and the street system should spread out over the new territory simultaneously; the two systems should expand together. Then the other services, such as water, sewers and light can follow.

It may be assumed that a city will be conveniently served if a prospective passenger is not required to walk more than a quarter of a mile—or walk longer than five minutes—to reach a surface line, either a motor bus line or a street railway line, routing towards the business center, which is the objective point for most of the traffic. This means that the lines would be about half a mile apart in the residential districts. For crosstown service, lines one mile apart will conveniently serve the community.

In the case of subway or elevated lines, that is, rapid transit lines, if the lines routing to and from the center are 1 mile apart, and the crosstown lines are 2 miles apart, convenient rapid transit service will be afforded the community; everyone could reach a rapid transit line within a ten-minute walk. The surface lines and the rapid transit lines would route closer together than described above as they approach the business center, to the extent of traversing every street in extreme cases.

ROUTES

A study of most of the larger cities indicates that they conform closely to the semicircular shape and can be included within a 6-mile radius. For this reason an analysis of the route mileage standard can be based on the theoretically semicircular city. Such a semicircular city of 1 mile radius contains an area of approximately 1,000 acres, and the area increases as the square of the radius; so, squaring the radius in miles and multiplying by 1,000 will produce the approximate acreage of any semicircular city.

Upon this basis, it would require approximately 1 mile of motor bus or street railway line, or route, for every 200 acres of city area. In the case of a single track, with the average sidings, this would reduce to 1 mile of single track for every 180 acres; or in the case of a double-track line (neglecting yards, etc.), one mile of track for every 100 acres. Usually the acreage served by 1 mile of track should be between these limits.

For rapid transit lines the corresponding standards are: One mile of rapid transit route for every 400 acres of city area; and 1 mile of rapid transit track for every 200 acres of city area, assuming a two-track line.

The next important factor is the routing of the transit lines, or number of routes. By a route is meant a continuous line, either from the business center to the outer limits of the city, or crosstown (or circumferentially) from one side to the other of the city. In the former case, such a line would serve a strip of territory a half mile wide for a motor bus or surface line and 1 mile wide for a rapid transit line, and would connect the residential section traversed directly with the business center; in the latter case, a crosstown strip a mile or 2 miles in width would be served, by surface and rapid transit lines respectively, thereby conveniently connecting every part of the city with every other part, with one or two transfers.

The number of routes is another measure of the accessibility or convenience of the service. The theoretically semicircular city again will be used as the basis for determining the standard.

For motor bus lines and surface car lines approximately the number of routes can be obtained by extracting the square root of the city acreage and dividing by 6.3. For rapid transit lines, the square root of the city acreage divided by 12.6 will give the number of routes approximately.

The routes should be distributed throughout the city so as to furnish the same character of service to all sections. The up-and-downtown routes should be as direct as possible. Their function is to provide quick transportation between home and work. As far as practicable, up-and-downtown routes serving opposite sides of the city should traverse the business center crosstown-wise through the same street. In this way one pair of tracks in the congested area would accommodate two pairs serving opposite residential sections; that is, for every four outlying tracks only two tracks would be required through the business center. In the morning and at night both such tracks would be utilized by loaded cars with workward-bound passengers in the morning and homeward-bound passengers at night. This constitutes the development of a two-way traffic through the business center and consequently is the most economical use of the streets within the congested area.

Ideally arranged, the central pair of up-and-down routes would penetrate farthest downtown, across all of the cross-wise business streets, except the one nearest the water-front, which would be traversed by the crosstown connection for two-way traffic above described. Thus the movement of the cars would be along a U-shaped route downtown on one side, across town through the business center and then uptown on the other side. The pair of routes next removed and on either side of the central pair would continue downtown as before across all of the crosswise streets to next to the last one. [This U-shaped arrangement would be continued as needed, the U having a continually wider spread and the bottom higher up.] With this route arrangement a passenger could reach almost any point in the business section by one transfer from his own up-and-down line.

The cross-town lines are for a different purpose. They will be used by transfer passengers chiefly. They should run directly across-town and thus intersect all up-and-down lines. Their function is to articulate the entire railway system. By means of them a passenger will be able to reach any point in the city from any other point.

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*A portion of a paper read before the National Conference on City Planning, Springfield, Mass., June 6, 1922.

National Committee to Consider A. E. R. A. Standards

THE American Engineering Standards Committee has notified the iron and steel, lumber, electrical, construction, chemical, railway and railway supply industries of the importance of the standardization program initiated by the American Electric Railway Association in submitting thirteen standards for approval.

The specifications submitted to the A. E. S. C. follow:

For approval as American standards:

Nine-inch girder grooved rail.
Seven-inch girder grooved rail.
Nine-inch girder guard rail.
Seven-inch girder guard rail.
Joint plates for 7-in. girder grooved and girder guard rails.
Joint plates for 9-in. girder grooved and girder guard rails.
Specification for galvanizing or sherardizing on iron and steel.

For approval as tentative American standards:

Seven-inch 80-lb. plain girder rail.
Seven-inch 91-lb. plain girder rail.

For approval as recommended American practice:

Specification for materials for use in the manufacture of special trackwork.

Specification for 600-volt direct-current overhead trolley construction.

Four special committees will be appointed by the A. E. S. C. to determine whether the A. E. R. A. specifications are the standards which should be adopted for universal use in the United States; the committee's decision will, of course, be predicated on its finding as to the desirability of national standardization of the products enumerated. The principal organizations concerned will be asked to name representatives on these special committees.

Meanwhile, the American Engineering Standards Committee requests the technical press, industrial associations, and technical bodies interested in these specifications to send to its headquarters at 29 West 39th Street, New York City, any available information as to the extent to which these specifications are meeting the needs of the industries concerned.

Electric Railways Have Unique Possibilities for Employee Training

Little Uniformity in Employee Training Systems Is Shown in Reports Based on Data Contributed by Fifty-six Electric Railways—Scope of Instruction Criticised as Being Too Limited

A BRIEF summary of the outstanding features of employee training on the electric railways of the United States and Canada was recently issued by the Industrial Relations Association of California. In the preface it is stated that emphasis is laid especially upon those features which are capable of universal application. The report is based upon data contributed by fifty-six of the largest electric railways in the section covered. The substance of the report is as follows:

The electric railway field occupies a very advantageous position in its possibilities for the training of novices. It is not hampered by a multiplicity of jobs with a mere handful of men on each type of job.

PRESENT LACK OF STANDARDS

Because of the unique opportunities for training which exist in this field, it would seem that the training of the men would already have arrived at a very high stage of development. This, however, is not the case. There seems to be very little uniformity in the training systems. In fact, the arrival at anything like a standard procedure in "breaking in" the men seems to be in the distant future.

A free interchange of data on various systems of training the men is very highly desirable, and if it were undertaken seriously and systematically, the result ought to be the elimination of much of the guesswork and haphazard effort which now obtain. If there is any best way of training men, the discovery of this way would be distinctly useful to electric railways all over the country. It is not the purpose of this report to present a logical plan for training platform men, but instead, to point out here and there the various features which seem to have been studied out with the most care and to be most fruitful of results.

SELLING THE JOB

One company does a unique thing in that it places at the very beginning of its instruction book a carefully worded discussion of the merits and demerits of the platform man's job. First, the advantages of the job are discussed; then the disadvantages with appropriate counter arguments. In addition some very helpful information is given which is designed to help the new man in adjusting himself quickly to the work.

A number of the larger systems maintain schools of instruction in which there are charts, diagrams, apparatus, skeleton cars, practice dummies, etc. In most cases the students receive their first instruction in these schools before they are put out on the lines. The school is presumably in charge of a carefully selected chief instructor, whose duty it is to see that each student is started out in the best possible manner.

The student platform men are usually supplied with rule books, but are too frequently left to their own devices in mastering the contents. Some systems require the students to study the rules carefully before going out upon the lines. One company issues a set of rules in which each rule is followed by an explanation and a reason for its necessity. Such a feature is certainly commendable. Some companies make the study of rules an integral part of the school of instruction, and in such cases it is possible that a thorough analysis of the rules is made.

Very few companies seem to make a serious effort to use simple readable English in the instructions and circulars of information which go out to the rank and file employees. It is hard to overestimate the importance of making all such publications as simple as possible, and the whole matter merits considerable thought.

TIPS TO THE STUDENT

It is the custom in a few systems to give each student in training a questionnaire to study which is quite similar to the one he must answer when he takes the final examination. The chief value of this lies, apparently, in that it calls to the student's attention the scope and nature of the field he is expected to master, and it emphasizes the important points he must familiarize himself with.

At least one company thinks it is worth while to put the student back on the instruction car for a half day near the end of the training period. The purpose is to break up any incorrect practice which the student has developed up to that time.

It is a prevalent evil among teachers everywhere to attempt to substitute impression for expression. Instructors try to teach a student by simply telling him. That will not do; he must be allowed to practice; otherwise he cannot know how it feels to do a thing, and it is that feeling which counts most. In order to give student motormen plenty of practice, some schoolrooms are equipped with sets of dummy brakes and controllers. Practice on the skeleton cars is also permitted to some degree. In a few systems there are pieces of track rarely or never used, or specially laid for the purpose, on which students are made to practice. This saves the passengers from jolts and permits the student to make good preparation for later experience in passenger traffic. One system adds a third step in the practice stage by sending the students with their instructor out on the regularly used tracks in a special car which does not haul passengers.

EXAMINATIONS

Written final examinations are customary in a great many systems. Most of these examinations are conducted with a stock set of questions. In a company or two, the student is given a copy of the examination questions beforehand as an incentive to a mastery of the rule book. Occasionally the written examination includes copying schedules, copying running time, and making out accident reports. Usually the written examination is supplemented by an oral examination. Actual performance in car operation on the practice track and the locating of car troubles form a part of some examinations. In one system at least, the student is required to operate in a congested district as a part of his final test.

At least one system holds a promotional examination every six months, by means of which all the platform men are grouped into classes 1, 2 and 3. Only those in Class 1 are eligible for promotion to the position of inspector, starter or instructor. All employees are expected to take these periodical examinations.

PERSONAL HELP

Naturally, all the training systems are aimed at making the platform man an effective working unit in the organization, but there is one system which attempts to secure this result in a new way. In its printed materials for students it includes suggestions as to how to make extra money, i.e, by arranging with the regular men to act as substitutes for them on their days off. This specific suggestion might not fit into any other railway organization, but the general idea seems good, for what makes an employee more contented and, therefore, more effective on his job than opportunities to make a larger income? Some companies attempt to help get their new employees comfortably housed at a reasonable cost conveniently near to the carhouse.

The man who can do best is not necessarily the man who can teach best. The instructors of students need to be carefully selected and carefully trained. Some companies show a real appreciation of these points and have taken definite steps toward more systematic instruction. Some have schools for instructors. Several have drawn up standard lessons for instructors, showing not only what points and operations the students are to be taught, but also the order in which they are to be taught, i.e., what is to be taught on the first day, what on the second day, and so on to the end of the regular training period. Some methods tend to develop the "one best way" of teaching the various steps in the learning process and to prevent an instructor from "going to seed" on one particular thing, to the neglect of other phases of training.

As may be expected, the larger systems are doing the most in the way of comprehensive training; however, there are still too many in this class who have a long way to go. The chief criticism of present training in general is that it does not include enough. It leaves too many things for the new man to pick up for himself in an incidental desultory fashion.

Slovenly training methods do not attract capable men and if this work is to hold the type of man who is later to develop into supervisory and executive timber, the type which will "carry on" and help the electric railway retain its proper place in the transportation world, then the present executives in charge must see to it that they establish training procedures which will call out the best there is in the man at the bottom.

It is not within the scope of this report to show how the personnel of electric railway systems should be handled, but it is evident from this study that very much more concentrated thought and effort on the subject is sadly needed. Until the street railways cease to leave the matter to the incidental attention of busy executives who have not had the opportunity to familiarize themselves with proper training methods, and establish training departments with specially qualified managers in charge, no new or conclusive results may be hoped for. To say the very least, every electric railway ought to have a man in charge of training who knows as much about training as the average school principal, and who knows something about electric railway operation besides. With such a change in the organization of the individual companies and provision for the interchange of ideas mentioned the first great step in the practical solution of training problems will have been taken.

Buses Major Topic at Meeting of Iowans

Bus Industry Must Come Under Regulation, says Chairman of Iowa Commission—One-Man Car and Pass System also Discussed

THAT the Iowa Railroad Commission is not unmindful of the competition with electric railways on the part of motor buses, but is without power to regulate the buses, was the assertion of Dwight N. Lewis, chairman of the Iowa Railroad Commission, at the joint session of the Iowa Electric Railway Association and the Iowa Section of the National Electric Light Association at Lake Okoboji, Iowa, on June 20. That the motor bus is a permanent institution with a definite field is the belief expressed by Mr. Lewis, but he said that it must come under regulation and that the existing conditions leading to unfair competition must be eliminated. Unless the electric and steam railways can find some way to handle the short-haul freight promptly they must expect to face competition from the motor truck for an indefinite period was also a statement made by Mr. Lewis.

In the discussion of the subject of motor vehicles using the highway to handle freight and passengers, which took place at the session of the railway association in the morning, F. J. Hanlon, general manager Mason City & Clear Lake Railroad, Mason City, laid stress on the lack of any responsibility on the part of motor bus companies in maintaining the highways, which he said were being rapidly destroyed by the buses. His remarks referred principally to the use of paved roads, since the Iowa experience he cited seemed to indicate that these buses had not been able to operate successfully on the dirt roads of the state. Even on the paved roads he cited incidents that seemed to indicate serious losses on the part of the companies trying to operate.

The light-weight one-man car came in for a great deal of favorable comment. The short discussion indicated that the light-weight car is a thorough success, with developments in the way of light cars for interurban service that promise success. E. C. Allen, general manager Cedar Rapids & Marion City Railway, said that with 100 per cent one-man operation, including the operation of a 5-mile interurban line between Cedar Rapids and Marion, no serious difficulties of any kind were encountered. On the heavier type cars used on the interurban line one-man operation had proved as feasible as in the city service. Accidents had been reduced 57 per cent, he said, and there were no platform accidents. J. M. Drabelle, Iowa Railway & Light Company, cited reductions in substation demand of from 400 kw. to 200 kw. and reductions per car-mile from 4.9 kw.-hr. to 1.9 kw.-hr. as examples of the savings possible.

L. R. Brown of Rock Island described the identification card fare scheme in use in Mason City, which has apparently met with considerable success. Identification cards good for one month were sold at the start for $1, but the price was later reduced to 50 cents. The holder is then entitled to ride for a 5-cent fare. A somewhat less revenue per ride is obtained from the passengers using the card than from passengers paying a 10-cent cash fare. A saving in time of making change and handling passengers, enabling the maintenance of schedules in better form and an apparently better reception of the identification card and its 5-cent fare over the 10-cent cash fare in use on the same lines are some of the advantages ascribed to the method used.

W. G. Dows, general manager Iowa Railway & Light Company, described a method under trial in which a monthly pass is sold for thirty-day periods for use on one of its interurban lines. The price is figured so that it will produce a revenue of 2 cents per mile on sixty rides per month. Experience seems to indicate that the number of rides on these passes averages fifty-seven to fifty-eight per month. Some questions were raised in the discussion as to the feasibility of using buttons for identification purpose in place of the cards, which are objected to by many on account of the inconvenience of handling. Business men seem to be the principal objectors. The expense of any other form of identification that it has been possible to devise it too great to permit its use was the answer made to the questions.

GROUP INSURANCE DISCUSSED

In the joint session on Tuesday afternoon Peter F. Bouquet of the Metropolitan Life Insurance Company discussed group insurance as a means of restoring or improving the relations with employees. If a man's regard for his family can be tied up to his daily work, he said that the three factors of brain power, muscle power and good will can be co-ordinated to secure the greatest good for both employer and employee. Group life insurance is available only for employees of a single employer and not for clubs or similar organizations, and, according to the speaker, many men who otherwise could not secure insurance at any price could be covered under group insurance. The premiums are usually paid by the employer, though in some cases joint arrangements for handling the premiums are made. F. J. Hanlon spoke enthusiastically for the plan, asserting that it had accomplished all that Mr. Bouquet had claim for it.

The officers for the past year were re-elected for the coming year, except that O. H. Simonds, general manager Dubuque Electric Company, replaced E. C. Allen, general manager Cedar Rapids & Marion City Railway, on the executive committee.

New York Association at Bluff Point

Annual Outing and Business Conference Draws Large Gathering at Charming Lake Champlain Resort—Commissioner Attwill of Massachusetts Makes Hit—B. E. Tilton Elected President

THREE hundred members and guests of the New York Electric Railway Association met on June 24 at Hotel Champlain, Bluff Point, for a day's recreation and the transaction of association business. This was the fortieth annual meeting. The reports of President W. O. Wood and Secretary-Treasurer W. F. Stanton, presented first, showed that an active year's work had been accomplished, with a substantial cash balance in the treasury to be carried over to the coming year. B. E. Tilton's report, for the membership committee, showed several additions to railway and manufacturer membership during the year.

T. C. Cherry, for a committee on changes in the constitution and by-laws, next recommended that the number of vice-presidents be increased from two to three and this recommendation was approved.

Two papers were then read by title, as follows: On "Tax and Paving Requirements Now Imposed on Street Railways and the Resulting Unfairness and Discrimination," by Alfred T. Davison, general counsel Third Avenue Railway System, New York City, and on "The Personal Factor in the Electric Railway Industry," by Clinton E. Morgan, general manager Brooklyn (N. Y.) City Railroad. The papers are abstracted elsewhere in this issue.

On recommendation of W. H. Collins, chairman of the nominating committee, the following were elected to serve for one year: President, Benjamin E. Tilton, vice-president New York State Railways and general manager Syracuse-Utica lines, Syracuse; first vice-president, Edwin Duffy, president the Cortland County Traction Company, Cortland; second vice-president, C. E. Morgan, Brooklyn; third vice-president, W. J. Harvie, vice-president and general manager Auburn & Syracuse Electric Railroad, Auburn; secretary-treasurer. W. F. Stanton. assistant to the president New York State Railways, Rochester. Executive committee, officers and the following: Frank Hedley, president Interborough Rapid Transit Company, New York; H. B. Weatherwax, vice-president United Traction Company, Albany, and Schenectady Railway; James F. Hamilton, president New York State Railways, Rochester; H. G. Tulley, president International Railway, Buffalo.

Commissioner Attwill Speaks Plainly on Electric Railway Situation

The annual banquet was a brilliant affair, an unusually large number of ladies being present. Mr. Wood acted as toastmaster. He introduced Hon. Henry C. Attwill, chairman Massachusetts Department of Public Utilities.

Mr. Attwill said that while the utilities of the country are undoubtedly in a difficult situation, it is largely up to electric railway men now to restore conditions to normal. A common question is: "What is the matter with the electric railways?" The cause of the difficulty is not automobile competition, except possibly in openly settled territory. In fact if the electric railways in the large cities were suddenly called upon to carry the people now riding in automobiles they would fall down. In Mr. Attwill's opinion the answer is that the electric railway status is an aftermath of the war. During the war there was a general expansion of credit, with consequent inflation of prices and reduced purchasing power of money. In this connection all utilities which were under control as to rates were called upon to give service under cost. The public thus became indebted to them and ought to be willing now to liquidate this debt caused by war conditions.

Under wartime conditions, said Mr. Attwill, utility operators were reluctant to try for increased rates, but when they did so such increases were usually denied. The public must now square the account or repudiate an obligation owed to the utilities. To insure the payment of this obligation is the problem just ahead. Such a consummation suggests the figure of the silver lining on the other side of the dark cloud. There is this to be said about wartime conditions, that no utility operator, so far as Mr. Attwill knew, has been charged with profiteering. Furthermore, the recent adverse operating conditions have undoubtedly developed efficiency in providing service.

As to the solution of electric railway difficulties, Mr. Attwill reviewed several suggestions; for example, reduce fares and carry more people. But, he said, there is no profit in doing a larger business at a loss. As to public ownership and operation, as the bills for providing service must be paid in any case, such a transfer of authority doesn't alter conditions. All that it can do is to distribute the burdens of the cost of service; that is, to transfer a part of them from the car riders to the general taxpayer. To those who advocate receiverships, reorganizations and confiscation, Mr. Atwill replied that it is not honest to take property without due compensation. No, he said, the solution is intelligent co-operation between the public, through its representatives, and the railway managers. It should be recognized that the utility franchise is granted with the understanding that good service at reasonable cost will be given. It is the manager's task to see that this is done, but until the public operates the utilities it is the duty of the state to see that service conditions are fair. Beyond seeing to it that the rates are reasonable, that the service is adequate and safe, that there is no discrimination and that the properties are operated honestly and with reasonable efficiency the state ought not ordinarily to go so long as we have private ownership. To go further is not regulation, as Mr. Attwill said he understood the word, but management, and management of the worst

Members and Guests of New York Electric Railway Association Assembled at Bluff Point, Lake Champlain, for Fortieth Annual Meeting sort because it is management without responsibility. In fact, it usually is nothing more than meddlesome interference.

Until it appears that the utility is obtaining a profit upon its investment in excess of what the public would have to pay to borrow money to maintain the utility if publicly operated, the interests of the utility and the public are in reality identical. The utility desires to earn sufficient income to make its securities attractive and to give good service. The public cannot hope to obtain that service unless the securities are attractive, because no improvements and additions to property can be made unless the securities can be sold.

Moreover, the directors of the utility are under a dual responsibility. They owe it to the public so to conduct the affairs of the utility that it will be able to perform the service in a safe and adequate manner at reasonable rates, and they owe a duty to their stockholders to conduct its affairs in an efficient and honest manner. This requires that dividends not earned ought not to be paid and that the properties should not be sacrificed to bolster the market value of outstanding securities. When these things are done it is proper for the state to step in and control the situation.

Finally, said Mr. Attwill, the 5-cent fare is no more sacred than the price of a 5-cent cigar. Five-cent cigars are not so good as they were before the war, and it is obvious we cannot obtain the same amount of transportation for 5 cents now as was possible then. Five-cent fares are always feasible if the zones are made short enough. But as the bills for supplies of all kinds at prices higher than those of pre-war times must be paid, there is no magic in the various nostrums that have frequently been advocated by certain political gentlemen who are seeking votes.

Railways are subject to and controlled by economic laws, the same as other kinds of business. Credit must be maintained and this necessitates operation at a profit. Mr. Attwill urged faith in the public, from whom money ultimately comes. This is different from faith in politicians and financiers primarily, for their influence and resources in reality come from the public. The public has ample resources and if convinced that utilities are properly managed, that the securities are sound and that the return therefrom is certain it will furnish the needed money.

MR. SIMS SPEAKS ALSO

C. S. Sims, vice-president Delaware & Hudson Railroad, was the final speaker. He gave humorous definitions of the pessimist, as one who sees only the hole in the doughnut, and the optimist, who gets something good out of every situation. Optimism, he said, is needed in the electric railway business now. The competition of the motor bus must be met, and railways may in many cases need to replace rails by bus lines as the former wear out. He paid a tribute to the nearby Montreal Tramways, which, he said, showed a satisfactory solution of the urban transportation problem.

SOCIAL FEATURES AND SPORTS

As usual at these annual gatherings, scratch teams of the railway men and supply men played a fast and vociferous game. A. E. Reynolds and Alex. Cameron were the respective captains. More serious efforts were made on the golf links, under the general direction of H. B. Weatherwax, with creditable scores considering the softness of the grounds. Prizes of silver cups and golf balls rewarded the golfers' efforts. Water sports closed the afternoon program, Harold Hegeman being the leader. The banquet was enlivened with musical numbers by professional singers from New York City and amateur talent, trained and otherwise. A dance followed the banquet.

In the afternoon, also, the ladies enjoyed a bridge tournament on the steamer en route between Bluff Point and Burlington, followed by afternoon tea. During the convention day and on Sunday following, many automobile parties slipped away for short periods for trips to the scenic attractions located near Bluff Point.

The Personal Factor in Electric Railways*

Understanding and a Co-operative Spirit Between Employer and Employee Are Especially Important on an Electric Railway—The Means for Creating This Relation Are Laid Down

By CLINTON E. MORGAN
General Manager Brooklyn City Railroad

TRANSPORTATION is the business of moving persons or commodities between two points in the shortest possible time with safety and comfort. It is the business of an electric railway to provide the facilities and to make the movement at the time most suitable to the purchaser of the transportation. Then it is necessary to sell this service to the public, but before this can be done we must secure the full co-operation of our employees, who are the ones that are constantly in contact with the riding public.

Because of the very nature of the railroad business, with its units scattered, there must be a large number of supervisory officials, with the result that the personal contact between men and management is sometimes not as frequent as it should be for the interest of all.

One of the difficult points of resistance is in the supervisory officials, generally in the ones close to the men. Therefore, it is of the utmost importance, when men are selected for such positions, to see that they are fitted for the task and able to inspire in men under their direction the desire to co-operate with one another and with the management, as well as to enter into the spirit of the work.

We depend on individuals to execute. Any plan which takes the responsibility for the execution of the work away from the individuals charged with intermediate supervision is bound to result in inefficiency. We should endeavor to create respect for management and engender among the employees willingness to have the work of management done by those best fitted to manage, as the management must accept responsibility for carrying on the business. Likewise, management must be mindful of its responsibility in matters of discipline, justice and fair treatment with its employees. The objective in personnel work in any industry is to enlist the maximum co-operation and interest of the human element in the success of the undertaking.

PROBLEMS IMPORTANT ON ELECTRIC ROADS

The problem in public utilities differs in many respects from that in ordinary private industries. Among the utilities themselves it varies. The gas, power and light companies have a more simple problem than the railway, both because of the smaller number of employees involved and because of the class of commodity sold by them. The delivery of the service is made without the purchaser actually coming in contact with the personal representative of the utility, while with a telephone company the purchaser of the service comes in contact indirectly with the employees, such as operators, although not able to visualize the personal representative.

In most other lines of business where large numbers are employed to produce a certain article the public seldom comes in contact with the production force, as the employees are usually grouped under the watchful eye of the supervisory force that is ever ready to assist in promptly straightening out difficulties. But on an electric railway the major portion of the employees not only form the production department but also practically form the entire selling force, and, by the nature of the business and of the units operated, they are placed on their own responsibility more than the employees of any other business.

With the railway, the sale of its service brings the representative, through the conductor, motormen or agents of the company, in direct contact with the public. Thus the public is able to judge the service rendered by the equipment and direct personal representative, and it is through these agencies, coupled with the policy of the management, that the kind of relation existing between the public and the governing bodies is determined.

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*Abstract of paper presented at the annual meeting of the New York Electric Railway Association, Bluff Point, N. Y., June 24, 1922.

To obtain proper results it is necessary to employ policies that will bring about conditions of mutual confidence and create a spirit of sympathy, understanding and real co-operation between members of its working force, its patrons and the citizens of the communities that are served. Lack of understanding or misunderstanding causes most of our troubles. Therefore, we can only avoid this trouble by properly schooling the working organization so that each individual will know the aims and requirements of each department, functioning with the unit as a whole to produce more and better transportation.

REAL LEADER BRINGS OUT BEST

Many officials assume that their men understand the work to be performed and all the conditions surrounding it without any explanation. Failure to receive proper instruction causes mental uneasiness, particularly to new, inexperienced employees, and this produces fear and distrust, especially if the "boss" criticises the manner in which the task has been performed. Under these conditions, the employees feel they do not receive fair treatment or justice.

Superior results can be expected only under a system which insures square dealing and under a "boss" who honestly practices this method in handling his men, for a real leader should know the art of bringing out the best in the men, creating a spirit of loyalty, pride and ambition, and securing the all-together spirit, so that the organization under him will move as a unit in efficiently accomplishing the job. Indifferent leadership will be quickly reflected in the men, who, on the other hand, will respond in proportionate measure to the earnestness of purpose of the "boss."

It should be borne in mind that the new employee is unfamiliar with our practices and customs. Nor does he comprehend what is wanted of him or his duties to the company and the public. His first contact with the employing officer should be such that will cause him to feel at ease and to believe that he will receive just treatment. He should be personally introduced to the other members of the organization who have to do with his instruction or supervision and while he is being schooled in his duties. The importance of the selection of instructors should be recognized. Many men efficient in their work are not of the type that make the best instructors. Following the schooling period, when the employee is allowed to work without the guiding hand of the instructor, he should be encouraged, and if there is room for just criticism, he should be criticised firmly but fairly, care being taken to point out mistakes of judgment or violation of rules.

The better way of doing it does not always involve infliction of severe discipline. If the problems of instruction are handled properly, every employee will be made to feel that his employment is a great and worthy undertaking, that he is a partner whose individual judgment is valued and his welfare is of the utmost importance to the successful operation of the organization as a whole, for, it must be remembered, our employees are in a sense the servants of the public.

In recent years the introduction into industrial life of many who are strangers to American ways has greatly complicated our problem of serving the public. This condition makes it all the more necessary for the establishment of some definite means to build up mutual confidence and eliminate misunderstandings.

Just now what method or agency should be utilized to cultivate this co-operation may be a question. It is being done not through any personal department or other special organization, but by the officials, including supervisory forces, who are responsible for the management of each department, for these officials, the intermediate bosses, must lift the rank and file to a higher plane of understanding and responsibility.

This is not the task of one whose connection with the organization is vague and temporary. The executive officers must support the supervisory forces in doing that work and must inspire them to do it. The supervisory forces are likely at first to object, because it may appear to them to take away some of their authority or to jeopardize their prestige with their subordinates. However, when they actually understand the subject thoroughly, they are usually convinced that it means more responsibility and more prestige for themselves, which, of course, results in better relationships throughout the organization. This accomplished, proper relations will exist between the utility and the public.

There Should Be Relief From the Paving Tax*

The Tax and Paving Requirements Now Imposed on Street Railways Result in Unfairness and Discrimination

BY ALFRED T. DAVISON

General Counsel Third Avenue Railway System, New York

THE report made this year by the joint legislative committee on taxation and retrenchment of the State of New York, of which Senator Frederick M. Davenport is chairman, shows that the street railways of the state are subjected to tax burdens which are grossly unequal compared with other utilities and corporations generally.

The iniquity of the situation arises from the fact that the agent of the state, namely, the public utility commissions, which have the power to regulate rates and service, thus regulating earnings, act independently of, and have no relation whatever to, the tax burdens imposed by the state under laws created before the establishment of these regulatory bodies. If public utilities are to be used as tax collectors or sources of revenue they should be able to pass on the tax paid to the consumer, and thus the result would be that the consumer is really paying the tax.

The taxation on street railways operating in New York State is as follows:

Taxes levied by the United States: Federal income tax.

Taxes levied directly by the State of New York: Franchise tax on gross earnings. This tax is equivalent to 1 per cent upon its gross earnings from all sources in the state and 3 per cent upon the amount of dividends declared or paid in excess of 4 per cent.

Taxes collected by municipalities under the authority of the state: Special franchise tax, taxes on real estate, paving, the cost of cleaning snow from streets.

Taxes collected by municipalities alone. (These taxes are not collected in all municipalities): car license fees, percentages of gross earnings, fees for uses of bridges.

In New York City street railway companies may not use sweepers unless they agree to clean certain streets from house line to house line.

Imposing as this array of taxes is, the greatest of all the burdens is paving. Before considering this obligation, however, I call attention to four principles which must necessarily govern any system of public utility taxation.

FUNDAMENTALS OF PUBLIC UTILITY TAXATION

1. It is an injustice to ask owners to dedicate their property for the public use, receive no return from it, and then require them to pay taxes taken from their principal and not from their net earnings.

2. Street railways cannot be treated as tax collectors. The very nature of a fixed fare prevents the tax from being passed on to the public, and increased fares result in loss of traffic.

3. Every tax burden placed upon a street railway, other than a tax on its net income over and above a fair return on its property, diverts money which should otherwise be used in giving service to the public.

4. To the extent that taxation deprives capital of a fair return, any taxation other than a tax on net income over and above a fair return prevents street railway corporations from attracting capital for extensions.

The constitutionality of the statutes under which paving obligations have been imposed upon street railways is upheld on the ground that the states in imposing such obligations are exercising the taxing power.

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*Abstract of paper presented at annual convention of New York Electric Railway Association, Bluff Point, N. Y., June 24, 1922.

HISTORY OF OBLIGATION

The paving obligation is a relic of the days of horse cars, when the horses did cause more or less wear and tear of the pavement and when the pavement was very simple, and it was not such an obligation as now exists, with the improved types of pavements involving the enormous expenditures. The paving obligation has survived the conditions which gave rise to it and now diverts the earnings of the company to uses which are entirely unconnected with service.

Every dollar from earnings which the street railway company is required to pay for paving means there is just so much less which the Public Service Commission can order expended for service or improvements.

The specific relief which we now ask is that the gross injustice now suffered by street surface railroads by reason of the paving obligation, under Section 178 of the railroad law, be removed, and that there be substituted therefor a paving requirement based upon fair and equitable principles, which will have reference to engineering features, and not constitute contributions by way of taxes.

UNFAIRNESS OF PRESENT PAVING OBLIGATION

The standard gage of car tracks in New York is 4 ft. 8½ in. and in double-track operation the width of the space between the tracks is usually 5 ft. Adding to this the 2 ft. in width outside of the tracks, as provided by the law, in each street where there is double track the street railways have to pave and keep in repair from 18 to 19 ft. of the roadway. This is from one-third to two-thirds the entire paving on those streets. The practical result is that in the streets where street railroads operate, new and more costly types of pavement are constantly being substituted for pavement which is still in good condition, because the companies must finance a large part of the cost of such improvement. Also, as a large general taxpayer, the company must bear its proportion of the cost of all other paving.

From 1911 to 1920 the street railways of New York State each year expended for paving alone an average of 23.4 per cent of their net income, or, to put it in another way, the paving expense has amounted to approximately 5 per cent of the total operating expenses of the companies during that time.

During these years in the metropolitan area, for every 100 cents expended for track and roadway purposes, other than paving, from 40 to 80 cents additional was expended for paving.

The percentage which the area maintained by the railways bears to the total paved area in those streets in New York City is 35 per cent; in Utica, 38.6 per cent; in Syracuse, 46 per cent; in Rochester, 56 per cent.

The great increase in number of motor vehicles has resulted in less riding on street cars. At the same time these motor vehicles have greatly increased the wear and tear upon the pavement in the streets upon which they operate. From 40 per cent to over 90 per cent of the total vehicular traffic in the streets operate over the railway area, so that the railway company is not only paying for the pavement so worn out by vehicles but for a larger proportion of this damage than is borne by the municipalities.

WHAT IS THE REMEDY?

In seven states, namely, Pennsylvania, Maryland, Georgia, Arkansas, Indiana, Oregon and Washington, there are no general statutes covering the subject of paving. In other states, such as New Jersey, Virginia, Kentucky, Texas, Ohio, Illinois, Michigan, Minnesota and Wisconsin, the municipal authorities have the right to determine or impose the paving obligation.

In view of the decision of the United States Supreme Court to which attention will later be called, it is unimportant to determine whether the municipal authorities in imposing such obligations do so by way of taxation or by way of contractual obligations imposed in the franchises themselves.

In Massachusetts, Connecticut and California drastic obligations similar in form to those now in force in New York have been modified.

While the street railways should be entirely relieved from this obligation, in view of the fact that the city authorities have claimed that the operation of electric cars on the streets does cause some deterioration of the pavement, it was argued before the Legislature of the State of New York at the last session that the most which the companies should be required to do is that required by the State of Connecticut, namely:

> • • • the cost of restoring to its former condition so much of the highway included within a distance of 8 in. on each side of each rail as shall have become in need of repair in consequence of the existence and use of such tracks. No such company shall be compelled to pave or repave or to pay the cost of paving or repaving any portion of the highway in which its tracks are laid, except as provided herein.

The relief then suggested was two-fold, viz.:

1. Eliminate any obligation on street railways to do any original paving. The only reason ever advanced why street railways should do any paving being that the operation of their cars caused deterioration of the pavement and as they cannot cause the deterioration to a pavement which has not yet been laid, the railway company should only be required to maintain a certain part of the pavement after it has been laid.

2. Reduce the obligation to repair to the wear and tear or damage done in consequence of the existence and use of the tracks over a maximum area of 8 in. on each side of each tram rail.

A bill was introduced at the 1922 session of the Legislature of New York whereby the railroad law would have been amended along these lines. The cities which so greatly benefit under the present law objected, but their objection was shown to be without merit, because under the proposed form of relief the railways would still be required to pay directly for the actual damage they do, and that is more than is required from any other user of the street.

FRANCHISE OBLIGATION REMOVABLE

The question has been raised a number of times whether street railways can be relieved from the paving obligations when embodied in the franchises themselves. There are two decisions in the United States Supreme Court which, in my opinion, squarely uphold the authority of the state to alter paving obligations, even when contained in franchises. One of these is Worcester vs. Street Railway Company, 196 U. S., 539, and the rule of this case has been applied frequently in later decisions by the Supreme Court, noticeably in City of Pawhuska vs. Pawhuska Oil & Gas Company, 250 U. S., 394. The second decision to which I refer is City of Chicago vs. Chicago Railway Company, and decided in November, 1921. These show there is no legal obstacle in the way of obtaining relief.

No relief was granted at the last session of the New York Legislature. A committee has been appointed by this association and will endeavor to confer with a committee appointed by the Mayor's conference to see if they can agree upon some recommendation for the much-needed relief. The righteousness of our cause should inspire us to leave no effort untried which will possibly aid in the accomplishment of this relief.

Affiliation of Boston Engineering Societies

NINE engineering societies with a total non-duplicating membership of about 3,500 have completed organization as the Affiliated Technical Societies of Boston and have established headquarters at 715 Tremont Temple, on the premises formerly occupied by the Boston Society of Civil Engineers and the New England Waterworks Association. The affiliation received a charter from the State of Massachusetts on June 12 and is the outgrowth of various informal meetings during the past year. The participating organizations are the Boston Society of Civil Engineers, which is the oldest engineering organization in America; Boston sections of the American Institute of Electrical Engineers, American Society of Mechanical Engineers and American Institute of Mining and Metallurgical Engineers, New England Waterworks Association, Plant Engineers' Club, Northeastern Section American Society of Civil Engineers, Massachusetts Chapter American Society of Heating and Ventilating Engineers and Boston Chapter American Association of Engineers.

Record Attendance at A.R.A.

THE final figures for the registration at the American Railway Association convention, recently held at Atlantic City, show an attendance larger than ever before. There were fewer supply men and ladies at the meetings this year, but this decrease was more than offset by the increase in the number of railroad men and their families who registered. There were 2,339 railroad men registered this year, as against 2,024 in 1920. The total registration for the two years was 6,254 for 1922 and 6,073 for 1920. The total registration at the American Electric Railway Association convention in 1920 was 3,330.

American Association News

Advertising Section Has Made Good

GRATIFYING results have been obtained by the Advertising Section of the American Electric Railway Association, according to a preliminary report just made to Guy E. Tripp, chairman of the Committee of One Hundred, by Henry R. Hayes, secretary-treasurer of the committee.

The Section began to function on Jan. 1, 1921, with Labert St. Clair, who had charge of the publicity work for the Federal Electric Railways Commission, as director, working under the immediate supervision of the association committee on publicity and Mr. Hayes.

Funds for carrying on the work first were advanced by the association and later raised by voluntary subscription. Mr. Hayes reports that generous support has been forthcoming from electric railway companies and manufacturers, both members and non-members of the association, but that the books are still open to subscription.

Although the work of the committee is carried on from association headquarters, no discrimination is shown between member and non-member companies. The movement is for the general good of the industry.

"The efforts of the advertising section have been highly successful," Mr. Hayes says in his preliminary report. "It has obtained a large amount of constructive publicity in the daily newspapers and periodicals for the electric railway industry; has prepared and distributed a large amount of printed advertising material dealing with electric railway situations of national interest; and rendered personal services in special cases to many individual companies. Service is given to all electric railway companies by the advertising section regardless of whether they are members of the association or not.

"The committee on publicity of the association reports monthly on the joint activities of itself and the advertising section to the executive committee of the association, and I am in constant touch with the character of the work that is being done."

Probably the most constructive work done by the section has been that of giving electric railway news a real standing in the papers and periodicals of the country. The policy of the section, as laid down by the committee on publicity and indorsed by the Committee of One Hundred, has been that of absolute truth in all dealings with the press. No attempt has been made to "put over" stories without news merit and the result is that today electric railway news is received at the source of national and local news channels with the same credit as other news from unquestioned sources.

An effective country-wide organization for the dissemination of electric railway advertising material also has been built up outside the section's newspaper and periodical connections. The section has a correspondent on every electric railway property and in every manufacturing plant producing electric railway materials and supplies in the United States and its possessions and in Canada. It also co-operates with directors of state public utility information committees in thirty states. An advisory committee of eight working publicity men meet regularly with the director and make recommendations to the general committee on publicity.

Membership Committee

A MEETING of this committee was held on board the S. S. South American on June 28 in connection with the cruise of the Central Electric Railway Association. Those present were: Chairman F. R. Coates, W. S. Rodger, F. G. Buffe, M. B. Lambert, H. J. Kenfield and L. E. Gould, with R. R. Holden representing the exhibits committee, C. W. Kelly, director of exhibits and Secretary J. W. Welsh. Various suggestions were considered and definite plans laid for pursuing more actively the work of securing new railway and manufacturer members. Co-operation with the exhibits committee will be followed closely in getting the non-member manufacturers into the association so they may take advantage of the much improved conditions in the industry exhibit.

Committee on Highway Construction and Maintenance

LAST month President Todd appointed a committee to make a report at the Chicago convention. The subject assigned to it for study is the cost of construction and maintenance of highways. There are nine members consisting of a chairman, four other executives, and four way engineers. The personnel of the committee is as follows: W. J. Harvie, Auburn, N. Y., chairman; W. H. Sawyer, East St. Louis, Ill.; S. W. Greenland, Fort Wayne, Ind.; J. H. Hanna, Washington, D. C.; C. M. Cheney, Des Moines, Ia.; W. F. Graves, Montreal, Que.; E. P. Roundey, Utica, N. Y.; H. M. Steward, Boston, Mass., and E. C. Johnson, Los Angeles, Cal.

The committee held a preliminary meeting on June 22 at the New York headquarters. Its purpose, as outlined by the chairman, is to secure statistics along the lines of the title of the committee, such as the mileage of state highways improved by years for the last five years, construction costs, maintenance costs, origin of funds by which these costs were defrayed and other pertinent information. This information will be secured from railway companies which are in a position easily to obtain it, and the committee hopes that its request for assistance will receive consideration. An extended report can hardly be prepared in time for the October convention, but the committee hopes that some facts at least can be presented.

Mail Pay Case Reopened

THE Interstate Commerce Commission has reopened the case involving electric railway mail pay. A petition to the commission for the reopening of this case was made by the American Electric Railway Association, which asked the commission to re-examine the facts and circumstances surrounding the transportation of mail matter on electric railways and the service performed by them in connection therewith so as to fix fair and reasonable rates in compensation therefor. After a study of this petition and of the answer to it of the Postmaster-General, the commission has decided to reopen the case.

Exhibits Committee

THE second general meeting of the convention exhibits committee was held in the office of Chairman E. J. Blair, Chicago, on June 24. An unusual demand for space was reported, due principally to the number of new exhibitors applying for exhibit privileges. The actual amount of space applied for during the first three weeks was approximately 50 per cent greater than for the corresponding period at the last exhibit. At present there is a greater amount of space available on account of the great size of the pier. It is the plan of the committee, however, definitely to assign the space applied for at its next meeting on Aug. 1, filling up the sections as assignments are made. This will make difficult an expansion of the space of any exhibitor, thereafter, and so the committee is urging all applicants to arrange adequately for their requirements in advance of the next committee meeting. The following sub-committees were appointed: Heavy outdoor exhibits: H. H. Adams, Walter Cummings; electricity and air, C. H. Jones, R. R. Holden; restaurants, J. C. McQuiston, R. B. Fisher; meeting rooms and decorations, L. E. Gould, W. J. Walsh, L. W. Shugg.

Recent Happenings in Great Britain

South Eastern Railway Electrification—Underground Railways Development—Manufacturing Profits

(From Our British News Representative)

THE outstanding matter in the electric traction field in this country is the preparation which is being made for the conversion to electric traction of the suburban lines of the South Eastern & Chatham Railway.

The South Eastern Scheme

On June 2 a special meeting of the South Eastern Railway agreed to an application being made, in concert with the London, Chatham & Dover Railway, to the Ministry of Transport for an order to authorize the companies to construct electric generating stations, to enter into an agreement with a construction company for the construction of a generating station at Charlton, on the banks of the Thames estuary, and for the construction, supply to and use by the two railway companies of electrical works, rolling stock, plant and equipment for working the traffic on the companies' suburban railways by electrical power. This is the scheme to which reference has been made previously and it involves a route mileage of 94, or 210 miles of single track. A government guarantee on £6,500,000, principal interest, under the trade facilities act has been obtained. The construction company will electrify the lines and there will be a lease by it to the two railway companies of the electrical works. The cost of the work will be raised by redeemable debentures or loans and on redemption the works will become the property of the railway companies. It is proposed that the three-wire system of electric distribution shall be adopted. That system has never been used on any British electric railway before except on the City & South London Railway.

Plans Made to Start Work

At the meeting on June 2 Cosmo Bonsor, the chairman, gave further details of the financial arrangements, which are probably unique. He said that there was to be no public issue, no commission paid, no underwriting, no assistance from any intermediary. They had formed a private construction company; it had been registered and subscribed. They were thus at once ready for work. The construction company created what was known as a debenture, not paid up. It was lodged at the Bank of England, with a Treasury mandate attached, on which the money would be borrowed as required for the construction of the works. The government security would be for £6,500,000 and on the security they would borrow for a period of twenty-five years. The Bank of England, holding the security, had agreed to lend the money as required at a rate of interest not exceeding bank rate. The works were to be completed in three years. They might also during construction go to the money market and borrow on short loans. The scheme would directly employ 4,000 men.

At a hearing in the end of May and early in June by the Electricity Commissioners in an application by the South Eastern & Chatham Railways managing committee for the Commissioners' consent to the construction of the necessary generating station some additional points of importance were brought out. The £6,500,000 guarantee is for the first stage only of the total scheme of the companies. The construction company consists of five members of the managing committee and two of their officers. It will have a capital of only about £10,000 and will carry out the work with the £6,500,000 raised under the guarantee mentioned. The cost of the generating station is estimated at £1,130,000. The maximum demand anticipated for this first stage is 29,000 kw. and the output 90,000,000 units per annum. The estimated cost of production is put at about ½d. per unit. The frequency proposed is 25 cycles per second, that being the frequency already in use by the London & South Western and the Brighton Railways.

Underground Improvements Imminent

The London underground railway companies, having got their government guarantee under the trade facilities act for their proposed extensions and improvements (particulars of which have been previously given) have issued a statement showing that £1,000,000 is to be raised by second debenture stock of the London Electric Railway and £1,500,000 by second debenture stock of the City & South London Railway, for which the companies already have powers, and such further amounts as may be authorized by Parliament up to a maximum of £6,000,000. The stocks are to be issued as redeemable debentures at rates of interest not exceeding 5 per cent per annum. Repayment is to be by 1972, with the option to the companies to redeem after 1942. The stocks will be a charge on the common fund of the associated companies, out of which the prior charges of all the companies are paid. The government's contingent liability in present circumstances is practically negligible. The companies are making application to Parliament for the necessary increase in borrowing powers and for authority to pay interest out of capital during the construction period. A number of contracts for the new works have now been let, and there will be no avoidable delay in beginning operations. Work will be provided for about 20,000 men, including men engaged on the manufacture of materials.

City Purchases Glasgow Subway

Glasgow Town Council on May 25 decided by a majority of votes to agree to the purchase of the Glasgow District Subway at a price of £385,000. The directors of the subway company have agreed to the figure, though it means only 10s. per £10 share in the company. As was explained on a previous occasion, the subway is a circular route underground cable railway which has been in financial difficulties for a long time. These difficulties were of course largely due to the competition of the municipal electric tramways. Now the subway should pay, seeing that there will only be a nominal capital liability on it. The fate of the shareholders in the underground road is the dismal aspect of the case.

People who are inclined to think that the tramways will be superseded may profitably direct their attention to some recent remarks by a leading British tramway expert. J. B. Hamilton, general manager of Leeds City Tramways and chairman of the Bath Tramways, recently returned from a tour around the world. Speaking at a meeting of the Bath company early in May, he said that those who had invested their money in tramways in Britain need have no fear that such undertakings would be superseded by other forms of traction. In all cities of the world where the electric tramcar was practically doing the work of transportation it was, in his view, likely to continue to do so.

Presiding at the annual meeting in London on May 16 of the English Electric Company, Sir Charles Ellis said that in recommending a dividend of 5 per cent on the ordinary shares the directors considered that they had reconciled the natural expectations of the shareholders with the needs of a difficult and obscure period to come. The state of things abroad was unprecedented; many foreign markets were closed; others still languished. Owing to a serious industrial dispute the engineering industry had this year to face peculiar difficulties. He was of the opinion that the best way out of present difficulties in general would be found through the efforts of private enterprise.

With the help and assistance of five powerful associations of world-wide reputation this company had recently formed the Power & Traction Finance Company, with the object of dealing with comprehensive engineering contracts on a large scale. During the last year the English Electric Company had secured many important contracts, including railway electrification contracts in Spain and Japan.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Commission Approves Grant

New Franchise of Grand Rapids Railway Will Go Before Voters—Sliding Fare Scale

Many months of negotiation have resulted in the approval by the City Commission of Grand Rapids, Mich., on June 12 of the franchise ordinance giving the Grand Rapids Railway a new franchise grant to conduct a street railway business in the city of Grand Rapids for a period of thirty years. On June 13 the franchise provisions were accepted by the Grand Rapids Railway. It remains now for the electors of the city to approve the grant. Just as soon as they do this the franchise will become effective. It seems likely that the proposed franchise will be put up to the voters as planned at the primary election on Sept. 12. The company has been operating without a franchise for many months. Various developments in the negotiations have been noted in the *Electric Railway Journal* since January of this year.

Under the new grant the company will be permitted to charge a 10-cent fare with seven tickets for 50 cents at least for three months from the adoption of this franchise. At the expiration of this period the rate of fare will be increased or decreased in fixed steps according to the following schedule:

5 cents cash and thirteen tickets for 50 cents.
5 cents cash and seven tickets for 25 cents.
5 cents cash and six tickets for 25 cents.
5 cents cash and eleven tickets for 50 cents.
5 cents cash.
10 cents cash and five tickets for 25 cents.
10 cents cash and nine tickets for 50 cents.
10 cents cash and four tickets for 25 cents.
10 cents cash and seven tickets for 50 cents.

An "Automatic Fare Equalization Account" is provided for determining the fare basis. This section provides in part:

> Whenever there shall be a net debit of more than $50,000 to the equalization account then the next higher rate of fare and the next lower rate of return shall be and become effective; whenever there shall be a net debit exceeding $100,000 to the equalization account then the next higher rate of fare and the next lower rate of return shall be and become effective and the rate of fare shall be further increased from time to time in like steps until the debit to the said equalization account is wiped out. Whenever the net credit to the equalization account exceeds $50,000 the next lower rate of fare shall be and become effective; whenever the net credit exceeds $100,000 the next lower rate of fare shall be and become effective and all amounts to the credit of the equalization account in excess of $100,000 shall be used as a basis for further reductions in fare and in like steps.

The value of the property is fixed at $5,500,000 as of Jan. 1, 1922, with the city or the grantee having the privilege after the first five years of requesting a re-valuation at any time. The initial rate of return is to be 8 per cent. The return is, however, to be decreased ¼ of 1 per cent whenever the rate of fare is increased one step. Thus when the cash or ticket fare in effect is less than 5 cents the return to the company is to be increased ¼ of 1 per cent for each step that the fare is reduced.

The grant also provides for a depreciation fund to which is to be credited monthly an amount sufficient to offset depreciation. The amount so credited to the depreciation account, until changed by mutual agreement or by arbitration, has been placed at the rate of 3 per cent per annum on the then value of all the grantee's property less the salvage received. At no time can the balance in the depreciation account including interest, etc., be more than 15 per cent.

The franchise does not permit the Grand Rapids Railway to sell or sublet to another unless such step is approved by the City Commission. All financing must be subject to the approval of the Public Utilities Commission.

Several sections included in the franchise draft before it was complete and given in the *Electric Railway Journal* of May 6 remain the same. They include provisions on extensions, reports to be submitted, right of city to buy property, etc.

Lynchburg Wages Reduced

According to a new wage bulletin dated May 17, 1922, wages of conductors and motormen of the Lynchburg Traction & Light Company, Lynchburg, Va., were reduced 5 cents an hour, 1 cent each two weeks extending over a period from June 1 to Aug. 1. This scale in cents per hour is as follows:

Year's Service	June 1 to June 15, 1922	June 16 to June 30, 1922	July 1 to July 15, 1922	July 16 to July 31, 1922	August 1, 1922 and Thereafter
First	38	37	36	35	34
Second	41	40	39	38	37
Third	42	41	40	39	38
Fourth	43	42	41	40	39
Fifth and thereafter	44	43	42	41	40

On Nov. 1, 1921 a wage scale became effective ranging from 39 cents to 45 cents an hour which was a reduction of 5 cents an hour from the schedule in effect to Nov. 1, 1921. With the present sliding scale reduction this makes two 5-cent reductions since October, 1921. The Nov. 1 scale for motormen and conductors in cents per hour was:

For the first year's service	39
For the second year's service	42
For the third year's service	43
For the fourth year's service	44
For the fifth year's service and thereafter	45

Report Submitted

Outlines Hollywood Improvements to City Council and Progress of Pacific Electric Railway

In addition to the proposed extensive program of the Pacific Electric Railway to expend $2,500,000 in constructing a subway 1 mile long out of its present Hill Street Terminal and the purchase of fifty new cars to improve the Hollywood street car service, as ordered by the California State Railroad Commission, Chief Engineer H. Z. Osborne, Jr., of the Los Angeles Board of Public Utilities has presented a report to the City Council outlining the progress the Pacific Electric is making with its improvements. The first of the new cars will arrive July 10 and the application for the subway franchise is in the hands of the city for adoption. The railway company has purchased a portion of the new right-of-way required for the subway.

BUS SERVICE RECOMMENDED

In Mr. Osborne's report to the City Council he outlined his plan for improving the Hollywood street car service, which included a change of the present 6-cent fare zone on the Pacific Electric Railway, the construction of a belt line about the business district of Hollywood, double-tracking and extensions of the Los Angeles Railway lines, the operation of a municipal bus line service in certain sections on Vermont Avenue, and bus line service in certain sections of Hollywood by the Pacific Electric.

The report states that the Pacific Electric has purchased the fifty new street cars for special Hollywood service and that the site for the west entrance of the proposed Pacific Electric subway under Bunker Hill has been obtained by the company. The utilities board's report states that it indorses a change of the 6-cent fare limit zone for the Hollywood district, now fixed for Sanborn Junction. It recommends that the zone limit be extended to Hollywood Boulevard and Vermont Avenue for the Hollywood Boulevard line, and Santa Monica Boulevard and Western Avenue for the Santa Monica Boulevard line.

BELT LINE PROBABLE

Additional improvements which the utilities board recommended were the operation of a belt line in the Hollywood district to serve local Hollywood needs and adequate transportation to provide crosstown service, such service to be provided by motor buses in the event that the extension of the Los Angeles Railway line is impossible at this time.

Des Moines Grant Invalid

Lower Court Rules Against New Franchise Awarded Last Fall—Decision to Be Appealed

Judge James C. Hume of the Polk County District Court has made a decision in the Des Moines City Railway franchise case in which he declared invalid the franchise recently secured by an overwhelming vote.

Judge Hume's ruling is on the suit brought by Grant Van Horn representing the North Des Moines Improvement League.

In brief he holds in his decision that the franchise is invalid because:

> It is an exclusive franchise.
>
> It was not properly advertised.
>
> It permits the company to charge a rate of fare in excess of that justified as a fair return upon the reasonable value of the property.
>
> The city of Des Moines was without power to repeal the existing 5-cent fare.
>
> The people have a vested interest in the then existing 5-cent fare franchise.
>
> The adoption of the franchise was outside the scope of the city's authority.

F. C. Chambers, general manager of the Des Moines City Railway, announced that his company would appeal the case to the State Supreme Court and until that decision was rendered would continue the 8-cent fare.

Former Corporation Counsel H. W. Byers, who conducted the case for the North Des Moines Improvement League, claimed that in view of Judge Hume's decision the railway, if it collected 8-cent fares, must give a receipt so that the rider may be protected for a refund of 3 cents.

A suit to restrain the city from holding the election was brought on Nov. 18, 1921. Judge Hume granted a temporary injunction restraining the holding of the election. The case was then taken to the State Supreme Court and an order was made by Justice Stevens permitting the election to be held and remanding the case back to the district court for trial.

The case was opened in the district court on May 29 and closed on June 9.

Further reasons than those mentioned above for rendering the decision are named by Judge Hume. He claims that the franchise ordinance contains more than one subject and subjects not clearly set out in the title. Further that the City Council passed the franchise ordinance without the proper legal publication.

In his decision Judge Hume criticised the tactics employed in conducting the pre-election campaign. The campaign was conducted by leading business men of the city and was in charge of Alexander Fitzhugh, a former president of the Des Moines Chamber of Commerce and now secretary-director of the Greater Des Moines committee. Mr. Fitzhugh's integrity has always been beyond reproach in Des Moines and he has been considered one of the most influential business men in Des Moines.

The outcome of the election held on Nov. 28 was a popular one and the vote was overwhelmingly for the new franchise. Since the franchise was granted the Des Moines City Railway has spent large sums of money in rebuilding and general satisfaction has been expressed over the improved service now being furnished.

The city of Des Moines will be a party to the appeal to the Supreme Court. This is a foregone conclusion. Some interesting developments in the Des Moines case may be expected during the next few months.

As a matter of fact the city of Des Moines has been injured by the damaging advertising its railway tangle has received in the past five years. It will be up to the higher courts to pass conclusively on the ruling made by Judge Hume, but to the great bulk of the citizens there is no satisfaction in the ruling just rendered.

Wage Agreement Renewed in Brooklyn

Announcement was made on June 28 that the present wage scale for employees of the Brooklyn (N. Y.) Rapid Transit System now in service in the respective groups of employees included in the Employees' Representation Plan would be continued for another year, until Aug. 3, 1923.

The Brooklyn City Railroad, through H. Hobart Porter, its vice-president, also announced that similar action had been taken in respect to the wage scale for its employees.

The decision to continue the present wage scale for these groups of employees for another year was based on the recommendation of the committees of employees' representatives elected under the Employees' Representation Plan. The recommendation of the Employees' Representatives was concurred in by representatives of the management. Their recommendation was based on a thorough investigation into the changes in living cost during the past year, which was made jointly by representatives of the employees and the management and extended over a period of five weeks.

Wage Matter to Be Settled by Arbitration

The dispute between the employees and the management of the Michigan United Railways over the wage reduction proposed by the company will be settled by an arbitration board. The wage agreement between the company and the union expired on May 31. Meanwhile the men are understood to be working at a reduction of 2 cents an hour under the old scale, pending the result of the arbitration award. John F. Collins, vice-president and general manager of the company, said:

> We are not getting in enough money to care for our cost of operation. We have cut expenses, at every possible corner, to the point where safety prevents further cuts. There remain only the wages for readjustment. The employees and the public are the only ones who benefit now from the operation of the road. Those who put their good money into the property are getting nothing in return and are standing by while the road goes further and further in the hole.

Subway Plan Outlined

Chicago Again Takes Steps Toward Consummation of Plan for Unification of Transit Lines

Means by which Chicago may take over surface and elevated lines and proceed with the construction of a subway system were outlined in a report and opinion, accompanied by the draft of a proposed ordinance, submitted to the local transportation committee of the City Council on June 26. It was expected that action by the City Council would be deferred until fall and a popular referendum held then.

Issuance of public utility certificates under authority of the municipal ownership act is the principal recommendation. The ordinance provides the city may not undertake operation or lease the properties until the proposition shall have been submitted to the electors. In their report the lawyers for the committee assert municipal ownership is "imperative and desireable" and point to the impossibility of financing extensions of present lines. Reference is made to the Parsons-Arnold-Ridgway report of 1916 that an initial construction program to double present facilities would cost at least $86,000,000, and that a completed plan would cost minimum of $275,000,000. The report continues:

> Obviously no such sums of money could be raised by the existing surface lines, dependent as they are upon short-term franchises, nor could they raise any such sums even if the laws of the state were so altered as to permit the granting of longer or indeterminate franchises. Further, we believe it has been demonstrated that the people of Chicago are not in favor of granting such longer or indeterminate franchises to privately-owned companies.

It is expected that Mayor Thompson will veto the proposed ordinance even if it passes the Council because he has a plan of his own which he believes will be revived when the next Legislature meets.

Plans to Extend Lines

E. A. Devereux, superintendent of the Fresno (Cal.) Traction Company, has announced that his company has ordered material for track extensions of the Fresno Avenue Line and the Tulare Avenue Line into Arlington Heights approximating $9,000. Delivery on the orders is expected in sixty to ninety days. The requisitions by the Fresno office call for rails, ties, overhead materials and special work. The greater part of the rails order comes from Pittsburgh, ties from northern California and the overhead materials from Eastern points. The Fresno Avenue extension is definitely settled, running north half a mile to Olive Avenue. But in the Arlington Heights district the traction company is awaiting an expression of opinion from the residents as to where the car line is most desired. The Arlington Heights line will be "tied in" with either the Tulare Street present line or the Fresno Avenue line. Total cost of the two extensions will be $107,000, it is stated.

Steam Line Electrification as Part of Interurban Project

Instead of building its own line between Dallas and Denton, 37 miles, the Texas Interurban Railway has entered into a contract with the Missouri, Kansas & Texas for the electrification and use of the latter's track between the two places. Under the terms of the franchise which the City Commission of Dallas granted the C. W. Hobson electrical interests in 1917 it is required that two interurban lines, each to be not less than 30 miles in length, be built out of Dallas within five years after the granting of the franchise.

The Texas Interurban Railway was organized to build the new lines. Its first one is to run to Terrell and this has been under construction for several months. It will be finished about Jan. 1, it is stated. The contract between the Texas Interurban Railway and the Missouri, Kansas & Texas for converting the Dallas-Denton line into electric trolley traction has been submitted for approval to the Federal District Court in St. Louis, in which the receivership of the Missouri, Kansas & Texas is vested.

It is stated that plans are all ready for the erection of the poles, the stringing of the trolley wires and the connecting up with the power transmission systems of the Texas Light & Power Company, subsidiary concern. The equipment will be of special design and will be built to order. The use of the track for interurban purposes will not interfere with the Missouri, Kansas & Texas through freight and passenger train service.

Wants Cities to Regulate Public Utilities and Control

The League of Texas Municipalities will stand sponsor for and seek enactment in Texas of a public utilities act, which shall provide machinery under which the cities can regulate and control public utilities. Action looking to the enactment of such legislation was taken by the league at its recent meeting in Waxahachie in the adoption of a resolution providing for the appointment of a committee of nine to make a study of utility legislation, to frame a bill meeting the needs of Texas municipalities and to work to secure the passage of such a bill through the Texas Legislature. The newly-elected president, Mayor E. R. Cockrell of Fort Worth, was empowered to appoint the committee called for by the resolution, and he announced his appointments.

It is announced that this committee will study the public utilities bill before the last regular session of the Texas Legislature and will try to determine just why that measure was defeated. A study will also be made of the decision of the United States Supreme Court in the Galveston street fare case, and a bill will be drafted that will be placed before the Legislature when it convenes next January.

At the concluding session of the league, Bryan was selected for the next meeting place and the following officers were elected: Mayor E. R. Cockrell, Fort Worth, president; C. H. Fulwiler, Mayor of Breckenridge, first vice-president; E. E. McAdams, city manager of Bryan, second vice-president; O. B. Black, Mayor of San Antonio, third vice-president.

Glendale Seeks New Railroad

Property owners of Glendale, Cal., have started negotiations with the Union Pacific System for a new electric line into Glendale, which would make use of the old Los Angeles & Salt Lake Railroad (Union Pacific System) tracks, now practically unused in the city of Glendale. It is understood that the Union Pacific asks the city to contribute a bonus of $25,000 from property owners who desire the line and proposes to ask certain other concessions from the city itself such as the acquisition of lumber yard property on Glendale Avenue for use as a terminus.

The new railroad if extended into Glendale would open up the eastern section of the city, the Montrose district and the Selvas de Verdugo territory by giving it additional trolley service, as this section of the city is at present partly served by the electric line of the Glendale & Montrose Railway. Glendale at present is served by the Pacific Electric Railway's interurban line between Glendale and Los Angeles, also the Pacific Electric operates local feeder bus lines in Glendale.

If the Union Pacific takes this step to serve Glendale the city does not know whether or not it would require the granting of a new franchise to the railroad. The Los Angeles & Salt Lake Line (now owned and operated by the Union Pacific) has a single track line entering East Glendale and to use it as an electric line would require the laying of an additional track.

Plans New Safety Campaign

The Kansas City Division, National Safety Council, has been reorganized and an aggressive program has been announced by the new officers. The program stresses traffic safety, but education is mentioned as a foundation element in the attainment of safe conditions. The first object aimed at is the regulation of motor traffic, the enforcement of rules under present ordinances and the enactment of new ordinances to check the reckless motorist.

The division has been reorganized by representatives from about thirty civic bodies, including the Chamber of Commerce and the Automobile Club, Mayor Cromwell being president of the Automobile Club and extending its co-operation. Julien H. Harvey continues as secretary of the division. Mr. Harvey, it will be remembered, had charge of the program for safety initiated by the Kansas City Railways several years ago, when important educational work was done by the railway through the public schools.

News Notes

Renews Franchise.—The Manhattan Bridge 3-Cent Line, New York, N. Y., has obtained a fifteen-year extension of its franchise. Under the renewal terms the company will pay the city 5 per cent of its gross annual earnings, but not less than $7,000 a year. The original franchise was granted in 1912.

New Agreement Ratified.—Members of Boston car men's union have accepted and ratified changes in the working agreement recently entered into by the trustees of the Boston Elevated Railway and the local wage committee. Some weeks ago the men accepted a new wage schedule which was given in the *Electric Railway Journal*, issue of May 20.

Will Try to Operate Line.—A short-term lease to operate the abandoned line between Millville and Bridgeton, N. J., has been obtained by Clayton McPherson. The Bridgeton - Millville Traction Company suspended operation on June 15 owing to jitney competition. The Board of Public Utility Commissioners has authorized the short-term lease.

Wages Reduced.—The wages of section men of the Arkansas Valley Interurban Railway were recently reduced from 35 to 30 cents an hour by the Kansas Court of Industrial Relations. The Arkansas Valley Interurban has its head office in Wichita, Kan. In giving this order the court made a decision applicable to all industries, that a shortage or surplus of labor is not a determining factor of whether employees can appeal to the industrial court to settle a wage dispute.

Franchise Being Sought.—Interests which the City Commission will not disclose are seeking a twenty-five-year franchise for the operation of street cars at Lima, Ohio. According to C. A. Bingham, city manager, the franchise is sought preliminary to the unnamed company taking over the street railway lines now owned by the Ohio Electric Railway. It is understood the negotiating company is close to the holders of the bonds of the Ohio Electric.

New Wage Agreement Being Negotiated.—Officials of the Interborough Rapid Transit Company, New York, N. Y., and the Interborough Brotherhood conferred on June 26 regarding an extension of the wage agreement which expires on July 1. The present agreement was first made last July when the men voluntarily accepted a 10 per cent reduction in pay in order to aid in keeping the system out of receivership. That agreement ran out the first of this year and was then renewed for six months. The 10 per cent cut last summer saved the company $7,000 a day, or about $2,600,000 a year.

Financial and Corporate

Financing Plan Announced

Arrangement Approved Under Which Eastern Pennsylvania Railways Will Be Reorganized

Of the 8,528 shares of preferred stock of the Eastern Pennsylvania Railways Company outstanding and held by the public, more than 7,200 shares, or over 84 per cent, have been deposited with the depositary under the reorganization agreement; and of the 39,174 shares of common stock outstanding in the hands of the public, more than 34,800 shares, or over 88 per cent, have been deposited.

EAST PENN ELECTRIC COMPANY

The stockholders' protective committee has formulated a reorganization plan calling for the organization of a new corporation under the laws of the State of Pennsylvania, under the name East Penn Electric Company, which will construct, own and operate a modern 25,000 kw. generating station, primarily to supply electricity to the Eastern Pennsylvania Railways. The new company, which, according to the plan, is also to take over the assenting stock of the Eastern Pennsylvania Railways, will have an authorized capital of 50,000 shares of no par value first preferred $7 per annum stock, 10,000 shares of no par value second preferred $8 per annum stock, and 150,000 shares of no par value common stock.

The new company, after the plan is declared operative, will issue the following securities:

Bonds:	
First mortgage 6%, 30-year gold bonds (first series)....	$2,500,000
Stocks:	
First preferred stock, no par value, cumulative dividends $7 per share per annum	12,000 shares
Second preferred stock, no par value, cumulative dividends $8 per share per annum	9,382 shares
Common stock, no par value (about)	100,347 shares

The $2,500,000 first mortgage bonds and the 12,000 shares of first preferred stock, together with approximately 22,000 shares of common stock, will be sold to provide funds for the erection of the new power plant. This purchase has already been underwritten and will provide more than $3,000,000 of new money for the purpose indicated.

DIVIDEND ARREARS FINANCED

Up to 9,382 shares of the second preferred stock will be issued to such of the holders of the present preferred stock of the Eastern Pennsylvania Railways as may participate in the plan, in exchange for their present holdings, at the rate of eleven shares of new $8 per annum second preferred stock for each ten shares of the present 5 per cent preferred stock of the Eastern Pennsylvania Railways with accumulated dividends. In other words, for each ten shares of the present preferred stock, the dividend on which is $50 in arrears, the holder receives eleven shares of new second preferred stock, the annual cumulative dividend on which will be $88, which it is expected will be paid.

Up to 78,347 shares of the no par value common stock of the new company will be issued to such of the holders of the present common stock of the Eastern Pennsylvania Railways as participate in the plan, at the rate of two shares of new no par value common stock of the East Penn Electric Company for each share of common stock of the Eastern Pennsylvania Railways now outstanding.

The first preferred stock of the new company will bear cumulative dividends at the rate of $7 per share, per annum, each share to be entitled to $100 and accrued dividends in case of liquidation, being preferred as to assets and dividends over the second preferred and common stock. The issue will be callable at $115 per share and accrued dividends. Dividends will accumulate from Jan. 1, 1923.

The second preferred stock of the new company will bear cumulative dividends at the rate of $8 per share per annum, each share to be entitled to $100 and accrued dividends in case of liquidation, preferred as to assets and dividends over the common stock; and to be callable at $110 per share and accrued dividends. The dividends will accumulate from April 1, 1923, and will be payable quarterly.

Under the proposed plan, when consummated, the East Penn Electric Company will own an unusually efficient modern power plant costing approximately $3,000,000, and also own all or most of the present preferred stock and common stock of the Eastern Pennsylvania Railways now outstanding in the hands of the public. Against these assets it is intended to have outstanding $2,500,000 of 6 per cent gold bonds secured by a first mortgage on the new power plant; 12,000 shares of first preferred stock, bearing cumulative dividends of $7 per share per annum; and not over 9,382 shares of second preferred stock bearing cumulative dividends at the rate of $8 per share per annum, and about 100,000 shares of no par value common stock. The present power plant is expected to be kept in operating condition as a reserve, and possibly to carry peak loads.

Through a power contract or through a lease of the new power house, the East Penn Electric Company will agree with the Eastern Pennsylvania Railways to supply all, or a major part, of the power generated at the new power plant to the Eastern Pennsylvania Railways and its subsidiary companies.

May Abandon Service

Local Company in Kenosha Files Application to Discontinue Service If Jitneys Compete

The Wisconsin Gas & Electric Company has applied to the Wisconsin Railroad Commission for a permit to discontinue and abandon its service in Kenosha in the event that the operation of competing jitneys is sanctioned by the City Council. The company also asked for a determination of what may reasonably be the duty of the petitioner to continue or resume such service. The hearing on the application is set for July 12 at the offices of the commission in Madison.

The application came as a surprise to Kenosha and it is understood to have been the outgrowth of the appeal to the Council of the Chicago, North Shore & Milwaukee Electric Railway for a permit to operate buses to connect its lines on the west side of the city with the downtown districts.

There are four specific demands put up to the commission in the application of the Gas & Electric Company.

1. That it be determined that if jitney competition be restored along the petitioner's lines, the petitioner will be entitled to abandon its said street railway system and discontinue service thereon.

2. That standards of service now prescribed for said system be reviewed and modified so as to authorize the discontinuance of all service in the event of restoration of jitney competition.

3. That it be determined that the commission will not require the petitioner to operate its said street railway system at a loss.

4. That the commission fix and prescribe the conditions under which it will require the petitioner to continue to furnish present standard of service upon said system as will more fully appear from the application.

New Bonds for Retirement Purposes

The Cincinnati, Newport & Covington Railway, Covington, Ky., announces that, for the purpose of retiring the $3,709,000 first and second mortgage bonds falling due on July 1, new bonds will be issued to be known as first and refunding mortgage bonds bearing 6 per cent interest and payable in twenty-five years. They will be secured by a mortgage on the properties and franchises in Ohio and Kentucky comprising the Cincinnati, Newport & Covington Street Railway system, now operated by a company of the same name, and the South Covington & Cincinnati Street Railway.

At the present time $4,000,000 of the new bonds will be issued. They are callable at 107½ during the first five years, at 106 during the second five, at 104½ during the third five, at 103 during the fourth five and 101½ during the last period of five years. The sinking fund will be cumulative at the rate of ½ of 1 per cent per annum.

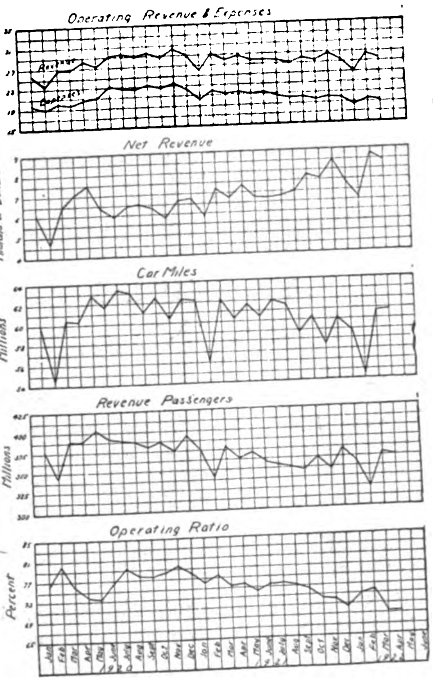
Figures Show Favorable Trend

Reports for the Last Sixteen Months from Eighty-one Companies Show Steady Improvement with Higher Net Earnings and Lower Operating Costs

EDMUND J. MURPHY, chief statistician American Electric Railway Association, has completed a tabulation for the sixteen months ending April, 1922, of the results of operation of the eighty-one electric railways whose earnings are compared at the association headquarters. According to Mr. Murphy there has been a gradual but very steady improvement of the underlying conditions of these properties and a rapidly decreasing operating ratio, which have made possible a steady increase in net earnings in spite of stagnant business.

The monthly revenue of the eighty-one companies represented in the accompanying table and charts is about $28,000,000 and represents approximately one-third of the total revenue of all the electric railways. Included in the properties compared are city lines, interurban lines, large and small systems of companies operating in all sections of the United States.

Attention is called to the decline in traffic (number of revenue passengers) which began in January, 1921, but in April 1921 became 6.5 per cent. The maximum was reached in August when there was a loss of 9.4 per cent. Owing to a higher rate of fare, the gross operating revenue did not decrease rapidly, and its maximum loss during 1921 was in September, when it was 6.6 per cent. Operating expenses, however, were decreasing and the operating ratio fell off almost as fast as traffic. This continuous decrease in operating ratio, in Mr. Murphy's opinion, is the most gratifying feature of the whole statement.



STATISTICS OF EIGHTY-ONE COMPANIES

Allowances should be made in the chart for the varying lengths of the months. Thus, for April, 1922, the lines for operating revenue, net revenue and passengers turn down, but the drop is not equal to the proportionate difference which would normally be caused by the difference in the length of the month. Actually the figures for April indicate the continuance of the favorable trend of the preceding months.

Receivership Proceedings to Be Concluded

The Fort Wayne & Northern Indiana Traction Company's receivership case—this company being the predecessor of the Indiana Service Corporation—which has been pending in the superior court for more than two years will be brought to a close with the decision in the last claim case against the receiver, the trial of which has just begun. The last claim is that of O'Connor & Sons who seek a judgment in the sum of $2,500 for grade work for the defunct traction company. After this case is concluded Robert M. Feustel, receiver for the old traction company, will file his final report and the last chapter will be written in the receivership proceedings which are said to be the most voluminous in the history of the local courts. There were nearly 1,000,000 words in the receivership decree.

Vacancy in Directorship Filled

The directors of the Cleveland (Ohio) Railway at a recent meeting elected Attorney Harry J. Crawford of the firm of Squires, Sanders & Dempsey, general legal counsel for the company, to the board of directors to fill the vacancy caused by the death early this spring of George L. Radcliffe, formerly vice-president. Mr. Crawford has been associated in a legal way with the company for twenty years and is considered an expert upon service-at-cost grants.

COMPARISON OF RESULTS OF OPERATION OF EIGHTY-ONE ELECTRIC RAILWAYS

	January		Per Cent Increase	February		Per Cent Increase	March		Per Cent of Increase	April		Per Cent of Increase
	1921	1920		1921	1920		1921	1920		1921	1922	
Operating revenue	$28,944,612	$25,891,484	11.8	$26,225,724	$23,611,649	11.1	$29,222,609	$26,738,860	9.3	$27,948,976	$26,819,112	4.2
Operating expenses	22,121,130	19,771,321	11.9	20,308,199	18,905,553	7.4	21,963,931	20,269,574	8.3	21,125,584	19,771,069	6.9
Net revenue	6,823,482	6,120,163	11.5	5,917,525	4,706,096	25.7	7,258,678	6,469,286	12.2	6,823,392	7,048,043	*3.2*
Operating ratio	76.4%	76.4%	....	77.4%	80.1%	*3.4*	74.3%	75.8%	*2.0*	75.6%	73.7%	2.6
Car miles	62,155,111	60,101,942	3.4	56,065,668	54,419,719	3.0	62,333,754	60,464,435	3.1	69,264,282	60,263,564	0.1
Passenger revenue	28,025,534	24,982,918	12.2	25,343,737	22,753,073	11.4	28,285,018	25,787,937	9.7	27,014,923	25,790,273	4.7
Revenue passengers	37,696,752	378,807,894	*0.5*	341,125,621	344,048,468	*0.9*	380,684,025	390,200,489	*2.4*	363,730,245	389,172,831	*6.6*
Average rate of fare*	7.43c	6.60c	12.6	7.43c	6.61c	12.4	7.43c	6.61c	12.4	7.43c	6.63c	12.1

	May			June			July			August		
Operating revenue	$28,722,481	$28,351,895	1.3	$27,848,773	$27,462,304	1.4	$27,883,813	$29,175,413	*4.4*	$27,662,414	$29,188,332	*5.2*
Operating expenses	21,312,103	20,836,514	2.3	21,030,309	21,070,591	*2*	21,146,140	23,119,554	*8.9*	20,806,428	22,734,107	*8.5*
Net revenue	7,410,378	7,515,381	*1.4*	6,818,464	6,391,713	6.7	6,737,673	5,955,859	13.1	6,855,986	6,454,225	6.2
Operating ratio	74.2%	73.5%	1.0	75.5%	76.7%	*1.6*	75.8%	79.6%	*4.8*	75.2%	77.9%	*3.5*
Car miles	61,715,330	62,926,944	*1.9*	60,524,706	61,780,198	*2*	62,045,199	63,400,785	*2.1*	61,582,685	63,049,241	*2.3*
Passenger revenue	27,760,333	27,228,684	2.0	26,764,224	26,378,913	1.5	26,841,786	28,033,124	*4.3*	26,602,452	28,264,453	*5.9*
Revenue passengers	371,172,207	404,018,343	*8.1*	359,278,529	390,165,049	7.9	355,079,420	389,454,886	*8.8*	351,909,481	388,177,285	*9.4*
Average rate of fare*	7.48c	6.74c	11.0	7.45c	6.76c	10.2	7.56c	7.20c	5.0	7.56c	7.28c	3.9

	September			October			November			December		
Operating revenue	$27,169,404	$29,098,389	*6.6*	$28,129,577	$29,569,530	*4.9*	$27,284,382	$28,753,028	*5.1*	$28,800,017	$30,229,716	4.7
Operating expenses	20,167,183	22,550,044	*10.5*	20,330,444	23,212,861	*12.4*	19,744,913	22,893,396	*13.8*	20,275,714	23,572,042	*14.0*
Net revenue	7,002,221	6,548,345	6.9	7,799,133	6,356,669	22.6	7,539,469	5,859,632	28.7	8,524,303	6,657,674	28.1
Operating ratio	74.2%	77.5%	*4.3*	72.3%	78.5%	7.9	72.4%	79.6%	*9.0*	70.4%	78.0%	9.7
Car miles	58,796,676	61,060,625	*3.7*	60,295,068	62,621,815	*4.7*	57,621,690	60,547,094	*4.8*	60,142,838	62,359,035	*3.6*
Passenger revenue	26,148,982	27,957,913	*6.5*	27,118,860	28,827,426	*5.9*	26,123,777	27,763,844	*5.9*	27,814,515	29,179,720	*4.7*
Revenue passengers	347,476,971	381,281,667	*8.9*	361,604,265	387,639,926	*6.7*	347,580,479	374,893,885	*7.3*	372,039,425	393,605,802	*5.5*
Average rate of fare*	7.53c	7.33c	2.7	7.50c	7.44c	0.8	7.52c	7.41c	...	7.48c	7.41c	0.9

	January†		Per Cent Increase	February†		Per Cent Increase	March†		Per Cent of Increase	April†		Per Cent of Increase
	1922	1921		1922	1921		1922	1921		1922	1921	
Operating revenue	27,417,848	$28,944,612	*5.3*	$25,092,268	$26,225,724	*4.3*	$28,519,019	$29,222,609	*2.4*	$27,617,750	$27,948,976	*1.2*
Operating expenses	20,038,437	22,121,130	*9.4*	18,537,361	20,308,199	*8.7*	19,732,925	21,963,931	*10.1*	19,189,576	21,125,584	*9.2*
Net revenue	7,379,411	6,823,482	8.2	6,554,907	5,917,525	10.8	8,787,094	7,258,678	21.1	8,428,164	6,823,392	23.5
Operating ratio	73.1%	76.4%	*4.3*	73.9%	77.4%	*4.5*	69.2%	75.2%	*8.0*	69.5%	75.6%	*8.1*
Car miles	59,025,584	62,155,111	*5.0*	54,353,327	56,065,668	*3.1*	60,835,436	62,333,754	*2.4*	60,856,490	60,264,282	*1.0*
Passenger revenue	26,533,518	28,025,534	*5.3*	24,104,142	25,343,737	*4.9*	27,347,165	28,285,018	*3.4*	26,630,527	27,014,923	*1.4*
Revenue passengers	355,650,144	376,967,528	*5.7*	324,098,107	341,125,621	*5.0*	366,073,643	380,684,025	*3.8*	362,582,014	363,730,245	0.3
Average rate of fare*	7.46c	7.43c	0.4	7.44c	7.43c	0.1	7.47c	7.43c	0.5	7.34c	7.43c	*1.2*

*Passenger revenue per revenue passenger.
Italics signify decrease.
†Partly estimated. The reports of 9 companies are estimated for April; 4 companies for March; 3 companies for February; and 1 company for January.

Commission Valuation Rejected

Brief by Interborough Rapid Transit Says Public Body's $174,221,056 Estimate Is Millions Too Low

In a brief filed with the New York Transit Commission on June 26 the Interborough Rapid Transit Company refused to be a party to the commission's proposed plan for a unified transit system and to sell its properties for anything like the $174,221,056 recommended as the value by the commission's valuation bureau. This valuation, said to be more than $40,000,000 less than the company's actual investment, was attacked as confiscatory.

The brief claimed a total valuation of $399,873,697, of which $331,747,697 was the estimate of the value of the physical property, based on the cost to reproduce, and $68,126,000 was claimed as the value of the company's subway leases. The brief attacked the commission's method of valuation as faulty in principle and with having failed to take account of many important items. In stating the specific reason why the company could not accept the commission's plan at its tentative valuation, the brief read:

> The commission's plan of September, 1921, offers only a 5 per cent return (and 1 per cent sinking fund) on the value which it may finally determine for the company's property; whereas, under contract No. 3, the company is allowed a preferential income of $11,135,000 after all operating expenses and taxes, or 8.76 per cent on its total investment in both the old and new subways.
>
> Under these circumstances the company, in justice to its security holders, cannot accept an unjustifiable reduction in its original investment along with the low rate of return proposed by the commission, especially in view of the fact that the evidence indicates the company's preferential will be earned during the entire period of the contract.

The brief contended that the United States Supreme Court, the State courts and public utility commissions had uniformly held that original cost was no proof of present value, that present value could not be ascertained in any rational manner other than by ascertaining what it would cost to reproduce the identical existing property, that the value must be fixed as of the time of the inquiry at the prices then prevailing, that appreciation as well as depreciation must be considered and that the law under which the commission's plan was developed permitted consideration of "cost to reproduce." The company said:

> The bureau, having failed to establish a value pursuant to the foregoing principles in the face of the well-known fact that the company's property can not be reproduced for anything like its original cost, its report is tantamount to a recommendation that the company's property be confiscated, which looks like an attempt to take advantage of the company's unfortunate temporary financial situation, for which the management is in no way responsible but which is due wholly to conditions brought about by the World War.

The brief attacked the "straight line" method of estimating depreciation used by the commission's engineers, and declared that the weight of legal authority was that only actual existing depreciation should be considered. It contended that the commission's engineers had discriminated against the company and in favor of the city in allowances for overhead, and had been wrong in excluding debt discount as an item. The commission's engineers were also criticised for having excluded a promotion payment of $1,500,000 in Interborough Rapid Transit stock to August Belmont, although the courts of the State had held that it was proper.

Financial News Notes

New Directors Elected.—Board of directors of the Tyler Traction Company, Sistersville, W. Va., has reorganized, electing Stephen G. Pyle, president and general manager; W. J. Neuenschwander, treasurer, and W. O. Harrington, secretary.

Receivership Hearing Adjourned.—Judge Julius Mayer has adjourned until October the hearing on the application for a receiver for the Interborough Rapid Transit Company, New York, N. Y., by the American Brake Shoe & Foundry Company and Clarence H. Venner.

Stock Offering Announced. — Bonbright & Company, New York, N. Y., are offering at 106 and accrued dividend $4,000,000 of the 8 per cent cumulative preferred stock of the Public Service Corporation of New Jersey. The stock is preferred both as to assets and dividends and will yield about 7.50 per cent.

New Georgia Issue Offered.—Stone & Webster, Boston, Mass., are offering a new issue of $2,000,000 Columbus (Ga.) Electric & Power Company 7 per cent cumulative first preferred stock, series A, convertible share for share into common stock at 96½ to yield about 7.25 per cent.

Operation Again Continued.—The Hartford & Springfield Street Railway, Warehouse Point, Conn., is to continue in operation until Dec. 15 at least, as Judge Kellogg in the Superior Court has ordered Receiver Harrison B. Freeman to continue the business for four months from Aug. 19, 1922.

Service to Be Resumed.—The Norwich & Westerly Traction Company expected to put into service again on June 30 that portion of its line between Westerly, R. I., and Hallville, just out of Norwich. Service had been suspended on this line in October, 1921. It is believed that the summer business will support the line.

I. T. S. Floats 5 per Cent Issue.—Estabrook & Company, New York, N. Y., are offering a new issue of $1,000,000 Danville, Champaign & Decatur Railway & Light Company 5 per cent bonds, due March, 1938, at 90 and interest, yielding 6 per cent. The issue is redeemable as a whole only, or in part, for the sinking fund at 104 and interest. These bonds are guaranteed as to the payment of both principal and interest by the Illinois Traction Company, Champaign, Ill.

Initial Common Dividend Declared.—The York (Pa.) Railways has declared an initial quarterly dividend on the common stock of 50 cents a share, placing it on a 4 per cent per annum basis. The dividend is payable on July 15 to stock of record of July 5. The board also declared the regular quarterly dividend of 1¾ per cent on preferred stock payable on July 30 to stock of record of July 20.

Receipts Smaller.—The Springfield (Mass.) Street Railway's receipts for the first five months of 1922 were more than $53,000 less than for the corresponding period of 1921, according to a statement from President Clark V. Wood. This is attributed to slack conditions in certain lines of industry, the effect of which is shared by the Worcester lines. The recent reduction in wages and better business in sight will count as factors in offsetting the loss of revenue.

Chattanooga Receivership Lifted. — A final decree in the receivership case of the Chattanooga Railway & Light Company has been entered in the United States District Court at Chattanooga, Tenn. The decree dismissed suits of the Commercial Trust Company and the Maryland Trust Company and lifted the receivership. It was an agreed decree, one step in the consolidation of various physical properties controlled by banking interests having their headquarters in New York and Philadelphia.

Seeks to Abandon City Service.—Another effort by the St. John's Electric Company to get rid of the franchise provisions for maintaining electric railway service in St. Augustine, Fla., has been made. W. A. Houston of the company has offered the city commissioners a proposition to maintain a much sought service to St. Augustine Beach in lieu of the contractual city service. The city service has been a losing matter for the company for months, but the commissioners doubt their authority to abrogate the franchise without consent of the people and are taking the offer under advisement.

First Dividend in Three Years.—The first dividend payment since February, 1919, to stockholders of the United Electric Railways, Providence, R. I., amounting to 1 per cent, will be made on July 1. An announcement to this effect was made by A. E. Potter, president of the company. He said that the disbursement would be made out of net earnings since the company took over the United Traction lines on July 9, 1921, and that this declaration did not necessarily mean that regular payments would be made to the stockholders. According to the plan of reorganization a 1 per cent disbursement would call for a payment of $82,848.

Traffic and Transportation

Announces Return of Five-Cent Fare

Cleveland car riders will again enjoy a nickel rate of fare either on Aug. 1 or shortly after that date, John J. Stanley, president of the Cleveland Railway, announced, following the meeting of the board of directors on June 22. Car riders are now paying a 6-cent fare with a 1-cent charge for transfer.

The directors at this meeting learned that the system in May piled up a surplus of $68,966, making an accumulated balance in the interest fund on June 1 of $393,124. The interest fund, which is the fare barometer, is expected to reach the $700,000 mark, at which the fare is automatically decreased, some time during the latter part of July. Due to wage reductions that became effective on May 1, and other economies in operation, the company's operating reserve fund accumulated a surplus of $152,737 in May, while the surplus in the maintenance and depreciation reserve fund amounts to $197,621. During May the company carried 34,591,620 riders, the largest number in any one month for the past twelve months and only 0.16 or 1 per cent less than May, 1921.

Paul E. Wilson, secretary of the company, says the May report indicates that business conditions in Cleveland are undoubtedly almost back to normalcy and that from now on the company's monthly reports will show traffic gains instead of losses, as has been the case for a year.

"The healthy condition of our various funds, together with the increase in traffic, indicates that our prediction of a return of a 5-cent fare early in August will be realized," said Mr. Stanley.

Through Service from Fort Wayne to Cleveland

Through passenger service on electric lines from Fort Wayne, Ind., to Cleveland, Ohio, has been arranged by the Indiana Service Corporation, according to an announcement just made by S. W. Greenland, general manager of the corporation. One car a day will be run through each way. This will be one of the longest through trips on an interurban railway in this part of the country.

It was originally planned to have the through service extended from the Ohio city to Indianapolis but through the inability of the Union Traction officials to agree to change their schedule to meet this, the service will only extend from Fort Wayne to Cleveland at the present time. The car which will come to Fort Wayne from Cleveland will continue south on the Indiana Service Corporation line and will make connections at Peru for Indianapolis. No definite date has been set for opening the service, but all the details have been worked out and it is probable that the schedule will be put into operation by about July 1.

Grants Fare Petition

Allowing the application of the Boise Valley Traction Company, Boise, Idaho, to make reductions on all round-trip rates where fare is greater than 36 cents, the Public Utilities Commission has granted the company's petition to lower the loop rates and make important changes in time tables. The reduction will amount to about 20 per cent of the present round-trip rate and will be effective June 16 for ninety days. The new rate will be 180 per cent of the present single-trip fare. Competition with the Oregon Short Line is given as the reason for the company's asking a reduction in fares.

Another Fare Reduction Expected

The Connecticut Company at Hartford, Conn., which voluntarily made a reduction in its fares on all lines on March 1, when it began selling three tokens for 25 cents, will make a further drop when industrial conditions improve. Mayor Kinsella of Hartford believes this step will bring about a greater use of the cars. He said that he had had many conferences with Lucius S. Storrs, president of the Connecticut Company; that Mr. Storrs had met him more than half way and that he had been assured by Mr. Storrs that when there was a sufficient improvement in the revenues with due regard to the financial obligations of the company a reduction in fares would be made.

P. A. Y. L. System Discontinued Temporarily

The P. A. Y. L. system of collecting fares has been discontinued on the lines of the New Brunswick Power Company, St. John, N. B., and suburbs of Fairville, Glen Falls, East St. John, Coldbrook, Eastmount, Beaconsfield. The company instituted the system in the hope of relieving congestion and speeding up traffic. There is no doubt but that the system speeded up traffic and relieved the congestion, but after it had been in operation a month it was found impracticable for one reason. That was due to passengers who broke through the emergency door at the rear, and escaped without paying fares. The door required repairs every day on virtually all the cars in operation, and after a close scrutiny of the number of persons who avoided paying fares and incidentally caused damage by opening the rear door, the company decided to revert to the P. A. Y. E. system, which has been in operation since the conversion of the rolling stock of the company into one-man cars.

California Railways Reduce Freight Rates

Rate reductions on the transcontinental railroads recently ordered by the Interstate Commerce Commission will concurrently apply on interstate rates, to be made effective July 1, 1922, according to announcement on June 7 by the California State Railroad Commission.

The announcement followed a conference between the commission and representatives of practically all carriers operating in California, at which the latter agreed to lower state rates to the level of the new interstate schedules. The reduction will be approximately 10 per cent of the 1920 rates and will amount to between $7,000,000 and $8,000,000 a year on California state and interstate freight traffic. In cases where the 1920 rates have already been reduced further reductions will be made to the 10 per cent level. Where rates have already been reduced by 10 per cent or more no further changes will be made. There will be no increase in rates.

In situations where certain differentials are maintained as between shipping points the relationship of rates will be continued. This in some instances may result in reductions not exactly on a 10 per cent basis. Among the electric railways represented at the conference were: Central California Traction Company, Fresno Interurban Railway, Holton Interurban Railway, Modesto & Empire Traction Company, Pacific Electric Railway, Sacramento Northern Railroad and San Francisco-Oakland Terminal Railways.

Pamphlet Shows Development of Interurban System

The Pacific Northwest Traction Company, which operates the Seattle-Everett interurban, the Bellingham-Mount Vernon and Sedro Woolley interurban lines, and the motor buses between Everett and Mount Vernon, which connect up the electric lines, has issued a new folder "The Interurban Lines," which shows that a comprehensive system of interurban transportation has been worked out, covering all the territory between Seattle and the Canadian boundary, and reaching, via Anacortes, into the San Juan Islands. The company maintains a half-hourly service out of Seattle to Everett, where the motor bus connections are made. The trip between Seattle and Bellingham is continuous and is frequent, it being possible to go straight through by leaving Seattle on the hour each day, and return in less than four hours running time. Connections are had at various points for places off the direct route, and at Anacortes with both the Vancouver Island ferry and the San Juan Island boats. All stages from Snohomish and Whatcomb Counties, points outside Everett and Bellingham, enter and leave the bus terminals operated as a part of the interurban system.

One-Man Cars May Be Added to Equipment

Operation of one-man cars in Cincinnati, Ohio, is under consideration by the Cincinnati Traction Company. Walter Draper, vice-president of the company, who made this announcement, also said that in the event the plan is adopted the one-man cars would be operated on the suburban lines first. The first intimation that the traction company had the one-man car plan under consideration was contained in a letter sent to the officers of the motormen and conductors' union by W. Kesley Schoepf, president of the traction company, in which he requested the men to accept a 10 per cent wage reduction when their contract with the company expires in July. In the letter Mr. Schoepf also requested that the clause in the contract pertaining to the use of motormen for conductors and the opposition be so modified as not to apply to the one-man car plan.

Plans Under Way for Reducing Fare

Mayor-elect A. V. Fawcett has started a campaign to reduce car fares in Tacoma, but is not yet ready to announce his plans for the reduction. Although no definite arrangement with the Tacoma Railway & Power Company has been reached, it is known that a plan for lowering fares is being formulated if tickets are purchased in blocks of twenty, with a 10-cent fare maintained for casual riders. Tentative plans provide for selling six rides for $1, with transfer privileges, or twenty rides for $1 without transfer. In return for the concession, it is suggested that the city eliminate free riding for city employees, eliminate paving between tracks for a limited period and stop its sale of electric power from the city plant outside the municipal limits. Mayor Fawcett states that he has urged upon the railway company the removal of its tracks and the substitution of trackless trolley buses.

Routing and Economies to Be Investigated

A. Morris Buck and P. J. Boeser of New York City, now in New Orleans, representing J. A. Beeler, traffic expert, will begin at once the work of making a survey of the New Orleans Railway & Light Company's property. They will have a force of about thirty technical men assisting them. After having checked up the present street car routing system that obtains here and made recommendations to the Commission Council based upon these investigations, the experts will turn their attention to the economies of the operation of the system. The difficulties which New Orleans is experiencing today are those which have had to be met and overcome in a great many cities in the United States, the experts say, where a conflicting system of routing cars prevails.

Transportation News Notes

Summer Privilege for Children.—According to a recent vote of the trustees of the Boston (Mass.) Elevated Railway children under fourteen years of age may ride for 5 cents on any line of the property during July and August.

Five-Cent Fares Effective.—Five-cent fares have gone into effect on the lines of the London (Ont.) Street Railway. Strip tickets at five for 25 cents will be sold on the cars. There will be no special rates during rush hours as before.

Receiver Wants Seven-Cent Fare Extended.—The attorney for Receiver Wells of the United Railways, St. Louis, has applied to the Missouri Public Service Commission for an extension of the present 7-cent fare until further settlement of the valuation matter.

One-Man Cars in Operation.—The Olean, Bradford & Salamanca Railroad, Olean, N. Y., has started the operation of one-man safety cars on the local lines of the company in Olean. It is planned to place them in service very shortly in Salamanca, N. Y., and Bradford, Pa., in which the company operates the local traction service.

Equipment Changes Made.—The rolling stock of the New Brunswick Power Company in St. John, N. B., and suburbs has been entirely repainted in green, replacing the red. The large electric signs on the roof of the cars have been removed. Painted signs have been placed in the front windows and also on the side windows near the ends of the cars.

Card Gives Operator's Name.—An innovation on the part of the New Brunswick Power Company operating the railway in St. John has been the placing of cards in each of the cars naming the operator of the car. The card reads as follows: This car is operated by ——— ———. The cards, 18 in. x 10 in., were placed in the advertising racks.

Petitions Against One-Man Cars.—As the result of a recent accident in Meriden, Conn., in which a one-man car figured, a petition has been sent to the Public Utilities Commission protesting the use of one-man cars in the city. There was a hearing some weeks ago on the objection of the city of Meriden to one-man cars at places with steep grades. The commission at that time dismissed the petition.

Allows Freight Reductions.—Under an order issued June 13 by the Public Utilities Commission of Utah, interstate railroads operating in Utah are permitted to reduce their intrastate freight rates to a parity with the interstate rates ordered reduced by the Interstate Commerce Commission effective July 1. The order follows an application to like effect presented in behalf of the Utah railroads by the Pacific Freight Traffic bureau.

Special Rates Being Arranged.—New tariffs are being filed with the interurban connections of the Northwestern Ohio Railway & Power Company at Toledo, Ohio, for points in western and central Ohio. A special commodity rate is also being prepared for points on this railway to Ryan, Ohio. This will be a material reduction in carload rates when handled in box cars and is being made for the purpose of competing with local truck lines. The new tariffs will apply particularly to shipments of the fruit crop.

Interurbans Agree on Fare Cut.—The plan for putting into effect the 1,000-mile book by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been indorsed by the Eastern Wisconsin Public Service, Milwaukee Northern, Wisconsin Traction, Light Heat & Power and the Wisconsin-Minnesota Light & Power Companies. The details of the scheme in effect on the lines of the Milwaukee Electric Railway & Light Company's lines were outlined in the *Electric Railway Journal*, issue of May 6, 1922.

Six-Cent Fare Extended.—The City Council of Vancouver, B. C., recently extended the period of time in which the British Columbia Electric Railway is authorized to charge a 6-cent fare in Vancouver, to Dec. 15, 1922. The 6-cent fare agreement normally would have expired shortly. The railway agreed, in return, to extend its service and to maintain its present wage scale to employees until a new fare agreement is reached, either before a board of arbitration, or by the proposed utilities commission which may be set up by the provincial government this summer.

Coins Instead of Tickets. — The Northern Massachusetts Street Railway, Athol, Mass., recently bought 30,000 metal coins for use in place of car tickets sold at a reduced rate. So heavy is the demand for these that it has been found necessary to order 20,000 more. On investigation it was found that the unexpectedly large purchases of the coins were due to withdrawals by residents of the rural towns, who buy several dollars' worth and keep them until they are used, whereas the urban patrons, riding more frequently, keep the coins in circulation.

Seven-Cent Fare Extended.—An ordinance has been passed by the City Council of Cincinnati, Ohio, granting the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad permission to continue a 7-cent fare within the city limits for a period of one year from July 9. Stanley Shaffer, attorney for the receivers of the interurban company, had asked for a two-year extension of the rate of fare. The committee on street railways decided, however, that conditions in another year may warrant a reduction and that if they did not, the ordinance might be re-enacted for another year.

Personal Mention

Presidency Changes in West

William von Phul Leaves Market Street Railway for New York—C. N. Black Succeeds Him

William von Phul, president and general manager of the Market Street Railway, San Francisco, Cal., has resigned to give his entire attention to Ford, Bacon & Davis, Inc., of which he is president and whose interest will require his continuous presence in New York. His resignation is to be effective July 1. Mr. von Phul went to San Francisco six years ago from New Orleans where he was identified with railway properties of the Ford, Bacon & Davis company. For three years he was vice-president and general manager and the last three years has been president of the San Francisco system. A statement expressing his regret at leaving San Francisco includes the following comment: "San Francisco must realize that without a unified system of transportation through municipal ownership, or some modification of its present franchise granting powers which will permit a private corporation to develop in peace with the city, it cannot realize its full development."

Col. C. N. Black, vice-president of Ford, Bacon & Davis, Inc., has been appointed by the board of directors of the Market Street Railway to succeed Mr. von Phul as president and general manager. Mr. Black was president of the American Electric Railway Association in 1915 and was at that time vice-president and general manager of the San Francisco system which was then called the United Railroads. His connection with the system dates back to 1907 and was terminated in 1916 when he resigned to become purchasing agent for the Allied Ordnance Department. Later he was commissioned in the U. S. Army and went overseas as assistant chief of ordnance in the American Expeditionary Forces. In announcing Colonel Black's appointment, the board of directors of the Market Street Railway stated that no other changes in the organization were contemplated at this time.

R. W. Altekruse to Adjust Claims

Robert W. Altekruse has been appointed claim adjuster of the Indiana Service Corporation, Fort Wayne, Ind., the Fort Wayne, Van Wert & Lima Traction Company, Lima, Ohio, and the Fort Wayne & Decatur Traction Company, Decatur, Ind. Mr. Altekruse succeeds F. R. Fahlsing who died recently.

Mr. Altekruse's railway connections began in 1912 when he joined the Fort Wayne & Northern Indiana Traction Company, as assistant cashier in the auditing department. A year later he was appointed assistant claim adjuster of that company and has continued in this capacity until his present promotion as claim adjuster. Mr. Altekruse is a graduate of the Fort Wayne Business College.

B. E. Tilton, President

Vice-President and General Manager at Syracuse Heads New York Electric Railway Men

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B. E. TILTON

To know the new president of the New York Electric Railway Association in his job as manager of the New York State Railways at Syracuse one might think that he was born to that estate, so naturally does he go about the work of discharging the duties of the executive post. Such is not the fact, however. Benjamin E. Tilton was not born to any such estate. He is by profession an engineer. But he is not an engineer first, last and all the time. If he were he would probably not be an executive. Many very able executives were trained originally as engineers, but they are not successful executives because of such training, but to a large degree in spite of it. The engineer who aspires to become an executive must be able for a substantial part of the time to forget that he is an engineer and use the exact knowledge of his technical training as a balance wheel to prevent him from attempting, as an executive, to accomplish the impossible. This is just what Mr. Tilton has been able to do.

To those who have watched him at work, Benjamin E. Tilton's present job looks easy. This is only because Mr. Tilton has mastered the job instead of letting the job master him. His engineering training helped him to do this. In fact, no task is ever likely to master Mr. Tilton that can be accomplished by the application of a combination of tact, tenacity and technology. Mr. Tilton brought all three of these adjuncts to bear on his first job down in Porto Rico with the government service making geodetic and coast surveys and he has been using the combination with success ever since. And with every new application of them by Mr. Tilton has come added ease in their use and greater success to their possessor through their application.

It was said that the government work in Porto Rico was Mr. Tilton's first job. Well, it was his first job after he was graduated from Cornell in 1897. He was in Porto Rico for three years. And then came to Mr. Tilton the call of private enterprise. It was a loud call, and he heeded it to become engineer of construction of the Pennsylvania Lines West and was located at Fort Wayne and Cleveland for six years. At Cleveland Mr. Tilton's fine work attracted the attention of the management of the Cleveland Railway and he was induced to join the select circle of very able men who administer that property. His title there was engineer of maintenance of way. Then and there Mr. Tilton was won over to the electric railways. His next connection was with the Rochester Railway & Light Company as engineer of maintenance of way of city and suburban lines. The Rochester lines are tied in with the New York State Railways and so it was in reality only a step for Mr. Tilton in his upward climb from the post in Rochester to the position of general manager of the Syracuse Rapid Transit Company, Utica & Mohawk Valley Railway and the Oneida Railway. His election as vice-president followed quite logically. In this dual post at Syracuse Mr. Tilton also has jurisdiction over the Oneida and the Utica lines.

W. C. Kline Temporarily Succeeds D. H. Blanks

According to an announcement made at the offices of General Manager E. B. Moore, W. C. Kline assumes the duties of active manager of the railway department of the Monongahela Power and Railway Company at Fairmont, W. Va. This follows the resignation of Vice-President Don H. Blanks. Mr. Kline, who has been chief engineer of the company for a number of years, will continue in this capacity, dividing his time between the two departments.

While his education and training have been along engineering lines, Mr. Kline is no stranger to the railroad operating business. He came to the local company from the Western Maryland Railway, where he was one of the young engineers on the staff of Carl R. Gray. His association with the operating department of that system makes him fitted in every manner for the work that has been assigned to him.

The order placing him in charge of the operation of the local railroads states that he will serve in this capacity until the vacancy is permanently filled.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Business Conditions

In discussing market conditions the National Bank of Commerce, New York, states that industrial stability has been more nearly attained in the past thirty days than at any time since the beginning of the World War. Some industries have shown moderate gains, in others conditions have altered but little and in a few lines a seasonal dullness has occurred. The unfavorable factors in the situation are the continued deadlock in the coal strike and in the textile mills of New England and threats of strikes by those classes of railroad labor affected by recent decisions of the United States Labor Board.

Iron and steel output for May showed further gains, and the unfilled orders of the United States Steel Corporation have increased.

The cement, lumber and brick industries have met with some difficulty in satisfying demand because of the large volume of building and construction under way throughout the country.

In the past month there have been important decisions affecting the railroads. These are a horizontal cut of 10 per cent in freight rates, a reduction to 5¾ per cent of the "fair return" basis for purposes of fixing rates, and a series of wage reductions affecting 800,000 men. The effect of the cut in freight rates can not now be gauged, and the reduction in the "fair return" basis is not likely to have any immediate effect, but the action of the Interstate Commerce Commission is regarded in some quarters as indicating a continuation of its policy, which has militated against securing adequate capital. Wages constitute the most important phase of the problem of rates. The reductions ordered by the United States Railroad Labor Board are estimated at $100,000,000 annually.

Difficulties Met in Putting in New Track

Last of the cable equipment in the Twin Cities is being torn up with the relaying of the trolley rails on Selby Avenue in St. Paul. The street railway system in St. Paul was electrified before the cable equipment was utilized in Minneapolis and the rails and underground work long ago disappeared, but in St. Paul the cable was utilized on Selby Avenue until the hill was tunneled some time ago, giving better access to lower town. Workmen find the rails and channels were laid in imported cement, which is as hard as granite to break up. Because a diamond drill has to be utilized to break up the roadbed, and the steel channels for the cable have to be cut with oxyacetylene gas, the relaying of the road on Selby Avenue consumes more time than is usually required for similar work.

Chambers of Commerce to Appoint Coal Committees

Julius H. Barnes, president of the Chamber of Commerce of the United States, has asked the members of that organization to help prevent a "runaway" coal market, by appointing fuel committees to make a survey of the local coal situation. In a letter urging such action, Mr. Barnes speaks of Secretary Hoover's suggestion to the utilities, railroads and metallurgical industries that each appoint a buyer's committee to secure and distribute such coal as is needed by these industries, and he believes that for the same reason local communities can best act through their local chambers of commerce.

Cars Under Construction for Georgia Railway

Twenty new trolley cars are now under construction at Paris, Ill., for the Georgia Railway & Power Company, and will be delivered in Atlanta by Oct. 1, 1922, and immediately pressed into service, according to F. L. Butler, general operating manager of the company. The cost of these cars is $13,000 each and they have seating capacity for forty-eight passengers.

Mr. Butler stated that during 1921 the company added twenty-nine new cars to its equipment and that during the next five years it plans to add twenty-five to thirty of the large type cars annually. The older cars are to be gradually retired.

The present order is the last the company will place with outside concerns as hereafter the cars used in Atlanta will be constructed at the railway company's own plant, operations to be resumed there in the early part of 1923, Mr. Butler stated. This plant has been shut down since the war.

New Rails Planned

Seven miles of track on the combined Connecticut Valley, Northern Massachusetts and the Concord, Maynard & Hudson Street Railway systems, operating in Greenfield, Athol and Maynard, Mass., respectively, are to have new rails this season. Prominent among the renewals is a 1½-mile stretch extending from the railway station northward in Deerfield Street, Greenfield. New track will be laid over the concrete bridge across Millers River in Athol when that structure is completed. Beginning June 17 cars were routed over a temporary bridge.

These companies have gradually converted their cars into the one-man type until more than 90 per cent of the entire outfit is being operated on the one-man plan, with satisfactory results.

ELECTRIC RAILWAY MATERIAL PRICES—JUNE 27, 1922

Metals—New York

Copper, electrolytic, cents per lb	13.812
Lead, cents per lb	5.75
Nickel, cents per lb	36.00
Zinc, cents per lb	5.625
Tin, Straits, cents per lb	31.00
Aluminum, 98 to 99 per cent, cents per lb	19.00
Babbitt metal, warehouse, cents per lb.:	
Fair grade	21.00
Commercial	11.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$6.075
Somerset mine run, Boston	3.425
Pittsburgh mine run, Pittsburgh	....
Franklin, Ill., screenings, Chicago	....
Central, Ill., screenings, Chicago	....
Kansas Screenings, Kansas City	3.05

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$35.00
Standard open hearth rails, gross ton	$40.00
Railroad spikes, drive, Pittsburgh base, cents per lb	2.30
Tie plates (flat type), cents per lb	1.875
Angle bars, cents per lb	2.40
Rail bolts and nuts, Pittsburgh base, cents, lb.	3.625
Steel bars, cents per lb	1.675
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	1.35

Hardware—Pittsburgh

Wire nails, cents per lb	2.25
Sheet iron, (24 gage), cents per lb	4.20
Sheet iron, galvanized, (24 gage), cents per lb	4.90
Galvanized barbed wire, cents per lb	3.10
Galvanized wire, ordinary, cents per lb	2.75

Waste—New York

Waste, wool, cents per lb	13.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	9.50
Colored	7.50

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	91.00
White lead, (100 lb. keg), cents per lb	12.25
Turpentine, (bbl. lots), cents per gal	1.48
Car window glass, (single strength), first three brackets, A quality, discount*	84%
Car window glass, (single strength), first three brackets, B quality, discount*	86%
Car window glass, (double strength, all sizes, A quality), discount*	85%
Putty, 5 lb. tins, cents per lb	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	15.75
Rubber-covered wire, cents per lb	6.25
Weatherproof wire base, cents per lb	15.50

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd	$3.20
Common, per sq.yd	3.00
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.17
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	49.50
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	2.07
Gravel, ¾-in., cu.yd., N. Y	1.75
Sand, cu.yd., N. Y	1.00

Old Metals—New York

Heavy copper, cents per lb	10.00
Light copper, cents per lb	9.187
Heavy brass, cents per lb	5.625
Zinc, old scrap, cents per lb	3.062
Yellow brass, cents per lb (heavy)	5.50
Lead, heavy, cents per lb	4.50
Steel car axles, Chicago, net ton	$14.75
Old car wheels, Chicago, gross ton	18.25
Rails (short), Chicago, gross ton	16.25
Rails (relaying), Chicago, gross ton	25.00
Machine turnings, Chicago, gross ton	6.50

Passenger Cars Ordered During First Part of 1922

The Number of Passenger Cars Ordered by Electric Railways in the United States from Jan. 1 to June 15, 1922, Exceeds the Total Number Ordered During the Entire Year of 1921

From the large number of orders for passenger cars which were being reported in our Rolling Stock columns, it was evident some time ago that a large number of new cars were being purchased by electric railways. To obtain definite information, the editors have asked the various carbuilders to furnish a list of car orders placed between Jan. 1 and June 15, of this year. The accompanying table shows the results of the information received from the carbuilders, together with information which we have previously published in our Rolling Stock columns. This method of obtaining information as to the cars ordered differs from that usually practiced by the *Electric Railway Journal* in its statistical issue published the first of each year, as in the statistical issue information is obtained direct from the various operating companies and is supplemented and checked by information received from the manufacturers. In this case, no attempt has been made to solicit information from operating companies. Also, no orders have been tabulated for cars outside of the United States. Several orders have been reported for Mexico, South America, South Africa and Canada, which shows that there is considerable buying for export also.

The total number of passenger cars ordered, as indicated by this information, is 1016. This exceeds the number purchased during 1921 by 122 cars. In the information received, no attempt has been made to tabulate orders for work cars or miscellaneous equipment and the orders shown are for passenger cars only. The list certainly looks good and it is evident from the large number of railways who are contemplating orders, that the buying from now on will be still more active. The recent stiffening of the steel market and the competition for skilled labor, which has set up, due to the buying activity in the steam carbuilding industry, may have an effect upon the price of rolling stock for electric railways. It would therefore seem that the present is the best time to buy.

A study of the accompanying table shows that orders for safety cars still constitute the large amount of the rolling stock and that the buying has been almost entirely for city and suburban service. Considering the classes of equipment ordered there were 443 safety cars, 107 special type of one-man cars, 404 other types of city cars, 12 interurban cars and 50 elevated cars ordered.

In the arrangement of the table, the various companies have been separated into districts, as has been the standard practice of this paper in tabulating such information for several years past. As is to be expected, the districts north of the Ohio and east of the Mississippi River have purchased the greatest number of cars, this being 324. The district west of the Mississippi has purchased 271 cars, the New England district 246 and the district south of the Ohio and east of the Mississippi 175 cars. It is evident that the car orders are quite generally distributed over the United States, which is a further indication that improved conditions in the electric railway industry are quite universal.

New Line for Miami, Oklahoma

Miami, Okla., will have a new electric line to Pawhuska in the near future. Miami has already raised her quota of $210,000 for the new line. The Chamber of Commerce of Miami is back of the new electric railway and will do all in its power to see the road completed. The Northeast Oklahoma Railroad will extend its line from Miami. This road has been for some years past a steam line, connecting Picher, Century, Cardin, with Miami on the south. Recently this road was electrified and was made an important unit in travel between Joplin, Mo., and Miami, Okla., connecting with the Southwest Missouri Railway at Picher. With the electric railway from Carthage, Mo., to Miami, Okla., and with the completion of the line to Pawhuska there will be electric lines for a distance of more than 140 miles. The Northeast Oklahoma Railroad has its main offices at Miami. H. B. Cobban is the general manager.

PASSENGER CARS ORDERED JAN. 1 TO JUNE 15, 1922

New England District

	No.	Type	Car Builder
Connecticut:			
Connecticut Co.	10	Safety	W
Connecticut Co.	25	Safety	O
Maine:			
Androscoggin & Kennebec Ry.	3	Safety	W
Central Maine Pwr. Co.	3	D. T. Safety	W
Central Maine Pwr. Co.	1	Closed Motor	W
Central Maine Pwr. Co.	3	Safety	W
Massachusetts:			
Boston Elevated Ry.	100	Closed Motor	B
Eastern Mass. St. Ry.	25	D. T. Safety	B
New Hampshire:			
Nashua St. Ry.	1	Safety	W
Rhode Island:			
United Electric Rys.	25	Safety	O
United Electric Rys.	50	U. T. Safety	O
Total for New England District	246		

North of the Ohio and East of the Mississippi River

	No.	Type	Car Builder
Illinois:			
Ill. Traction System	95	D. E. Safety	A
Indiana:			
Interstate Pub. Ser. Co.	5	D. T. One Man	C
La Fayette St. Ry.	15	D. E. Safety	B
New Jersey:			
Atlantic and Suburban.	6	D. E. Safety	B
New York:			
Binghamton Street Ry.	7	D. T. Motor	C
Poughkeepsie & Wappingers Falls Ry.	10	Safety	O
Ohio:			
Dayton Street Ry.	15	Safety	C
Pennsylvania Ohio Power & Lt. Co.	5	D. E. Safety	B
Steubenville E. Liverpool & Beaver Valley Trac. Co.	25	D. E. Safety	B
Western Ohio Ry. Co.	10	Interurban	K
Youngstown & Suburban Ry.	2	Interurban	K
Pennsylvania:			
Conestoga Traction Co.	10	D. E. Special Safety	B
Erie & Suburban Ry.	25	D. E. Safety	B
Eastern Pennsylv. Rys.	2	Semi-Conv. Motor	B
Frankford Elev. Ry.	50	Elev. Motor	B
Johnstown & Somerset Ry.	2	Lt. Wt. Motor	K
Pittsburg Rys.	40	D. T. Motor	P
Total North of Ohio and East of Mississippi	324		

South of the Ohio and East of the Mississippi River

	No.	Type	Car Builder
Florida:			
Jacksonville Trac. Co.	20	Safety	S
Pensacola Electric Co.	8	D. E. Safety	A
Tampa Elec. Co.	4	Special Safety	A
Tampa Elec. Co	20	Safety	S
Georgia:			
Columbus Elec. Co.	3	Safety	S
Georgia Ry. & Pwr. Co.	20	D. T. Motor	M
Georgia Ry. & Pwr. Co.	6	Paye	C
Savannah Elec. Co.	30	Safety	S
Kentucky:			
Kentucky Traction & Terminal Co.	10	Con. Motor	C
Virginia:			
Virginia Ry. & Pwr. Co.	50	Safety	B
West Virginia:			
Tygarts Valley Traction	4	D. E. Safety	B
Total South of the Ohio and East of Mississippi	175		

West of the Mississippi River

	No.	Type	Car Builder
California:			
Los Angeles Ry.	25	D. T. Motor	S
Pacific Elec. Ry.	50	D. T. C. E. Motor	S
San Diego Elec. Co.	10	D. E. Safety	A
San Francisco Municipal	20	C. E. Motor	A
Union Traction Co.	4	D. E. Safety	A
Colorado:			
Western Lt. & Pwr. Co.	1	D. E. Motor	A
Iowa:			
Des Moines City Ry.	20	P. A. Y. E.	M
Sioux City Service Co.	5	S. E. Motor	A
Louisiana:			
New Orleans Ry. & Lt. Co.	75	Closed Motor	B
Shreveport Ry.	5	D. E. Safety	A
Mississippi:			
Delta Light & Traction Co.	1	D. E. Safety	A
Missouri:			
Kansas City Rys.	20	D. T. Motor	K
Texas:			
Houston Elec. Co.	25	D. E. Safety	A
Houston Elec. Co	10	Special Safety	A
Total West of Mississippi River	271		

Car Manufacturers

A. American Car Company
B. The J. G. Brill Company
C. Cincinnati Car Company
K. The G. C. Kuhlman Car Company
M. McGuire Cummings Mfg. Company
O. Osgood Bradley Car Company
P. Pressed Steel Car Company
S. St. Louis Car Company
T. Perley A. Thomas Car Works
W. Wason Manufacturing Company.

C. E.—center entrance; D. E.—double-end.; D. T.—double-truck

Track and Roadway

Southwestern Gas & Electric Company, Texarkana, Ark., has started the work of raising and lowering its tracks on paved streets to conform to the established grades of the streets.

Three Rivers (Que.) Traction Company is contemplating extensions on Boulevard Normand, Bellefeuille and St. Phillippe Streets. They will cost in the neighborhood of $75,000.

Boise (Idaho) Railroad and the Idaho Traction Company have entered into an arrangement for eliminating duplication of service. The agreement takes into consideration the extension of the Eighth Street line from Front to Julia Davis Park.

New York, N. Y.—Bids were received by the Transit Commission on June 9 for the furnishing and installation of 1,200 enameled direction signs to be placed in the Interborough and Brooklyn Rapid Transit subways, and bids for the completion of built-in newsstands in stations on several of the new lines. The several bids upon both contracts have been referred to the commission's engineers for report.

Indiana Service Corporation, Fort Wayne, Ind., petitioned the board of public works of Fort Wayne for a double track franchise on Columbia Avenue to Kensington Boulevard to a width of 17 ft. 1 in. and the petition was granted by the board of works. The Western Construction Company was given the contract. The petition of the corporation for a franchise to extend the Columbia Avenue lines from Kensington to Anthony Boulevard was referred to the city attorney for an opinion. The board is favorable to the project, it is said.

Dallas Southwestern Traction Company, Dallas, Tex., has been granted an extension until Dec. 31, 1922, for building the first 10 miles of the proposed interurban line from Dallas to Denton, Tex., a distance of 30 miles. The original franchise was granted the Dallas Southwestern Traction Company, headed by E. P. Turner as president, on Sept. 30, 1917, and since that time there have been numerous extensions. The company represented that the costs of grading for its line between Dallas and Irving, a distance of 10 miles, have been found prohibitive, exceeding by far original estimates.

Dayton & Western Traction Company, Dayton, Ohio, has been granted a fifty-year franchise in Montgomery County, Ohio. Resolutions to this effect were adopted by the county commissioners at a meeting held on June 19. The company's first franchise, running for a period of twenty-five years, expired March 11, 1922. Since that date, negotiations for the new franchise have been in progress. Application for a fifty-year franchise was first made by counsel for the company, but the county refused to grant the request until a clause was inserted in the franchise whereby the franchise would be terminated automatically if the railway company ceases to operate an electric railway service over the present right of way.

Power Houses Shops and Buildings

Water Plant Sold by Akron Company.—By a vote of more than four to one the electors of Kent, Ohio, at a special election recently approved a bond issue of $200,000 with which to purchase the property of the Kent Water Works, now owned by the Northern Ohio Traction & Light Company, Akron. The purchase price of the plant is $135,000. The additional sum of $65,000 will be used to build an addition to the plant.

Suburban Railroad Terminal Plan Considered.—The New York Transit Commission indicated on May 28 that it has had some informal discussions with the Westchester Rapid Transit Commissioners and with local railroad engineers in New York with reference to the possible utilization of the carhouse block at Thirty-second and Thirty-third Streets and Fourth and Lexington Avenues as a great new central terminal, especially for the handling of Westchester and Long Island traffic. The three other corners of the great quadrangle, namely, the Grand Central, Times Square and Pennsylvania terminal, are highly developed as traffic distribution centers. The Grand Central and the Pennsylvania terminals have almost reached their track capacity for incoming trains, and further accommodation of growing Westchester traffic is an immediate problem. It was at the request of the parties most directly interested in the future handling of this growing traffic that the Transit Commission has taken up the subject.

Professional Note

John F. Layng, of Hemphill & Wells, consulting engineers, New York, is the author of a pamphlet entitled "Our Job and the Basis of Its Enjoyment." It relates to the hiring of men, the viewpoint of a new employee toward his job and of the old employee toward both his work and the new man, and finally the side of the employer. Each public utility executive is urged to make a self-analysis along the lines of a questionnaire given in the book in regard to his relation with employees and the public.

Trade Notes

Walter S. Goll has been appointed manager of the Fort Wayne (Ind.) works of the General Electric Company to succeed F. S. Hunting, recently resigned.

Missouri Car Company, St. Louis, Mo., announces the removal of its offices from Central National Bank Building to Suite 310, Chemical Building, St. Louis.

H. Blanco Fombona of Guatemala City is now in the United States, where he intends to study trackless trolleys. Mr. Blanco Fombona has been granted a concession by the Guatemalan Government to operate in that country a trackless trolley service. His present address is Hotel Bristol, New York.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that it has received an order for motor car and substation equipment from the Chichibu Railways, which operate in the vicinity of Tokio, Japan. A large part of the equipment on this order will be a duplicate of a similar order shipped from the Westinghouse Company's plant and placed in operation during the past year.

General Electric Company Schenectady, N. Y., announces that Charles Neave has resigned as director and chairman of the board of the International General Electric Company, and Gerard Swope, new president of the General Electric Company, has resigned as president of the International General Electric. Anson W. Burchard, vice-chairman of the board of the General Electric Company, has been named chairman of the board and president of the International General Electric Company.

New Advertising Literature

Century Wood Preserving Company, Pittsburgh, Pa., has recently issued Bulletin No. 21 decriptive of the process of adzing and boring cross ties.

The Fulton Company, Knoxville, Tenn., has just issued catalog No. 100 on Sylphon heating specialties, temperature and pressure controlling instruments, valves, etc.

MacGovern & Company, Inc., New York, N. Y., has issued catalog No. 51 describing power machinery, which it has on hand ready for immediate shipment. The company buys and sells used machinery.

The J. G. Brill Company, Philadelphia, Pa., has issued Bulletin No. 263, descriptive of the 79-E Truck. The booklet tells how the design of this truck meets all the requirements of the modern Birney safety car.

Conveyors Corporation of America, Chicago, Ill., has issued a booklet entitled "Cut Ash Handling Costs." The booklet treats of the steam jet conveyor method of ash handling and contains a description of the conveyor and its method of operation.

Spencer Trask & Company, New York, N. Y., recently issued a circular describing a selected list of bonds of water power companies. As an example of the highest type of hydro-electric investments, the bonds of the Shawinigan Water & Power Company are specified. Bonds of the Nevada-California Electric Corporation are recommended to investors who desire a higher return than 5 per cent.

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Volume 60 New York, Saturday, July 8, 1922 *Number* 2

Automatic Substation Control Is Now in Third Phase of Development

FROM the discussion, at the recent Niagara Falls meeting of the American Institute of Electrical Engineers, on the automatic substation with particular reference to electric railway use, it is evident that power distribution engineers are now emphasizing the economic aspect of automatic control.

Thus it appears that the manless substation, like all successful inventions, has passed through two phases of its career and is now in the third. The first was primarily that of the invention period, the second had to do with selling the new idea to the public and the third is, of course, its adaptation to power-distribution conditions all round.

The several stages of progress can be epitomized in these three questions, respectively: (1) What physical principles are available for performing by electrical and mechanical means the functions now or previously requiring brain and hand power? (2) How can operators be convinced that the inventions resulting from the utilization of these principles are applicable under their conditions? (3) When, where and how should the equipment be installed to secure the greatest return in quantity and quality of service per dollar of investment and per dollar annually expended in operation?

At the A. I. E. E. meeting Messrs. Crecelius and Phillips, both formerly connected with the power department of the Cleveland (Ohio) Railway, read a paper which is the result of many years of study of the broad principles involved in the application of automatic control. While they were still connected with the railway, its management decided upon the gradual replacement of manual by automatic control in Cleveland. This replacement is now under way. The conclusion was not reached without an exhaustive study, because it was realized that reliability of service is the prime consideration, and there must be no interruption hazard introduced by the change. As a result of the general analysis and the actual installation of a few substations in Cleveland some important technical developments in the art have been made within the past two years or so, and in fact are still being made.

It is true that in the discussion which followed the presentation of the Crecelius-Phillips paper their conclusions were not all agreed with. W. E. Bryan, superintendent of power, United Railways of St. Louis, in particular, took exception to several. This fact is not to be deplored. It is too early yet for general agreement on the requirements of so young an art; in fact, engineers are far from agreeing regarding far older technical and economic questions. Local conditions control in all cases. All that the engineers can do is to agree on fundamentals—they can then be trusted to work out the local details satisfactorily.

To return to automatic control itself—the evolution of this control in the eight brief years of its history has been traced in a succession of articles and statistical tables in the columns of this paper. Each significant item of progress has been chronicled, as manufacturers and railway engineers have applied the results of their experiments. The control is not yet physically perfect, perhaps never will be. But it is now generally recognized as a reliable piece of equipment which is to be purchased or not as a reply to the question—"Do we need, and can we afford not to have it?" rather than—"Will it work?" The present great interest in automatic control is due almost entirely to necessity. Power costs must be reduced; here is one practical way to limit them. The necessity is not so critical as it was during and soon after the war, but it is still here.

Union Domination the Issue in Buffalo

MEMBERS of the Amalgamated local in Buffalo have gone on strike. The issue is a clean cut one. The International Railway, under the direction of Mitten Management, Inc., will not agree to the demands of the men for a closed shop. In its effort to throw off union domination the management of the railway has the backing of the Buffalo Chamber of Commerce and other influential interests tired of short-sighted labor rule of industry in that city. On their part the union men, through their representatives, announce that they "will resist any un-American attempt to force us into social subjection, though the plan may be governed by the most benevolent despot on earth."

The situation thus briefly outlined presages a fight to the finish. The phrase "the most benevolent despot on earth" is evidently supposed to be a true likeness of Thomas E. Mitten. Of that more will be said later. Unknowingly, of course, the Amalgamated local in Buffalo has painted a pretty good picture of itself in the phrase about the despot, but none would associate with that body the term benevolent. Last year the United Traction Company of Albany threw off the yoke of union domination after a long struggle following dictation of its affairs extending over many years. A similar condition has long existed in Buffalo. A year ago a truce was patched up in Buffalo at which Mr. Mitten took no notice of the Amalgamated Association.

The union men at Buffalo see Mr. Mitten through a glass darkly. It is only to be expected that they would. However inaccurate the picture may be which presents Mr. Mitten as a despot, he certainly has been nothing if not benevolent. His record at Philadelphia testifies to this. There wages have been advanced beyond the original dream of the men as a result of his co-operative efforts between management and men, savings have been promoted among the employees and the men and women there have a large monetary interest in the company. So far has his program been carried that criticism has been pretty general in some quarters of the extent to which he has gone to have the workers become financially interested in the railway there and participate in the management of the company. If anything similar to this has been accomplished by organized labor anywhere in behalf of the workers on electric railways, the facts have apparently escaped the attention of the historians.

It has been said that Mr. Mitten's system of management is not a plan, but rather a man. Like all other aphorisms this is true only in part. This much is certain, however—Mr. Mitten does not want to rule labor, but neither will he let labor rule him. In this phase of the struggle in Buffalo he is fighting a battle in behalf of the entire industry.

Power Substations Can Be Made Noiseless

CIRCUMSTANCES arise occasionally which demand that a substation for the transformation of electric railway power be made practically noiseless. In a quiet residence neighborhood the penetrating whistle of some rotary converters offends the ears of the fastidious. Sometimes circumstances may arise in which the "rotary" and its accompanying apparatus must be located near offices or other rooms or buildings in which quiet is at a premium. It is, therefore, desirable for the power engineer and the general manager of an electric railway property to be somewhat familiar with acoustics from this point of view, so that they may be ready to meet a special condition such as this.

An illustration of the rendering of a substation noiseless, on the property of the Birmingham Railway, Light & Power Company, was given in the issue of this paper for March 13, 1920. In that case practically the only noise producer, the rotary converter, was inclosed in a windowless room and the ventilating air was baffled to eliminate sound waves. The machine was mechanically insulated, also, to localize vibration.

Another and still more recent example is furnished by the Garvanza substation in Los Angeles, which is the subject of an article in this issue. This is doubly interesting because the control is of the automatic type. In this case the ventilating air is forced through a circuitous path and the whole equipment is housed in a windowless building. The walls of this building are heavily buttressed so that vibration production is discouraged. The automatic control lends itself admirably to a noiseless arrangement, as it is not necessary to provide for the convenience and comfort of operators other than the inspectors.

The architectural problem involved in the noiseless substation is one of some difficulty, if the building must be made to harmonize with the surroundings. A windowless building is not inherently attractive, because it is unusual in appearance. Heavy buttressing, also, is apt to give a small building a clumsy aspect. The pleasing result achieved in Los Angeles is thus the more creditable.

While it may not often be necessary to go to such lengths as was done there and in Birmingham to secure noiselessness, the fact that these particular designs have proved successful will furnish confidence that equally good results can be secured elsewhere.

Fares Have Elastic Limits, Too

THIS period of economic deflation or shrinkage ineluctably calls for a downward revision of fares even if the existing fares do not seem high enough to the operator who is trying to whittle away preceding deficits. When many of the patrons are either out of work or working only part time at lower wages, there is neither popularity nor profit for the railway which does not move with the economic trend, regardless of the sound justification of retaining longer the high rates that were so tardy in coming.

Downward revision of fares does not necessarily mean a reduction in the cost of the single ride. On the contrary there may be a downward revision coincident with an increase in fares. What is in mind is the use of plans which not only hold all of the compulsory riding of a community, but also attract that freer off-peak riding that is essential to a dividend-paying railway. Such off-peak riding will not come in straitened times unless the patron is offered something reasonable and attractive in the rate of fare. A variety of plans are available.

There is, for example, the special case of an incline railway. When the operator introduced a ten for 25-cent ticket rate, business went to capacity and revenue exceeded the results of a 5-cent straight fare policy. In a second case, the use of monthly passes gave regular riders a 6-cent fare and irregular ones a 10-cent fare with satisfaction to all concerned. In a third case, the use of weekly passes enabled the operator to eliminate most of his jitney competition, earn more revenue, leave single-trip and ticket fares where they were and still cut the fare in half for nearly half of the riders. In a fourth case, the installation of a simple zone fare has saved the situation because the short-ride majority which enjoys the lower rates is determined not to be penalized for the long-ride minority.

These examples do not exhaust the possibilities of giving a reduction in fare coincident with maintaining and even increasing revenues. They suffice to show, however, that it is not the average rate of fare per ride that tells so much as the product of rides times rates of fare. Only totals and net count.

Will the Industry Finance the Proposed Rail-Joint Tests?

IN COMMENTING upon the plans of the committee on welded rail joints, which hopes to do some real research in the field covered by its name, this paper recently referred to a probable request for funds addressed to electric railways. Since then the proponents of the testing program, largely electric railway engineers, have suggested that the American Electric Railway Association might be willing to finance the tests.

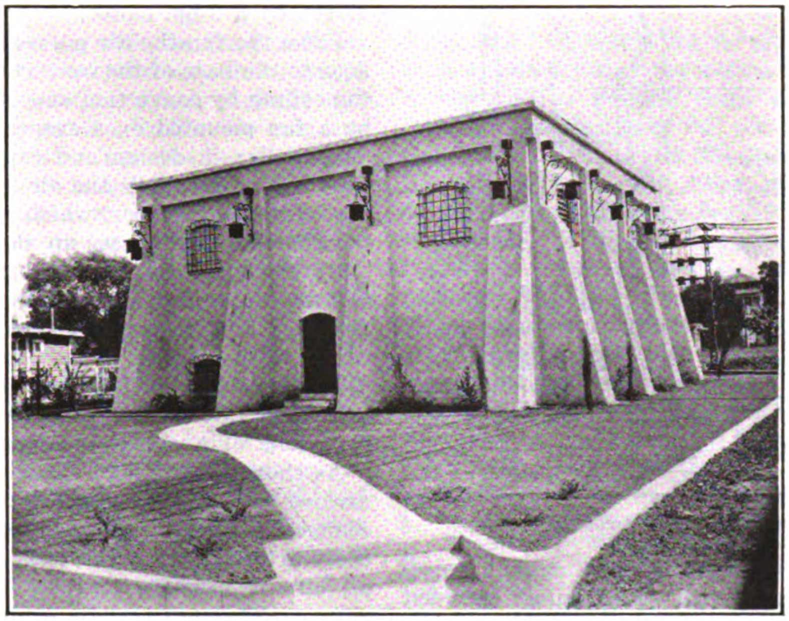
If at all feasible, it would appear best to supply the needed funds by a lump appropriation rather than by the time-honored but monotonous "passing of the hat." No doubt the railway companies will cheerfully furnish the money if necessary, but the other method will be more dignified and more convenient. Besides, the achievement of creditable results of the sort confidently expected would be a "feather in the cap" of the association.

The Special Safety Issue of This Paper Will Appear July 22

Noiseless Substation for Los Angeles Railway

By Means of a Circuitous Route for the Sound-Laden Air the Designers Were Able to Muffle the Noise from the Machinery—The Building Is of Massive Design and Harmonizes Architecturally with the Neighborhood

By George E. Campbell
Chief Draftsman Los Angeles Railway Corporation



Exterior of New Automatic Substation in Los Angeles, Designed for Beauty and Noiseproofness

IT RECENTLY became necessary for the Los Angeles Railway to extend its distribution system by erecting additional substations, particularly to supply power necessary for heavy morning and evening peaks.

To carry out this plan it was necessary to place some of the substations in residence districts of the city, in regions where the restrictions against the erection of industrial building are extremely rigid.

In order to secure the sanction of the City Council for the erection of substations in these portions of the city, the railway had to agree to erect sightly buildings, housing apparatus which would operate noiselessly. Of course, noiseless machinery of the kind necessary for the operation of an electric railway could not be obtained, so that the buildings had to be designed to absorb the noise within themselves and at the same time not interfere with proper ventilation of the machinery.

The engineering department of the corporation was not able to find many data as to noiseless substations, and was consequently obliged to do some pioneer work in this field. The first of the attractive, noiseless substations erected was the one known as the "Garvanza" substation, which has now passed the inspection of the city fathers and has been pronounced both attractive and noiseless. Satisfaction having been given with this substation, permission has been granted for the erection of others designed along the same general lines.

Details of the features of the design which have to do particularly with the points already mentioned will be given, in the hope that they may be useful to other electric railways having to install substations in residence districts.

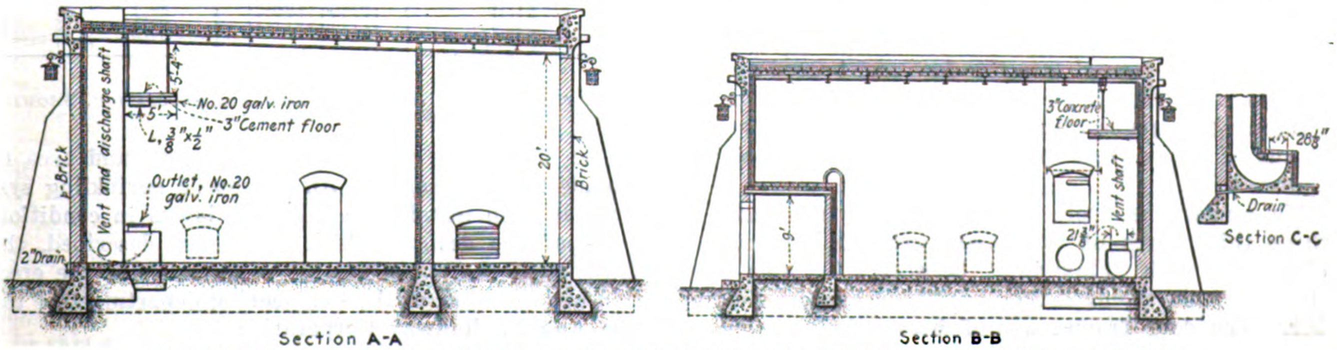
The equipment consists of a 1,000-kw. General Electric rotary converter, a three-phase, self-cooling-type transformer, with complete automatic control equipment for the machine. There are four feeder panels.

The lighting is controlled by an automatic time switch, by means of which the exterior of the substation is illuminated from sundown to 2 o'clock in the morning.

The floor plan of this substation is 42 ft. x 44½ ft. inside measurement, and the ceiling is 20 ft. above the floor at the lowest point, the roof being flat and sloped to drain in one direction. The foundations are of concrete, extra heavy as a part of the noiseproof design, and reinforced with old 60-lb. A.S.C.E rails. These rails were thoroughly cleaned to facilitate adhesion to the cement, were cut to lengths by the railway and delivered on the job free of cost to the contractor, who placed them in the concrete.

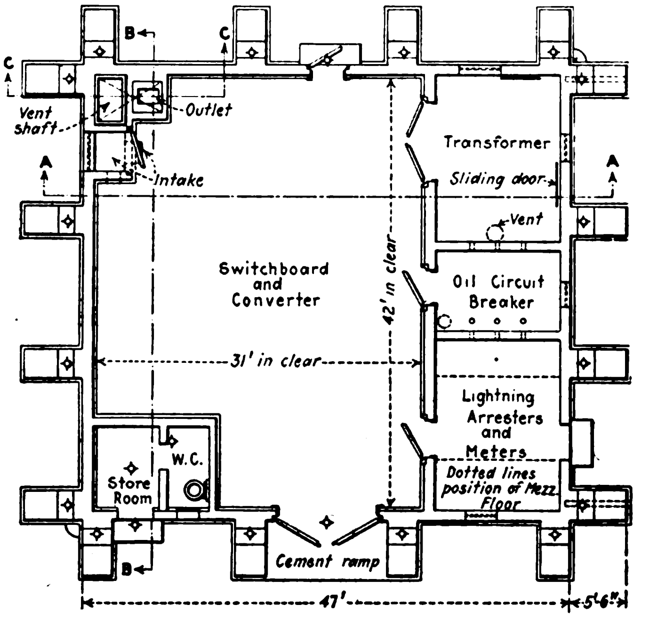
All walls, exterior and interior, are of well-burned common brick, 13 in. thick and laid in cement mortar. The upper portion of the exterior walls is made of reinforced concrete, to act as a bond to tie the building together and to facilitate the placing of tile and anchors where required.

Inside the walls, ½-in. "Flaxlinum" was placed be-



Cross-Sections of Garvanza Substation, Showing Noiseproofing Construction of Walls and Roof tween two thicknesses of building paper. Next to this, 4-in. x 12.-in. x 12-in. well-burned hollow building tiles were laid up in lime and cement mortar and secured to the brick walls by 60d. spikes over each third tile, the spikes being bent down to the tile.

The roof, of concrete reinforced with square twisted bars, is carried on steel girders and beams. The roof slab is 4 in. thick. To insulate the roof against noise, the concrete was covered with "Flaxlinum" between paper and a layer of the 4-in. hollow tile. The roofing consists of two layers of 15-lb. roofing felt and a three-ply standard cap sheet, all mopped down. All flashings are of 18-oz. copper. Two 6-in. cast-iron down spouts, buried in the wall, drain the roof, overflows being provided to take care of excessive rain.



PLAN OF GARVANZA SUBSTATION, LOS ANGELES RAILWAY

The exterior walls have large buttresses laid up solidly of brick, and timbers 8 in. x 8 in. in size project out beyond the cornice line by way of ornament. The walls are coated with cement plaster, tinted a deep green color and applied with a circular sweep. The effect of this is highly pleasing.

There are no windows in the wall, but a number of blind windows, covered with heavy black grilles, were provided to break up the flatness of the wall and thus improve the appearance from the architectural standpoint. Each pilaster is ornamented by a large black iron lantern, especially designed for this substation.

To return to some of the noiseproofing details, attention is directed to the design of the doors.

The main door is 10 ft. x 14 ft. in size, and it is made in two pieces and located at the rear of the building. This door is for occasional use only and is large enough to permit the passage of any piece of machinery in the building. It is held in place by a specially designed beam, screwed into the door and braced against the jamb. A small door is provided in the front of the building for general use. Both doors are closed by means of icebox fasteners to permit them to be tightly closed.

To render the doors soundproof they are made of three thicknesses of tongue-and-grooved lumber, laid diagonally with "Flaxlinum" between. To give them the maximum strength they are framed into solid timber. The door frames are of heavy timber, well secured to the walls by long bolts built into the brickwork. The doors and jambs are beveled on all sides like refrigerator doors to permit them to be drawn absolutely tight.

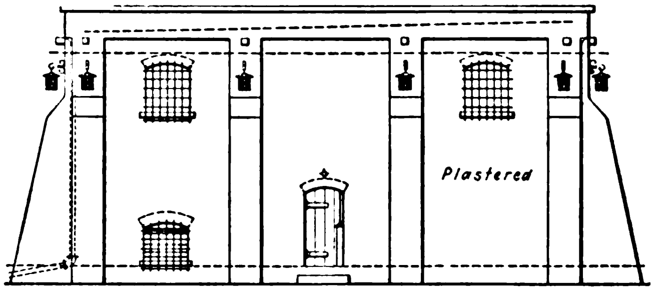
The air intake for ventilation was originally through metal louvers. These, however, caused a shrill whistling sound and they had to be boarded up. A hole of equal area was then cut in the roof and covered with a pent house, hidden behind the fire walls. Through this hole the air is drawn down through an intake shaft by means of a No. 6½ Sturtevant multivane fan, driven by a 2-hp. motor.

From the fan the air passes through a conduit in the floor to the base of the converter, after which it rises to the ceiling by convection and is drawn into the exhaust by a fan mounted on a suspended reinforced platform and similar in design and capacity to the intake fan. This second fan pulls the air into a duct running from the ceiling to the floor, which makes a 180-deg. bend at the floor line and passes up and out through the roof.

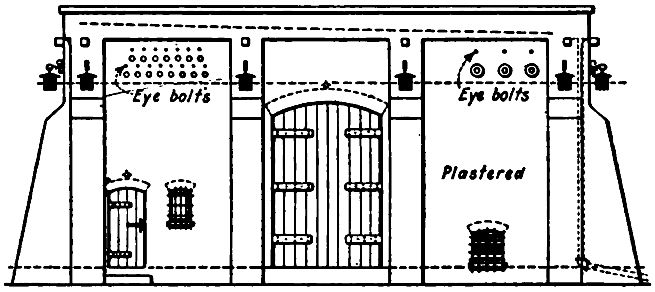
By the time the air has passed through this circuitous route, its noise-producing vibration has all been absorbed and it carries no noise from the rotary converter to the outside air.

As the outlet duct is open to the air so that some rain falls into it, the shaft is drained at the bottom by means of a galvanized iron pipe.

As shown in the plan of the building, the interior is divided into several rooms. The main room is to accommodate the rotary converter and switchboard, and there are separate rooms each for the transformer, the oil circuit breaker, and the lightning arresters and meters. Although there are no attendants regularly at the substation, a storage room is provided for supplies for the repair men and inspectors and a toilet room also.



Front Elevation



Rear Elevation

FRONT AND REAR ELEVATIONS OF GARVANZA SUBSTATION, SHOWING HEAVY BUTTRESSES AND DOOR OPENINGS

The building is placed on an ample ground area to provide for landscaping. An automatic sprinkling system has been installed to keep the lawns in condition.

All of the designs which have been described, the drawing of the plans and the supervision of the erection are the work of the engineering department of the Los Angeles Railway Corporation.

What Weekly Passes Do on a Zone-Fare Railway

Experience of the Beaver Valley Traction Company Shows Greater Traffic and Increased Revenue, More Particularly Due to Greater Off-Peak Riding by Companions of Passholders

BY WALTER JACKSON
Railway and Bus Fares Consultant

IT IS a far cry from London with its many millions to the Beaver Valley of Pennsylvania with its sparse thousands; from the operation of long underground trains almost every other minute to the one-man car service of a cross-country line; from the handling of a people who speak but two languages—English and Cockney—to that of a public whose tongues are of Babelian diversity. For all that, it would seem that a type of fare charging involving a wholesale rate for wholesale use can be successfully transplanted from the world's metropolis and readily adapted to the needs of an entirely different community.

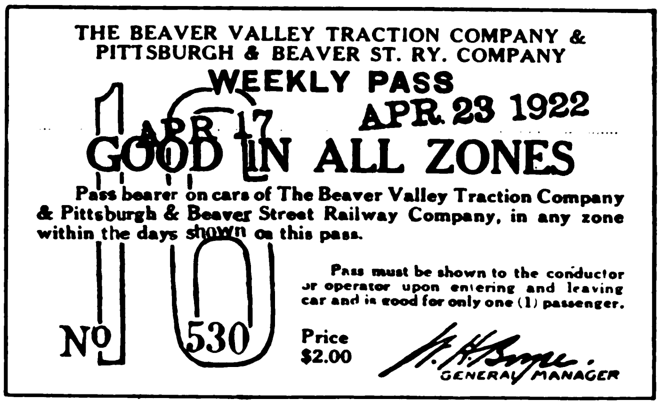
This type of fare is the unlimited-ride pass. In applying it to the Beaver Valley Traction Company, however, certain changes were made as follows: Period of validity cut from the London minimum of one month to one week; pass made good for bearer instead of using personal contract form; price, except for longest runs, set at the cost of between two and three rides a day instead of being generally less than that of two rides a day. The last change means that people riding in the one-zone and two-zone classifications must ride more than twice a day in order to secure a lower average cost per ride.

RESULTS BEFORE ADDING UNIVERSAL PASS

Since comprehensive articles on the layout of the Beaver Valley Traction Company have appeared in the April 22, 1922, and April 9, 1921, issues of the *Electric Railway Journal*, it will not be necessary to go into detail again. It is only well to remind the reader that the routes are cross-country lines serving small towns (the biggest 13,000) and thinly-populated, river-bluff country between; that the better-fixed element of the population is made up largely of commuters to Pittsburgh, and the less endowed classes are foreign-born people who work in local mills or factories; that the wives of commuters are tempted to shop in the big city via steam railroad, and that many local workers also use steam railroad commutation at very low rates. While there are no jitneys in the Beaver Valley, there are plenty of private automobiles run by companionable owners.

In the early days of the Beaver Valley Traction Company, 5-cent fare zones of 3 to 4 miles average length had obtained. With war times came 6-cent and 7-cent fares without change in length of zone. As this made serious inroads on the large proportion of short-haul riding, the company on Dec. 1, 1919, went back to a 5-cent base but cut the zones to an average of 2 miles. This shorter zone length, however, was still long enough to give nearly all town residents a 5-cent fare. As a result, the company revenues improved up to 23 per cent until the unemployment wave hit the valley a blow from which it is still suffering.

In this extremity, Mr. Boyce turned his thoughts to some plan that would cut fares for the wholesale rider without diminishing the actual revenue received from that rider—or possibly even securing more revenue through greater use of the service. The questionnaire mentioned in the April 22, 1922, article had revealed that people were only doing part of the riding they ought to, but that some bargain offer might put them on the cars oftener. Following an analysis made by the writer, the company put on a variety of weekly passes to take care of one-zone, two-zone and three-zone rides. The price for a one-zone pass was fixed at $0.85 or seventeen 5-cent rides a week; of a two-zone pass at $1.60 or sixteen 10-cent rides a week, and of a three-zone pass at $2 or thirteen and one-third rides a week. To these Mr. Boyce added a limited-hour special-distance school pass at 75 cents.



THE BEAVER VALLEY TRACTION COMPANY &
PITTSBURGH & BEAVER ST. RY. COMPANY
WEEKLY PASS
10
APR 17 APR. 23 1922
GOOD IN ALL ZONES
Pass bearer on cars of The Beaver Valley Traction Company & Pittsburgh & Beaver Street Railway Company, in any zone within the days shown on this pass.

Pass must be shown to the conductor or operator upon entering and leaving car and is good for only one (1) passenger.

No 530
Price
$2.00
GENERAL MANAGER

A UNIVERSAL PASS WAS PUT ON SALE IN APRIL FOR $2

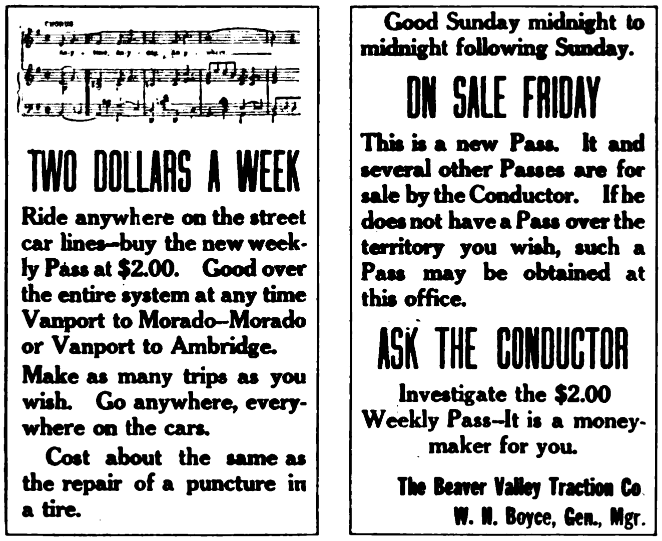
A zone or inter-station pass is, of course, not the same simple and flexible thing as a universal city pass. In the Beaver Valley there are long, desert stretches for which one would be lucky to get half a dozen steady riders a day, so that it would not pay to sell such combinations on the car. Another deterrent feature of an inter-station pass is that it may not cover both the rush and non-rush riding of the passholder. Thus, a man might travel westward to his work and eastward to his pleasure. If the pass did not cover all this at an attractive price, he would not buy one.

Because of the novelty of the pass idea, however, it was determined to go step by step rather than do everything at once. During the first week, beginning Feb. 13, 1922, nineteen fully printed varieties were sold to a total of 466 passholders in quantities from seventy down to one; in the following week twenty varieties totaling 476 were sold; in the third week, twenty varieties totaling 481, and in the fourth week, twenty varieties totaling 497. In the fifth week, eight unimportant passes were withdrawn without injury to gross revenues from passes.

From these first experiences, it was clear that certain passes need not be printed in full but could be rubber-stamped to cover date of issue and week of year at a considerable saving in printing expense. Another saving was obtained by selling the back of the pass for advertising by the local gas and electric company at a price which covers half the cost of production. The management also knows now what passes it is worth while to offer on the cars through the platform men and what passes, because of trifling sales, it should sell only at its offices. In short, the company is ready to make to order any combination desired, but it does not expect its men to have on hand those of the rarer kind.

For eight weeks the company studied the behavior of the one, two and three-zone passes without changing prices, but liberalizing conditions in some zones so that extensions, lap-overs, etc., were granted to bring the rider to destination without irritating him by seeking more money for a walking distance ride. This commonsense procedure made a hit with the patrons, as shown by the jump to 531 in the sixth week and 585 the seventh week with accompanying increases in revenue as shown in Table I.

Despite the restrictions inherent in any inter-station pass and despite the fact that many residents of the valley were either wholly or partially unemployed, the passes brought at once a gratifying increase in revenue. Thus, during the first four weeks, the increase was $420 a week or $60 a day compared with the average of four weeks just preceding the pass. This was equivalent to a gain of 4 per cent in gross with, of course, no addition to service because nearly all such extra business necessarily is off-peak. For that matter, the company can take a lot of new rush-hour business, too, in plenty of zones without being "rushed" as it were.



TWO DOLLARS A WEEK

Ride anywhere on the street car lines--buy the new weekly Pass at $2.00. Good over the entire system at any time Vanport to Morado--Morado or Vanport to Ambridge.

Make as many trips as you wish. Go anywhere, everywhere on the cars.

Cost about the same as the repair of a puncture in a tire.

Good Sunday midnight to midnight following Sunday.

ON SALE FRIDAY

This is a new Pass. It and several other Passes are for sale by the Conductor. If he does not have a Pass over the territory you wish, such a Pass may be obtained at this office.

ASK THE CONDUCTOR

Investigate the $2.00 Weekly Pass--It is a money-maker for you.

The Beaver Valley Traction Co
W. H. Boyce, Gen., Mgr.

Two Posters on the Universal Pass

This first gain in revenue was approximately 80 per cent of the then revenue from pass sales. It is not conceivable that it came wholly from the passholders' own riding. The two most likely causes were these: First, while the passholders took more off-peak or pleasure rides than before because they had no further fare to pay for themselves, they did have to pay full cash fares of 5, 10 or 15 cents each way for their companions—the more companion rides, the more fares; second, it is reasonable to suppose that the riding suggestions addressed to the passholder as "Go to the basketball game on your pass" would also tend to get some riding out of people who did not have passes. At any rate, more money came into the treasury and more people onto the cars, than which no better tests could be desired.

STILL BETTER RESULTS ON ADDING UNIVERSAL PASS

Owing to the great variety of passes that were required merely to take care of one to three zones, it was not desirable to go further at the start. The analysis of traffic had shown that not more than 6 per cent of the revenue came from rides in excess of three zones, because almost all the long-haul rides in the valley were being taken on the two steam railroads. The commutation rates were so low that it appeared unwise to make a direct attack on this kind of business, bearing in mind also that it was largely rush-hour travel in any case.

TABLE I—CHANGES IN EARNINGS FROM PASSES, SHOWING HIGHER RATE OF INCREASE FOLLOWING INTRODUCTION OF $2 UNIVERSAL PASS, WEEK BEGINNING APRIL 3, 1922. ALSO NUMBER OF PASSES AND AVERAGE RETURN PER PASS.

	Amount	Number of Passes	Average Return
No. 1, Feb. 13	$512.85	446	$1.15
No. 2, Feb. 20	552.00	476	1.16
No. 3, Feb. 27	564.00	481	1.17
No. 4, March 6	586.00	497	1.18
No. 5, March 13	570.95	485	1.18
No. 6, March 20	609.30	531	1.14
No. 7, March 27	655.55	585	1.12
No. 8, April 3	619.65	538	1.11
No. 9, April 10	798.75	598	1.33
No. 10, April 17	870.60	635	1.37
No. 11, April 24	978.20	695	1.41
No. 12, May 1	1,047.70	730	1.43
No. 13, May 8	1,109.50	769	1.44

However, some inroads are being made on the steam railroads indirectly through the universal pass which was introduced the ninth week, beginning April 10. Almost immediately after the inauguration of the inter-station passes, there had arisen a demand for a pass that would be good anywhere on the system. At first, a price of $3 to $4 a week was considered, but bearing in mind how little existing business was in excess of three zones, the management took the plunge by announcing that from April 10 onward the three-zone price of $2 would also be the price for any length of ride. The response was most gratifying from the start, pass sales rising from 538 to 598 and pass revenue from $619.65 to $798.75; by the week beginning May 8 (No. 13 of the pass) the passholders had risen to 769, and the revenue to $1,109.50 or more than double the first week.

The change in the distribution of passholders according to price paid is clearly set forth in Table II, comparing the first, seventh, ninth and thirteenth weeks. This shows in comparing the seventh (best pre-pass) and ninth (first universal pass) weeks that of the 133 new $2 riders, ninety seem to have come from the $0.85 class and twenty-eight from the old $1.60 class, thus raising the average return per pass from $1.11 to $1.33 a week. In the following weeks, the $2 universal continued to grow in favor so fast that by the thirteenth week there were 338 subscribers at that price, bringing the average return per pass to $1.44 a week.

TABLE II—CHANGE IN CHARACTER OF PASSES SOLD BEFORE AND AFTER INTRODUCING UNIVERSAL PASS, COMPARING FIRST WEEK WITH SEVENTH (BEST PRE-UNIVERSAL), NINTH (FIRST UNIVERSAL) AND THIRTEENTH WEEKS.

	First Week	Seventh Week	Ninth Week	Thirteenth Week
75 cents School	2	14	12	11
85 cents 1-zone	291	397	307	329
$1.60 2-zone	105	101	73	91
2.00 3-zone or more	48	73	206	338
	446	585	598	769

Up to the week of May 1, the universal pass could not affect steam railroad commuters because commutation is sold in this district from the first of the month. In that week, sixteen were added to the 280 of the week before. This does not look so promising, but it is likely that the electric railway started cutting into steam railroad off-peak revenue from the time it first put on the universal pass, especially in drawing messengers, commercial travelers and other off-peak riders who would find the universal pass exceptionally convenient. One must bear in mind that the commuter within the valley has to decide between these two conditions: A cheap and rapid ride to and from his job when time is precious, but with almost no use of the service at other times, versus a slower and costlier work-hour ride which can be made cheaper only by almost doubling the number of rides (though not the mileage) taken daily.

The likelihood is that as time goes on, the two, three and possibly four-zone steam railroad commuters will find the electric railway's universal service proposal the best in the end, particularly those whose homes or jobs are not conveniently close to the steam railroad stations. Furthermore, when 100 per cent employment conditions return, it may be feasible for the electric railway to run fewer-stop cars for these workmen and thus cut more deeply into this class of business.

It has already been stated that during the first four weeks the average increase in daily revenue was $60, compared with the four non-pass weeks preceding. By the end of the eighth week this daily gain had risen to $76.64. The introduction of the universal pass has improved this increase to approximately $125 a day, or about 9 per cent increase in gross revenue. As at the start, the increase in revenue is consistently equal to practically 80 per cent of pass revenues. Almost all of this increase is pure net, for no increase in service is required to handle the increase in traffic and the principal expenses in connection with the introduction of the system were covered by the gains of the first two or three weeks.

A gain of $125 a day is indicated by the first three weeks experience with the addition of the universal pass. The next week, beginning May 1, was abnormally low because a strike begun on May 2 on the Steubenville, East Liverpool & Beaver Valley Traction property put the Beaver Valley Traction Company's Route No. 2007 completely out of business to the tune of $75 a day local revenue and of $125 to $150 a day total revenue, the latter being due to the loss of through travel by Steubenville-East Liverpool transferees. Another loss of $25 a day is set down to the daylight saving plan which began on May 1. For the opposite reason, namely, pleasure business due to a circus at Junction Park, the extra good week beginning May 8 must also be cut out of the reckoning.

In any event, the twelve weeks period of the zone pass during a normal time compared with the preceding normal period of four weeks has convinced the management that the innovation has made good.

Additional Service Provided

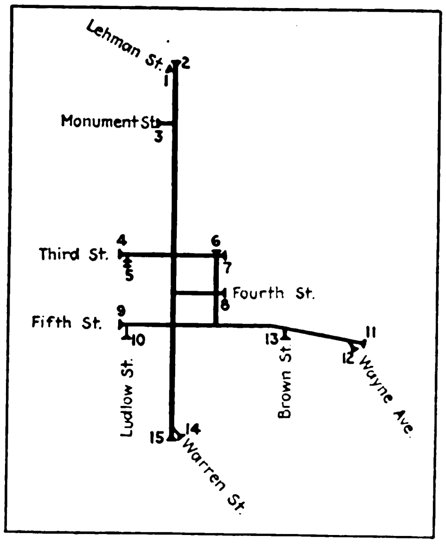
THE Erie Railroad, now operating a steam train service between Bradford, Pa., and Salamanca, N. Y., will shortly start a motor car service over this route, which connects at Salamanca with the main line of the Erie road. The length of the route to be covered is 17 miles. It is planned to install several cars, each seating forty passengers. The company also operates a large gasoline car.

Allocating Energy Consumption in Dayton

Energy Bills of Ten Electric Railways Operating Through the Central District of Dayton, Ohio, Based on Unit Consumption of Each Type of Cars as Determined by Metering the Energy Used

THE ten separate electric railways that operate over the same tracks in the central district of Dayton, Ohio, entered into a contract last year with the Dayton Power & Light Company for the purchase of all power used for the propulsion of the cars in that area. One of the local companies had formerly supplied the power for this area and had billed the other companies on a basis determined by a power survey made by the City Railway some six or seven years ago. Since that time many changes in operating conditions had taken place, so that the factors in use for determining the power used by each company were not accurate. Therefore, all the interested railways desired to arrive at new factors which could be used in computing more accurately their pro rata share of the total power bill.

The Economy Electric Devices Company, because of its extended experience and complete equipment to handle this work, was retained by a committee representing the ten interested companies to make a complete survey. This committee consisted of Henry Gebhart, general manager Oakwood Street Railway; T. E. Howell, general manager City Railway, and T. A. Ferneding, general manager of the Dayton, Springfield & Xenia Southern Railway.



MAP OF THE CENTRAL RAILWAY POWER DISTRICT IN DAYTON WITH ISOLATING CIRCUIT BREAKERS NUMBERED FOR PURPOSE OF THE STUDY

The purpose of the survey was to establish the normal energy consumption of each type of car operated over each route by the various companies. Having this information, it would then be possible to determine the total amount of energy used by each road from the number of trips through the central district and the unit consumption per trip of each type of equipment.

The energy consumption for each type of car was determined by placing suitable watt-hour meters on each car and taking readings each trip as the car entered and left the central power district. The accompanying map shows this central district and the position of the fifteen circuit breakers by which it is segregated from the remainder of the systems. The segregated district is fed by the Dayton Power & Light Company through one meter located in the power house. It is the total kilowatt-hours shown by this meter that is allocated monthly among the ten companies.

Following is a tabulation of the combination of routes and number of different types of equipment that were tested on each route for each of the ten railways:

	Name of Road	No. of Routes	No. of Types Of Cars
1	Oakwood Street Railway	1	6
2	People's Railway	3	6
3	Cincinnati & Dayton Traction Company	3	7
4	Dayton Street Railway	1	2
5	Dayton, Springfield & Xenia Southern Railway	1	6
6	Dayton, Covington & Piqua Traction Company	1	4
7	Dayton & Western Railway	7	5
8	City Railway	4	8
9	Dayton & Troy Electric Railway	7	3
10	Ohio Electric Railway	6	4
	Total	34	51

Thus the individual power consumption of fifty-one different types of cars had to be determined; in some cases for each type of car on but one route and in others for each type on as many as seven routes. Sufficient Sangamo railway type watt-hour meters were used to equip approximately one-third of the cars simultaneously. Readings on each group of metered cars were taken for every trip into and out of the central district for four successive days and the data obtained during this time were considered representative of the entire week.

Observers were stationed at the circuit breakers and were given individual written instructions to read the meters on specified cars passing in and out under their circuit breakers. These readings, together with the car number and the time, were noted on a printed form. At the end of each day's work each observer turned in his data sheets to the engineer in charge of the survey, who tabulated the figures. At the conclusion of the test all detail data were summarized by cars and routes for each company.

ENERGY CONSUMPTION DATA OF CARS OPERATING THROUGH CENTRAL DISTRICT, DAYTON, OHIO

	Class of Car	Number and Type of Motors	Weight of Car, Lb.	Single or Double Truck	Kw.-hr. per Car-Mile	Watt-hr. per Ton-Mile
Oakwood Street Railway	150	2 G.E. 67	24,000	S	2.08	173.5
	190	2 G.E. 800	24,000	S	1.75	146.0
	260	2 G.E. 80	24,000	S	1.87	155.0
	290	2 G.E. 88	24,000	S	2.27	189.0
	395	4 W.H. 323-A	43,000	D	3.09	143.5
	401	4 W.H. 323-A	43,000	D	3.23	150.0
Dayton Street Railway	200	2 G.E. 80	23,400	S	1.67	143.0
	300	2 W.H. 306	32,400	D	2.42	149.5
Dayton, Springfield & Zenia Southern	6	2 G.E. 201	34,000	D	2.47	145.5
	10	4 G.E. 201	45,000	D	4.01	178.0
	16	2 G.E. 304	46,000	D	4.06	176.5
	17	2 W.H. 101-B	28,000	S	1.39	99.3
	105	2 W.H. 306	32,400	D	2.03	125.0
	107	2 G.E. 201	34,200	D	1.85	109.0
Dayton, Covington & Piqua	12	4 G.E. 67	36,000	D	2.56	142.0
	30	4 W.H. 532-B	56,000	D	4.10	146.5
	19	4 G.E. 67	42,000	D	3.32	158.0
	Frt. Trailer		30,000	D	1.21	80.6
People's Railway	151	2 G.E. 80	24,860	S	2.42	194.5
	161	2 G.E. 80	29,200	S	2.64	181.0
	400	2 W.H. 306	36,500	D	2.79	153.0
	512	2 W.H. 306-V	38,100	D	2.75	144.2
	201	4 G.E. 80	53,400	D	3.84	143.5
	600	....	23,100	D	1.48	128.5
Cincinnati & Dayton	1	2 W.H. 303	65,000	D	4.35	134
	48	2 G.E. 57	45,000	D	5.40	230
	160	4 G.E. 73	85,000	D	8.55	201
	264	4 W.H. 93	60,000	D	7.05	245
	267	4 W.H. 56	50,000	D	5.52	221
	750	4 W.H. 303	60,000	D	5.52	184
	Frt. Trailer	....	......	..	1.79	.....
City Railway	57	2 G.E. 800	18,000	S	1.425	158
	170	2 G.E. 67	20,000	S	1.495	149
	182	2 G.E. 67	34,000	D	2.190	129
	226	2 G.E. 67	22,000	S	1.62	147
	282	2 W.H. 306	34,600	D	2.84	164
	340	2 G.E. 800	19,000	S	1.21	128
	452	2 W.H. 306	32,800	D	2.39	146
	572	2 W.H. 306	33,600	D	2.37	141
Dayton & Western	271	4 W.H. 56	60,000	D	6.06	202
	274	4 W.H. 56	55,000	D	5.38	196
	280	4 W.H. 93	60,000	D	5.55	185
	795	4 G.E. 240	60,000	D	3.91	131
	Trailer	....	......	..	1.98	.....
Dayton & Troy	200	4 W.H. 333	88,000	D	8.04	.....
	225				6.36	.....
	Trailer	....	......	..	2.46	.....

All meters were calibrated before their installation on the cars and after being removed from the cars. No meter was found to have any appreciable error and hence no correction factor had to be used.

At the conclusion of both the first and second week's test, the period from Friday night until Monday night was used to transfer meters from the equipment on which tests had been completed to the next group of cars to be tested. All meters were so connected in circuit on the cars as to register only the energy consumed by the car motors and compressors. Tests on all cars equipped with electric heaters were made with a direct-current rotating standard after the conclusion of the power tests.

The figures for energy consumption per trip for any one car were very consistent, a result which is remarkable considering that the energy consumed per trip was very small, as low as 0.55 kw.-hr. The average energy consumption per trip for the different days of the week was also found to be consistent. A difference in the energy consumption of cars of similar types operating over the same line occurred at times. This may have been due to the difference in operation by the different motormen, or to varying conditions of equipment or to the use of unlike gear ratios. The variation between the operation by a good and poor motorman may be as high as 30 per cent. The condition of equipment may also account for a discrepancy in power consumption of from 20 to 30 per cent. Shorted fields, binding side bearings, nosing trucks, etc., have been found greatly to increase the power consumption of a car.

COMPARISON OF COMPUTED AND METERED VALUES OF THE ENERGY CONSUMED IN THE CENTRAL POWER DISTRICT, DAYTON, OHIO

	Kw.-hr. Computed from Car Schedules and Constants	Kw.-hr. at Switchboard Meter	Percentage Excess of Metered Over Computed Value
March, 1921	113,321*	165,200	45.78
April	161,745	181,900	12.46
May	168,836	184,100	9.04
June	168,030	178,500	6.24
July	117,602	131,900	12.16
August	151,317	153,133	1.20
September	142,617	148,900	4.41
October	151,437	166,900	10.21
November	168,801	178,600	5.81
December	174,941	205,825	17.75
January, 1922	168,079	201,700	20.00
February	149,625	177,000	18.30

* Based on old constants.

A comparison between the computed and metered energy values is given in an accompanying table. During the period from April, 1921, to February, 1922, the power house switchboard meter reading averaged 10.7 per cent higher than the computed consumption of all the cars in the joint-operation area. In this difference are included the distribution losses, the energy used for car lighting and by service equipment and heaters. It will be noticed that during the winter months the heating load has caused an abnormal discrepancy between the two values. When this additional use of current can be traced it is charged to the user, while the remainder is prorated among all ten companies.

While the determination for billing purposes of the energy consumption constants to apply to cars operating through the central district of Dayton was the definite purpose of this survey, some very interesting information was obtained as to the watt-hours per ton-mile for cars equipped with different types of motors. These figures, it must be remembered, cover operation in the downtown district where a stop is made at every corner and where speed is slow.

Rail Motor Buses Replace Interurban Cars

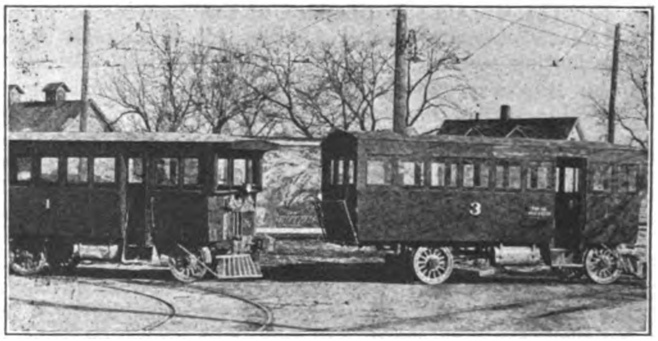
The Abandonment of Camp Funston in Kansas So Seriously Reduced Traffic that Electric Railway Operation Had to Be Discontinued—Some Details of the Buses Which Replaced the Cars

OPERATION of electric interurban cars on the Manhattan City and Interurban Railway, connecting Manhattan and Fort Riley, Kan., has been discontinued and four-wheel drive trucks substituted therefor. These trucks were purchased new from the factory and bodies seating thirty passengers built for this service. These are pictured herewith. Two of the rail buses are operated on the city line in Manhattan and two on the interurban line. In addition the company operates two buses of the same type equipped with pneumatic tires between Fort Riley and Junction City, which make connection with the rail buses.

The chassis for each car weighs 7,200 lb. Some of the other features of the cars are as follows: 156-in. wheelbase; high-speed reverse gears which enable the cars to go as fast in reverse as they will go forward; locomotive type "cow-catchers"; electric starting and lighting devices; heating systems which utilize the heat from the motor exhaust; entrance and exit near the front of the car, the door being operated by the driver.

The two cars operating on the city lines average about 95 miles each per day and 500 stops each per day, while the two cars in interurban service average 150 miles each per day and about 250 stops each.

Both in the city and on the interurban line between Manhattan and Junction City, there are many steep grades and sharp curves in the tracks. At one place the cars travel up a 5 per cent grade which is 2,500 ft. long and another 3½ per cent grade which is 4,000 ft. long. The curves encountered by these cars vary from less than 1 deg. up to a curve with only a 45-ft. radius.



RAIL MOTOR BUSES SUBSTITUTED FOR ELECTRIC CARS ON SHORT KANSAS LINE

Joseph T. West, president, explains briefly that the principal thing that caused the change in the plan of operation was the falling off of business on the interurban line after Camp Funston was abandoned. In addition, the cost of electrical energy was about 2.6 cents per kilowatt-hour measured on the alternating-current side, whereas the gasoline cost is just about one-third what the power bills were. Furthermore, the expense of keeping up three substations, the maintenance of the pole line and overhead construction are eliminated, as is also the salary of one engineer. Furthermore, the rail buses are operated with one man as against two on the interurban cars. Mr. West also comments that the cost of maintaining the trucks will not be as great as that of the electric cars displaced.

Since the pictures reproduced herewith were taken, steel spoke wheels have been installed to replace the wooden wheels shown, and this is said to be a great improvement. Later on, after further operating experience has been had and cost data accumulated, it is expected that a detailed article giving the operating comparison between electric and present equipment will be published herein.

The Automatic Substation for D. C. Railroad Distribution

This Is a Discussion on the Most Economical Size of Station and Equipment Where an Automatic Substation Is to Be Installed

A FEATURE of the annual convention of the American Institute of Electrical Engineers, held at Niagara Falls June 26 to 30, was a paper on "The Economics of Direct Current Railway Distribution, with Particular Reference to the Automatic Substation," by L. P. Crecelius and V. B. Phillips, consulting engineers, Cleveland, Ohio, and formerly connected with the Cleveland Railway. Their paper is given in full in the May issue of the *Journal* of the A. I. E. E., page 363.

In a preliminary statement the authors said that the comparatively recent development of the full automatic substation and also the automatic substation combined with remote control have served to reopen the entire subject of economics of distribution. The great fluctuations in the prices of materials and of labor have also made necessary a renewed study of this subject. As the proper design of a distribution system should represent the balance among all of the different items of cost that go to make up the total cost of power, any change in the relative costs of materials as against labor or of a certain class of material as against another class of materials tends to upset such a balance.

The Niagara Falls paper was prepared to determine, first, the relations that govern the size of feeders and the correct feeder layout for any given arrangement of substation, and, second, the principles underlying the correct location, size and type of substations, assuming the fullest development of automatic and semi-automatic control. There is involved also the question of stray current, the minimizing of which is certainly to be desired by electric railways. The most effective method of accomplishing this is to increase the number of distributing points. If a large number of distributing points is justified from an economic standpoint and an operating standpoint the problem of electrolysis may perhaps cease to exist.

The cost of distribution in large cities the size of Cleveland, Detroit or St. Louis, comprising the carrying charges on the feeder, the heating losses in the feeder and the carrying charges on the equipment necessary to supply these losses, is considerably in excess of $250,000 per year. It is apparent that a careful study of this item, of course, will more than likely be justified by the savings that will result.

There are not at present sufficient accurate data on cost and performance of automatic substation to make possible a precise analysis of specific cases. In lieu of this, the authors of this paper endeavor to show limiting conditions and by example to illustrate the relation of the various determining factors to the final cost.

As the paper is available in the A. I. E. E. *Journal* and in reprints available through the Institute office, it will not be abstracted here. However, the conclusions of the authors may be briefly stated as follows:

(a) The economically proper size of feeder where, as in cities, distributing distances are at most 3 or 4 miles, is such that the maximum voltage drops are too small ever to interfere with proper operation of cars.

(b) The economic justification of the automatic substation is a reduction in distribution costs.

(c) In a city district in which there are wide fluctuations in loads and in which full automatic control is used, so that machines are started and stopped entirely by line voltage and load conditions, the average efficiency of the substation over a period of time may be reduced by as much as 5 per cent largely because of the frequent starting and stopping of machines. It is believed that in large cities it will prove necessary to adopt some form of remote control in conjunction with automatic control.

(d) The principal limitations in the reduction of substation sizes by means of automatic and remote control are: (1) investment, (2) substation losses, (3) substation maintenance.

(e) Inasmuch as even a small difference in substation maintenance costs may be the deciding factor in a comparison between two distribution layouts, the standardization of substation equipment, with the resultant economies, is a matter of importance.

DISCUSSION OF PAPER

After the presentation of the paper motion pictures were used to show in detail certain sequences of operation which were under discussion. In the following discussion D. W. Roper, Commonwealth Edison Company, Chicago, urged the railways, in their present position of financial ability, to rehabilitate and catch up with the times. He advocated, among other things, a plan to use as many automatic substations, with the many resulting closely located feeding points, as possible, in order to reduce electrolysis as well as to increase economy.

W. E. Bryan, superintendent of power United Railways of St. Louis, read a carefully prepared discussion of the paper. He said that the automatic substation has interjected an important element into the field of electric railways, and engineers in this field must be prepared to take full advantage of the new developments, involving some readjustment of previous ideas as to size of station, type of buildings, etc. Variation in local conditions, he said, makes general conclusions applicable to cities of a given size both difficult of determination and of doubtful value. A solution applicable to one locality may not be the best solution for another, because of large differences in the cost of land, availability of conduits, etc.

Another point is power supply. In St. Louis, for instance, the railway receives its power from three sources. It purchases water power at 55 per cent load factor and steam power at 40 per cent load factor, while it generates power in its own plant at 14 per cent load factor. There are several direct-current feeders of admittedly poor design from a distribution standpoint which, nevertheless, considering the different costs of the several sources of power, provide the best arrangement from an economic standpoint.

Referring to the cost of distribution mentioned in the paper, Mr. Bryan stated that in St. Louis the annual cost of distribution is $425,000. The larger the distribution cost, the greater the possible saving which can be effected by the use of an increased number of substations. In other words, if, as the authors conclude, stations of 3,000-kw. capacity are best adapted for cities where the annual distribution loss is $250,000 per year, it seems logical that if the distribution loss is considerably in excess of this figure a greater number of stations, and therefore stations of smaller capacity, are justified.

Of the factors entering into distribution costs, the most important is that of fixed charges on investment necessary to supply peak load losses. If automatic substations, especially in congested districts, are properly adjusted as to voltage, a very material saving in this item will result, due to the saving in distribution losses.

In connection with the layout of substations, the railway engineer is usually confronted with the necessity for taking care of a given district, and the question is whether it shall be fed by one, two or perhaps four stations. In this connection it may be of interest to note that a comparison of a 2,000-kw., two-unit station and two 1,000-kw. stations for St. Louis resulted in showing investment costs of $38.25 per kilowatt for the former and $39.75 for the latter. The cost of the control equipment for the two-unit substation is slightly higher than the cost for two single-unit stations, due to the necessary additional control devices. This difference is more than offset, however, by the increased cost of land and buildings for the single-unit stations. The maximum advantage of automatic stations can only be obtained where land and building costs are held to a minimum. Automatic equipment lends itself to simple and inexpensive types of building.

Referring to the lower efficiency which the authors of the paper state is to be expected with automatic substations, making some kind of remote control advisable, Mr. Bryan said that this conclusion is evidently based on the efficiency curves of a 60-cycle converter, which constitutes a minor portion of those in use on railway systems. The situation is different with the 25-cycle converter. In St. Louis the five new automatic substations recently purchased are laid out to carry approximately 125 per cent of rating for the maximum half hour, which would result in an average load of about two-thirds of rating. The relays will be set so that the station will run practically continuously for sixteen to eighteen hours per day, the slight loss in station efficiency at the lighter loads being more than offset by the saving in distribution losses. The stations and feeders are so designed that if one station is out of service the overload on adjacent stations would not reach the danger point, nor will the distribution voltage be seriously affected by the redistribution of current.

As to the authors' conclusions that in cities such as Cleveland it is doubtful if the capacity of substations can be profitably reduced below 3,000 kw., Mr. Bryan cited the following: In St. Louis it was desired to reduce the load on a 4,000-kw. substation feeding principally the heart of the downtown section. It was decided to move two 2,000-kw. interpole rotaries from their locations in existing stations into the downtown district fed by the 12,000-kw. station. Three alternatives for the use of this equipment presented themselves: (1) A single 4,000-kw. station manually operated; (2) a single 4,000-kw. station automatically operated; (3) two 2,000-kw. stations automatically operated, spaced approximately 4,500 ft. apart. The following figures represent the annual cost, based on the investment necessary for additional equipment, land, buildings, transmission cables, distribution cables, together with allowances for distribution losses:

4,000-kw. station manually operated	$14,250
4,000-kw. station automatically operated	13,800
Two 2,000-kw. station automatically operated	13,000

The last named arrangement was decided upon, and Mr. Bryan felt that for cities similar to St. Louis the 3,000-kw. station is not the minimum size justifiable. Furthermore, if automatic substations of 2,000-kw. capacity can be justified in a congested downtown district where the feeding distances are comparatively short, in districts outside the downtown areas, where conditions more nearly approach interurban, the automatic substation of, say, 1,000-kw. capacity finds a useful field.

It is not contended that in areas like the loop district of Chicago, where concentration of load is extremely heavy, the automatically controlled equipment will be found advisable.

Taking up the last conclusion of the authors (e), Mr. Bryan said that this is open to the objection that if units of one size are used exclusively, the maximum distribution economies cannot be obtained. It would seem that for a city the size of St. Louis 1,000-kw. units would be best for general use, with 2,000-kw. units for the downtown districts and other points of heavy load concentration and, say, 500-kw. units for use at outlying points and on interurban lines. Such a plan would not materially increase the necessary stock of spare parts, since many items of the control equipment are the same for various sizes of units.

Standard control layout has material advantages, but it has also commercial disadvantages. Changes of a more or less radical nature are bound to occur also in automatic control equipment as the art develops.

C. E. R. A. Has New Experience

Summer Convention on Board Ship Beset with Navigation Delays but Cruise Greatly Enjoyed Nevertheless—Manufacturers Have Their Inning in Business Sessions with Papers on the Motor Bus, Energy-Saving Devices, Bearing Metals, Gears, Light-Weight Cars and Ventilation—Papers Also on Weekly Pass and Freight Development

CONTRARY to the precedents furnished by all previous boat trips of the Central Electric Railway Association, the six-day cruise on Lakes Michigan, Huron and Erie last week was given new variety by a brief experience each with rough seas, cold winds and rain, fog and a sand bar. A missing buoy light in Lake Erie was responsible for the *S.S. South American* getting off the course and on a sand bar. Having feared he was off the course, the captain had slowed down so that the ship was barely moving when it went aground and no damage was done. Nevertheless, all manner of maneuvering failed to free the ship, a curious circumstance being that from 19 to 24 ft. of water was sounded all around the boat, which draws only 15 ft. Apparently the boat was grounded amidships on a high shoal or other obstruction in the channel. After being stuck fast in this position for about six hours the boat floated off with the shifting of the wind to an easterly direction, which raised the level of the water.

Another delay of about four hours was caused by a dense fog, which settled down while the *South American* was passing north through the St. Clair flats. All ships had to drop anchor until the fog lifted on account of the very heavy tonnage that navigates this narrow and winding course. The combined delays made it necessary to omit the stops planned at Charlevoix and Traverse City, Mich. But despite the several unscheduled events, the cruise was a happy party as usual, and everyone seemed to enjoy the trip and associations, the meetings and the entertainments.

As usual, much of the entertainment during the cruise was furnished by talent in the party under the direction of the committee on arrangements, James H. Drew, president Drew Electric & Manufacturing Company, Cleveland, Ohio, giving particular attention to this feature. A unique attraction was a "1952" meeting of the C.E.R.A. enacted by the Rotarians on board, in charge of John C. Schade, general manager Winona Interurban Railway, Warsaw, Ind. The committee reports read at this entertainment indicated phenomenal developments in the transportation world during the thirty-year interval which had elapsed since 1922.

Dancing on the sun deck was a popular feature of the entertainment. The "Central Daily Spray," published by *Electric Railway Journal* and delivered at the breakfast table each morning, recorded the lighter happenings and "scandals" of the care-free party. It was a much appreciated part of the general merriment.

The technical sessions were held in the saloon of the boat and were well attended. Abstracts of most of the papers presented are published in this issue. Others will be printed next week. An account of the meetings follows:

AN ANCIENT BUS LAW IN OHIO

Following the presentation of the paper on "Auto Transportation" by Zenas W. Carter, White Company, T. A. Ferneding, general manager Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, said that his company is experiencing severe and destructive competition from a bus paralleling its interurban route between Dayton and Xenia. The motor company is running three high-class buses, which are able to make the run in ten minutes less time than the interurbans. An annual tax of $24 per vehicle is all the bus operator is required to pay. Recently an old statute has been found which states that a bus line operating in competition with an electric railway can be ordered by the commission to cease running provided its service is being conducted at a loss to the operator. A check of the number of passengers riding in the buses indicated that in spite of the low taxes the business was not showing a profit. On this basis the commission has been petitioned by the railway to have the bus company submit its figures and show whether or not operation is being conducted in a profitable and commercial way. If the operating figures submitted to and approved by the commission show a deficit it will have to refuse permission for the buses to furnish its competitive transportation service.

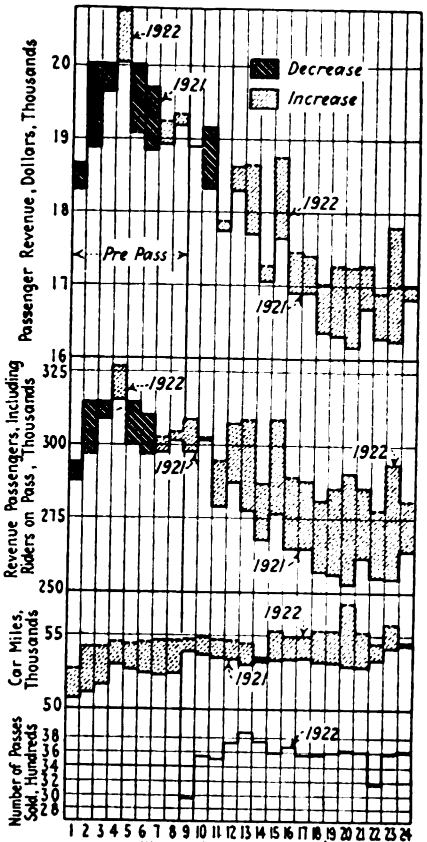


CHART SHOWING EFFECT OF WEEKLY PASS ON FORT WAYNE (IND.) CITY LINES

THE WEEKLY PASS IN FORT WAYNE

In presenting the results of the weekly, unlimited-ride, transferable pass, S. W. Greenland, vice-president and general manager Indiana Service Corporation, Fort Wayne, Ind., said that the plan was introduced with the week beginning Feb. 27, 1922, when 2,967 passes were sold. The company has the second highest fare in the state of Indiana, namely, 7-cent cash and a 6¼-cent ticket rate, and 90 per cent of the passengers used the lower ticket rate.

That the pass worked out on the city lines of Fort Wayne as it has in other places is shown by the accompanying chart of weekly earnings and riding. It will be noticed that although the weekly earnings were consistently lower for the first two months of 1922 than for the corresponding period last year, almost every week has shown an increase since the passes were put on sale. An analysis of the figures shows that a 2 per cent decrease in riding has been converted into nearly a 9 per cent increase with but slightly more car-miles. The number of revenue passengers includes those riding on passes, the assumption being that pass holders take twenty rides per week.

Even if the number of car-miles had to be increased slightly, Mr. Greenland said the pass is an excellent fare scheme provided the extra seats furnished do not cut down the net below the earning requirements. It is a real merchandising idea that has appealed to the public and has helped both the people and the company by largely eliminating the fare collection transaction.

Because of this feature alone the pass has speeded loading and done away with the argument between the conductor and riders who try to present worthless transfers. Mr. Greenland also brought out the point that the pass is such an attractive proposition to automobile owners who are required, on driving into town, to park their cars four or five blocks from their place of business that many of them now prefer to take the street cars. As the downtown business centers of our cities become more congested, this is a class of riders who will be regained.

There are many interesting and humorous sidelights in the way a few people will attempt to beat the game. While there is only "one in every office," there are many varieties in every town. For instance, each pass is punched as it is sold because clerks in the stores where the passes were on sale acquired the habit of using them and then returning them to the company at the end of the week. Others consider a pass as an investment which can earn a reasonable return besides amortizing itself when rented for 5 cents a ride. On the other hand it was reported that one gentlemen was too wise to kill the goose that laid the golden egg. The pass system, in his estimation, was too good to last and consequently he did his bit to make it last by paying cash fares for all rides over twenty.

In the connection of abuses of the pass, J. B. Stewart, Jr., general manager Youngstown (Ohio) Municipal Railway, remarked that the practice of making "two passes grow where one grew before" became prevalent enough with the heavy pasteboard type of pass that could be split that his company is now using thin protectograph paper. By having the printing done out of town there was less danger that the printer would sell a few "over-runs" at a reduced price. Because of numerous complaints that the new thin paper passes were too frail, a pocket case with a celluloid face is given away with every pass. The back of these cases carried the advertisement of a local bank, which bore the total cost of their production. The popularity of the pass holder was such that during the first week they were distributed the sale of the passes themselves showed almost a 10 per cent increase over the sales of the previous week.

Mr. Stewart also showed samples of the advertising copy which has been used in the Youngstown newspapers and for car cards. Some typical specimens of the "personified pass" copy appeared on page 13 of the issue of this paper for July 1, together with facts that show how worth-while and effective this publicity has been. Mr. Stewart said that now 30 per cent of the company's revenue comes from pass riders who comprise 44 per cent of the total passengers. The Youngstown Municipal Railway registers the number of rides taken by pass holders.

DEVELOPMENT OF FREIGHT

After the reading of Bert Weedon's paper on the Development of Interurban Freight, Harry Reid, president Interstate Public Service Company, Indianapolis, Ind., called attention to the fact that the faith in the future of the electric freight business, which was the prevailing note of Mr. Weedon's talk, was based on a successful campaign and therefore should carry a great deal of weight. Mr. Reid said that when Mr. Weedon undertook to increase the percentage of the Interstate Public Service Company's revenue from freight haulage six years ago, the earnings from this source were 6 per cent of the gross and that now under his régime they have been increased to 45 per cent.

WHAT A KNOWLEDGE OF ENERGY CONSUMPTION OPENS UP

Even though Mr. Miller's paper on energy saving devices contained the results of seven properties using the Economy meter on their cars, Harry Nicholl, general manager Union Traction Company of Indiana, Anderson, Ind., told of several very important operating economies that none of the others had reported. One of the more important of these was that accurate data on the kilowatt-hour consumption per car mile had enabled the operating department to redistribute the various types of equipment according to the kind of service and the characteristics of the route and power supply. In other words, for a given set of route, traffic and power conditions a car with a certain size of motor and a certain gear ratio will be the most economical to operate. Likewise this information has been used to determine the actual cost of power used by freight motor cars with different numbers of trailers. In regard to the over all saving which the meters have largely made possible, Mr. Nicholl said that a 14 per cent reduction in the amount of coal consumed had been effected. Besides, a very marked reduction in the cost of maintenance of electrical equipment had resulted both because of the better treatment the cars had received and on account of the inspection of rolling stock on the dial inspection basis, a system that is well liked by the maintenance department. Another important point Mr. Nicholl mentioned was that there had been absolutely no increase in the number of accidents even though the motormen must give additional attention to the economical handling of their cars. The advantages mentioned are based on over two years operation with meters installed on about 130 cars. Mr. Nicholl added that complaints had ceased about loose brakes and frequently it is difficult to adjust them loose enough to suit the men.

FRARY BEARINGS ON LEXINGTON CARS

The only discussion on H. H. Buckman's paper on "Car Bearings" was that offered by W. G. Stuck, master mechanic Kentucky Traction & Terminal Company, Lexington, Ky., who said that Frary metal motor, axle and journal bearings are being used on all ten of the company's new 25,000-lb. interurban cars. No hot boxes of any sort have occurred since the cars were placed in operation during the latter part of February, 1922. Each car, which is operated 7,200 miles per month, is lubricated every forty-five days. For May the cost of lubrication was 3.41 cents per 1,000 car-miles. The journals of these light-weight cars are fitted with 3½ x 6-in. bearings, which have a rubbing speed of 221 ft. per minute for the schedule speed of 20.8 m.p.h.

NEW PINION SAVES SCRAPPING OF GEARS

In addition to the able paper on new tooth shapes for pinions, E. S. Sawtelle, assistant general manager Tool Steel Gear & Pinion Company, Cincinnati, Ohio, mentioned the results that are being obtained by several railways with the new "wisdom" tooth pinion recently brought out by his company. In answer to a questionnaire, one property claims that for the short time the new type of pinion has been in service it has shown slightly less wear than the regular long addendum design. Even though one tooth has been dropped from the wisdom pinion to obtain the heavier base, the slight increase in the gear ratio has not affected the schedule speed. However, in another case of a motor car pulling a trailer, the increase in tractive effort was noticeable. A good instance of the possibilities of this new type of pinion, Mr. Sawtelle said, was how its advent had prevented one electric railway from scrapping $14,000 worth of new 14½-deg. tooth gears because of excessive pinion breakage. It was the intention of that company to re-equip all motors and axles with gears and pinions having the long and short addendum tooth. However, by the mating of all the gears already in stock with the heavy-base wisdom tooth pinion, the change to a new type of gearing has been avoided and the gears in stock can be worn out instead of thrown out.

A representative of the R. D. Nuttall Company was inclined to disagree with Mr. Sawtelle on the point that the change in speed from employing a higher gear ratio was not a rather serious drawback to the wisdom tooth pinion. He claimed also that an undesirable condition has been established by dropping one tooth from the pinion because its addendum is increased and that of the gear shortened with the effect that the point of contact is moved away from the zone of pure rolling contact.

W. G. Carey, General Electric Company, claimed that by concentrating the stretch during shrinking of a pinion having a lesser number of narrower spaces than the long addendum pinion, a danger of exceeding the strength of the material has been introduced and breakage would result.

DISCUSSION ON LIGHT-WEIGHT CARS

Commenting on F. E. Wynne's paper about light-weight interurban cars, J. C. Thirlwall, General Electric Company, presented figures by which he showed that a saving of $8,000 per car could be effected with the replacement of heavy interurban equipment with modern light-weight rolling-stock weighing about 60,000 lb. Mr. Thirlwall took present investment figures and operating costs from the statistics compiled for seventy-seven interurban lines by the American Electric Railway Association. The allocation of the possible savings per car as given were as follows:

Ties	$1,300
Tamping, etc.	500
Feeder copper	800
Substation	700
Power house	2,000
Car	3,000
	$8,300

What the light-weight car has done for the Kentucky Traction Terminal Company was told by W. G. Stuck, who said that the revenue of the interurban lines of that company had increased 12 per cent and the riding 30 per cent since the introduction of the more attractive and lighter equipment. The successful outcome in Lexington shows how perfectly possible it is for the public to be pleased with better and more frequent service while the company is enjoying a larger income and decreased operating expenses.

ENGINEERING COUNCIL DIRECTORS REPORT

Each of the sections of the Engineering Council, except the southern section, has held two meetings since the council was organized in the summer of 1921. The reports of the directors of the eastern, northern and western sections indicate that the formation and organization of the council was a wise move. In his remarks on the activities of the eastern section, Mr. See points out that most engineers are too busy following the endless details of their own property to have time for visiting and following the developments of other roads. It was to enable the operators to broaden their scope and learn the latest practices in the industry that the council was formed and in this direction it is attaining success. E. B. Gunn, chairman of the northern section, feels that one of the best features of the Engineering Council is that every man present knows that he has the freedom of expressing his ideas in his every day language. In regard to the attendance at the meetings, both Mr. Gunn and Mr. Schlesinger believe that the officials of the companies can give still further co-operation by making it easier for their men to be present.

A. Schlesinger, chairman of the western section, then outlined the proposals that were made at a meeting of the directors of the Engineering Council some time ago. The council is to undertake the preparation of certain standards useful to the association, and a plan is now under consideration to study existing specifications adopted or recommended by the American Electric Railway Engineering Association. It is the intention that committees be appointed by each of the four councils and after a thorough study of the various specifications, recommend to the Central Electric Railway Association through the Engineering Council the adoption of such standards and specifications as in their judgment are satisfactory. Any suggestions will, of course, be referred to the proper committees of the American Association for their consideration.

SECRETARY'S REPORT AND BUSINESS SESSION

Secretary L. E. Earlywine submitted his report, in which he commented on the various activities of the association. The traffic association has held three meetings since the beginning of the year and during that time thirty-seven excursion tariffs have been issued, making a total of sixty tariffs issued during the past year. The application to compile a master tariff to cover excursion movements was declined by the Interstate Commerce Commission. The traffic association has authorized the reissuing of the present storage tariff to conform to the rules and charges in effect on the steam railroads and the issuing of a supplement to the baggage tariff correcting transfer charges. The committee on prevention of freight claims is compiling monthly statements from member companies of loss and damage claims. The committee on the official interurban map has been authorized to revise the map plates.

The Accountants' Association has adopted a uniform interline waybill, which has been put into practice by a number of member companies.

A special committee appointed by the president consisting of A. Schlesinger and C. L. Henry has been conducting extensive work concerning rules and principles for safety and inductive co-ordination and has appeared on three occasions before the Public Service Commission of Indiana.

At the final meeting of the association on Friday morning resolutions on the death of George L. Radcliffe and Walter Hinman were passed, also one thanking the Chicago, Duluth & Georgian Bay Transit Company for the excellent service provided on the cruise.

The executive committee made a tentative suggestion that the annual meeting in January be held in Louisville.

Metals for Car and Power House Bearings*

Some of the Essential Characteristics of a Satisfactory Bearing Metal Are Given and the Advantages of Using a Lead Base Metal Are Discussed

BY H. H. BUCKMAN
Special Railway Representative United Lead Company,
Frary Metal Division

I FIND that nearly 64 per cent of equipment failures, causing train delays and annulments, are due to bearing failures. What portion of the bearing failures are due to lubricant failure I have been unable to ascertain. Fighting hot boxes with oil instead of analyzing the cause of the hot box runs up the lubrication cost of railroad operation, and high lubrication costs are found on railroads most troubled with hot boxes.

It is somewhat surprising to know the number of railways that purchase their bearings without knowing the nature or metal contents of them. Price seems to be the governing factor. I do not know of a more important subject than this for close co-operation between a purchasing agent and the master mechanic or superintendent of equipment.

Engineers, chemists and metallurgists have always endeavored to incorporate as high a percentage of lead as possible in babbitt metals, thereby increasing its anti-frictional qualities and at the same time lowering the cost. As the matter stands today, users of babbitt metal seem divided as to a standard formula as between a tin base or a lead base alloy.

The American Society for Testing Materials made an attempt to settle this subject by tabulating several alloys of lead base and tin base metals, but I feel safe in saying that bearing metals are as numerous and varied today as ever before and the consumer is still meeting his individual requirements by actual service tests. This is not as easy as those unfamiliar with bearing problems would suppose.

In the first place, the operator must determine the following factors: Tensile strength, compression strength, hardness, melting point, specific gravity, elongation and, most important, select a metal with the highest anti-frictional quality. It would be an endless task to try out by actual service tests all the different makes and grades of bearing metals, so before conducting service tests, the consumer carefully tabulates from his own laboratory tests the necessary qualifications to meet his requirements, or has these tests conducted by a local metallurgist or he secures this information from the manufacturer, except one and the most important point, the coefficient of friction. This he cannot secure from any one and he is compelled to draw his own conclusions because no machine has as yet been perfected that will give accurately the coefficient of friction under all conditions. So much depends upon actual conditions that figures thus far obtained are of little value. These conditions may be variation in load, in speed, in lubrication, and figures obtained on one test cannot be applied to another.

There are two specific services to be borne in mind when selecting bearings —one is heavy pressure at slow speed, the other is light pressure at high speed. Primarily, the object of a bearing is to reduce friction as much as possible, to prevent as far as possible wear on the shafts and axles and to provide quick means at as low cost as possible for taking up lost motion due to wear. Practically, the same mate-

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*Abstract of paper presented before the Central Electric Railway Association, June 25-30, on board *S.S. South American*.

rials are used in bearings today as were used in bearings in 1839 by Isaac Babbitt, showing very little improvement, and on first thought one would wonder how bearings have kept up with the wonderful progress in increased speed and weights. The answer is, better designed bearings and better methods of applying them, together with improvement in lubricants and methods in lubrication. Most credit I believe is due to the latter to meet the increased speeds and weights; for instance, we could not expect to operate at the increased speeds and weights of today with the same lubricants as were used in the time of Isaac Babbitt in 1839, which were principally tallow grease.

The improvement in lubricants has been such that it is possible to use a bearing that has no anti-frictional qualities at all and little trouble would be experienced from hot boxes in certain light service. The writer recently visited a railway that uses cast iron motor and journal bearings without lining or even tinning. It simply machines, polishes and places in service. It experiences very few hot bearings, which proves that a bearing of no anti-frictional qualities at all can be operated in some instances without running hot. It also shows that one may operate with a very poor grade of bearings without hot boxes, but while he is escaping trouble in hot boxes he most certainly is encountering trouble of a more serious nature, but not so readily noticed in the form of high operating costs, due to excess lubrication, fast wear of shafts and axles and high power consumption. Therefore, it is necessary to give the bearing subject more thought and attention than merely eliminating hot boxes.

ADVANTAGES OF LEAD

Lead, being a greasy, anti-frictional metal, naturally has the highest anti-frictional qualities, and the more lead used in a bearing metal the more valuable it becomes as an anti-frictional bearing. A skip of lubricants for a few seconds with a tin base metal will often permit the tin to seize the shaft, with damage resulting to both the bearing and the shaft. This is easily understood when a comparison is made of the melting temperatures. Genuine babbitt melts at 460 deg. F. and lead at 621 deg. F. Complete liquefaction point of genuine babbitt is 683 deg. F., while that of lead is 800 deg. F.

The question is frequently advanced as to why a relined bearing does not last as long as the original lining. The answer is that it is due to poor bonding. Very rarely is a bonding on a relined bearing more than 75 per cent efficient and it is very often as low as 30 per cent, the reason being that it is impossible to get a 100 per cent job of tinning on a used bearings due to the oil that remains in the brass; though the bearing be boiled, subjected to baking processes at high temperatures, pickled, etc., some oil is always present, which prevents perfect bonding, even though a good job of bonding is secured. Very often a lined bearing also fails because at elevated temperatures the tin in the bonding softens and undermines the lining.

KEEPING BEARINGS TIGHT

Keeping armature and motor axle bearings tight in the motor casings is extremely important and is often neglected. A loose bearing not only destroys itself but assists greatly in destroying the entire motor. A bearing that is loose in the casing produces faster wear on the inside of the bearing than a bearing which is kept tight. The dowel pin was never intended to do all the holding of a bearing; its purpose was that it should be a guide, and a clamping fit in the casing was intended to hold it. However, to keep bearings tight in a casing is easier said than done. Several methods are now used to eliminate the dowel pin trouble, one of the most promising methods being to cast extended side lugs on the lower half of the bearing and cutting or grinding out suitable recesses in the bearing caps, thereby allowing the extended side lugs to come in contact with the upper section of the motor, and which practically eliminates all chances of the bearing turning over or moving. This scheme can only be used where bearings are cast to size, eliminating machining.

When the flange of the journal wears back into the bearing it is a mistaken idea that it can be corrected by filling the recesses with babbitt at the time of relining the bearing. The babbitt takes care of it but a short time, in some cases only two or three days, where trail cars are pulled around short radius curves. This you can readily understand when you consider that some recent tests showed end thrusts on a 4¼ x 8-in. M.C.B. journal bearing amounting to more than 10,000 lb. at certain intervals.

Develop the Freight Business !*

Freight Haulage Holds Great Potentialities for Interurbans to Increase Revenue Provided Adequate Traffic Organizations Are Developed—Very Important to Know Actual Costs

By BERT WEEDON

Traffic Manager Interstate Public Service Company, Indianapolis, Ind.

THE development of interurban freight business is more important today than ever before. The shrinkage in passenger earnings, the most important element of our earning power, is a serious matter. Much of this loss in revenue will never be overcome by the increase in passenger traffic and we must look elsewhere for earnings to fill up this gap. A general survey of the situation will disclose the fact that the development of interurban freight haulage can and will more than offset this loss.

Due to the fact that many miles of electric railways were built as passenger carriers, and for many years have been operated as such without regard to the important feature of carrying freight, many have been led to believe there was no profit in freight haulage. Many honestly believe yet that carrying freight on electric railways is a necessary evil and that we tolerate it becuse the various commissions require us to.

How many know anything about our freight business except the gross figures? Do we know the cost per ton-mile of operation? Do we know the gross revenue per ton-mile? Do we know what our actual investment is in freight equipment, including freight stations, cars and other facilities? In other words, do we know our actual investment in all equipment used and useful in the freight department? In fact, have we given the subject the consideration to which it is entitled?

There may be a few isolated cases where this question can be answered in the affirmative, but in the majority of cases we must admit we have failed to develop this phase of the industry. How many of us realized as early as 1914 or 1915 that in time we must rely on our freight department for a much larger portion of our income? A general education campaign directed toward the public as well as toward our own organizations to demonstrate our ability to perform freight transportation service is absolutely necessary. Also a system of accounting must be devised so that we can determine accurately the cost of handling freight and the return therefrom. Essential also is an aggressive, vigorous traffic department that will carry on a continuous campaign of solicitation 365 days a year and twenty-four hours a day. In other words, go after this business and keep after it, and then keep after it some more. Next, a transportation department must be developed that will educate itself to that point where it can furnish a service pleasing to the public and one that will also be economical in cost.

In a general way, conditions in our territories are very much alike, although there are certain local conditions in the various localities that require special attention and special treatment, such as:

1. A close industrial survey of the various communities in which we operate.
2. Finding out the location of the industries relative to our rails, as well as the possibility of placing of industrial switches to insure carload business, which is the most important phase of freight hauling and the one in which there is perhaps the greatest net.
3. A careful survey of the rural com-

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*Abstract of paper presented before the Central Electric Railway Association, June 25-30, on board *S. S. South American*.

munities, ascertaining their service needs and showing a general interest in the development of these communities.

4. A wideawake industrial department, which will assist civic organizations in locating industries on electric railway lines or where they can be reached with an industrial switch.

With all of this development under way, let us direct our attention to the motive power, box cars, flat cars, gondolas and freight houses, tracks and other necessary equipment. We must be in condition to handle the business offered. Many of us expect our traffic departments to develop business, and then we are embarrassed by having neither proper service nor the equipment with which to handle it. It must be remembered that in order to furnish proper service we must have a surplus of equipment to meet emergencies at all times. Shippers must be educated to the fact that we can handle promptly all business offered.

A comprehensive system of accounting by which we may determine accurately the cost of operation; close attention to the freight claim department, requiring systematic attention to overs, shorts and damages, and prompt adjustment of claims are all necessary to the proper handling of a successful freight department. Freight agents, freight trainmen, in fact all departments having direct or indirect contact with the freight department, should be called in regular meetings, held at stated periods, for discussion of the problems of this department.

Where will we find the money to finance all the necessary equipment? If the average business man goes to his bank to borrow money for financing a purchase of merchandise and the banker should say, "Mr. Merchant, what will this merchandise cost, and have you a ready market?" Mr. Merchant answers with the figure of cost, and an evasive answer as to the market, and is again asked by the banker: "What will this merchandise net you?" Mr. Merchant is unable to answer the question, as he has not kept operating costs in such manner as to be able to give his banker a definite answer. Will he get the loan?

Most of us are in very much this position. Put your freight business on a basis that you may determine definitely what it is doing and you will have no trouble in financing the necessary equipment to show a good return. The reason that there are still many who do not believe in freight business on electric railways is that no systematic development has been started that we might determine its possibilities. There are, however, a venturesome few who have developed their freight departments. They know a splendid return awaits the effort to render freight service that meets the shippers' approval. Co-ordination of traffic and transportation departments, with the co-operation of other departments, will do much to develop black figures on your balance sheets.

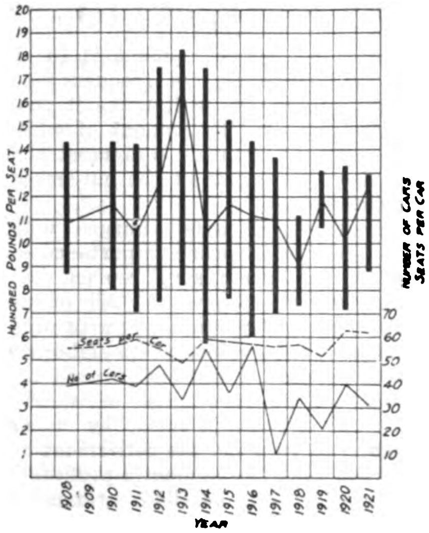
How Light-Weight Cars Improve Interurban Earnings*

Weight Analysis of Cars Is Given and the Savings that May Be Effected Are Detailed—Suggestions Made for Standardizing Designs of the Lighter Cars

By F. E. Wynne
Manager Railway Equipment Engineering
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

NUMEROUS ways of improving the financial situation of the interurbans have been suggested, such as broader publicity, general ownership of railway securities in the communities served, special service for frequent travelers and large shippers, the intensive development of freight traffic, the installation of automatic substations and the more extensive operation of one-man cars.

Lighter weight cars may be used to secure improvement by any one or all of these means, but the maximum benefit in one direction is not necessarily coincident with securing the greatest all-round return. Such cars will decrease operating expenses directly per car-mile by reducing energy consumption, by decreasing the wear and tear on the track and by lowering the cost of maintenance, provided their design and construction are adequate. The greatest direct saving will accrue where the new cars are used to give only the same service as that previously given by the heavier cars. Usually this does not produce the greatest over-all improvement, for more frequent service is a major factor in improving public relations and in securing more revenue. This shorter headway means more car-miles, and part or all of the direct saving may be sacrificed in order to build up a greater income. The determination of the correct balance between saving and gaining is a nice problem for each railway to solve for itself.



DATA ON WEIGHTS OF INTERURBAN CARS DURING LAST FOURTEEN YEARS

In speaking of interurban cars, I have in mind those electric railways whose lines are of such length that two hours or more are required for the trip one way, with cars seating at least fifty passengers and with schedules requiring frequent or sustained speeds of 55 to 60 m.p.h. I am excluding the purely suburban and short, moderate-speed interurban lines where the 26,000 to 30,000-lb. double-truck car now available has an unquestioned field. Neither am I considering those electric railways which have to compete with the best in steam railroad service and which, consequently, must provide luxurious equipment and maintain exceedingly fast schedules for the attraction of an ultra-critical public.

With the generous assistance of the several manufacturers of cars, I have collected some information on weight, length and seating capacity of interurban cars more than 45 ft. in length over all as built during the years 1908 to 1921. These data furnish the basis for certain derived values shown in the accompanying chart. The weight per foot of over-all length was found to vary from 710 lb. to 1,570 lb., with an average of 1,185 lb. The weight per seat ranges fom 575 lb. to 1,825 lb. and the average is 1,147 lb. By years, the average car length and number of seats do not vary widely. For the nearly 500 cars considered, the average car is 55 ft. long, seats fifty-seven and weighs 65,000 lb. without equipment. The average equipment may be taken as four 125-hp. motors with multiple-unit remote control. This, together with air brakes, adds approximately 21,000 lb., bringing the total weight of car equipped to 86,000 lb., or the equivalent of 1,563 lb. per foot.

The standard safety car (16,000 lb. total) weighs 575 lb. per foot of length. Some of the light-weight double-truck cars recently built weigh 625 lb. per foot, fully equipped. Of course, we can hardly hope to secure such low weight for long-haul interurban service and, at the same time, provide the correct degree of safety and comfort at the high speeds required. However, the difference between 625 lb. per foot and 1,560 lb. per foot indicates that the latter figure is unnecessarily high. From conversations with the car builders, I believe they will not hesitate to undertake to build interurban cars 55 ft. over all to weigh approximately 65,000 lb. when completely equipped with multiple-unit remote control, air brakes and motors geared for a maximum operating speed of 55 to 60 m.p.h. For such a car, quadruple 100-hp. motors would be adequate. Assuming that this new car weighs 65,000 lb. to-

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*Abstract of paper presented before Central Electric Railway Association, June 25-30, on board *S.S. South American.*

tal, the weight exclusive of electrical and air brake equipment will be approximately 47,000 lb., or 855 lb. per foot. This unit weight is 28 per cent less than the average of the 494 cars considered, and 70 per cent more than recent light-weight double-truck cars. It therefore appears that such a reduction in weight is not only possible, but is also conservative.

The use of such cars (65,000 lb. total weight) in place of 86,000-lb. cars will produce worth-while direct savings in:

(a) First cost of cars and equipment.

(b) Energy consumption.

(c) Maintenance.

(d) Line copper.

(e) Power-house and substation apparatus.

(f) Fixed charges.

The amount by which the cost of car body and trucks will be reduced is a question for the car builders to answer. The cost of a quadruple equipment of 100-hp. motors is in the neighborhood of $1,200 less than that of a quadruple 125-hp. equipment.

POWER SAVING IS CONSIDERABLE

The energy consumption may be roughly taken as proportional to the weight of loaded car, so that the reduction in the power bill will be in the neighborhood of 23 per cent. For the class of service being considered, the average energy required may be taken at 85 watt-hours per ton-mile at the power house. This is equivalent to a difference of 0.9 kw.-hr. per car-mile at the power house. At 1 cent per kw.-hr. and 50,000 car-miles per year, the energy cost will be reduced $450 per car annually. This alone will pay 6 per cent interest on a $7,500 investment.

The reduction in maintenance of cars and equipment is, of course, difficult to predict. For a 28 per cent reduction in car weight and a 20 per cent reduction in motor capacity, it seems fair to suggest a 10 per cent reduction in maintenance. There may also be a reduction in wear and tear on track, but this benefit may not be realized because it is entirely possible that better track may be an essential to the successful operation of lighter cars.

The direct benefit in the distribution system will be most apparent on entirely new roads and extensions. A 25 per cent reduction in weight will make a corresponding reduction in both the average and peak power requirements. With substation spacing fixed, this will reduce the feeder copper. With copper trolley wire costing 15 cents per pound and stranded copper feeder at 17 cents per pound, the saving in line copper by using the lighter car may be anywhere from $200 to $900 per mile of single-track route.

In certain cases where old equipment is replaced car for car with new light equipment, a similar return may be secured by taking down the excess feeder copper. However, before taking such a step, careful study should be given to the voltage conditions with the old cars because it may prove more economical to retain the full amount of feeder copper in service, thus securing improved line voltage conditions which tend to better the schedule speeds possible with a specific equipment, or to the operation of the same schedules with lower maximum speed and smaller motors.

On interurban lines the substation and power-house capacities are determined primarily by the peak loads. Where car for car replacement is made, lighter cars may relieve overloaded rotaries, transformers and generators. Under other conditions, they may make it possible to decrease the number of substation and power house units in operation during a considerable portion of each day, resulting in a better load factor, higher over-all efficiency and lower maintenance. On new lines and extensions the lower power requirements of lighter cars are reflected directly in smaller or fewer substation and power house units.

Where the new equipment is to be used for increasing the frequency of service, lighter cars will make it possible to minimize the amount of additional feeder, substation equipment and power house apparatus to be purchased and installed.

The saving in fixed charges with lighter cars is of prime importance in the cases of compulsory replacement and additional equipment. All of us are so thoroughly familiar with this fact that it is unnecessary to elaborate on it here. But I do wish to call attention to the possibility of saving enough in operating costs, by using lighter cars, to make the retirement of even good heavy equipment a profitable procedure. The detailed statement and solution of such a case are beyond the scope of this paper, and each case must, therefore, be settled entirely on its own merits.

Operation with one man instead of two will not save as large a proportion of the operating expenses on interurban properties as on city systems. Statistics published by the American Electric Railway Association for a typical year show for seventy-two city and fifty-five interurban properties that the cost of conducting transportation was respectively 45 per cent and 30 per cent of the total operating expense. Car for car replacements on interurban lines, therefore, should not be expected to show direct returns of as high an order as on city properties. On the other hand, the greatest all-round benefit is likely to be derived from the provision of more frequent service without any increase in line copper, substation equipment or power house apparatus. More frequent service correctly operated and advertised will certainly produce more revenue and the amount of this is increased by the improved public relations which invariably follow the operation of new cars more frequently.

The proper analysis and solution of operating and traffic conditions are problems which can best be solved by a high class transportation engineer working in conjunction with the equipment engineer and the master mechanic. In determining the advisability of using lighter cars, their effect on numerous things must be investigated. I have discussed only a few of these and shall indicate only some of the others. For example, consideration of steam railroad competition carries with it the study of fares, including those for city cars and taxi cabs; time of trip, including changing cars; convenience, and the character of steam service as defined by frequency, speed and equipment. The study of the extent of replacements of, or additions to, rolling stock will be affected by the number of cars, annual mileage per car, per cent of weight reduction, schedules, probable earnings, operating costs and fixed charges. When everything has been taken into account, the result will show the steps necessary to secure the greatest over-all return.

ESTIMATES MADE HEREIN ARE CONSERVATIVE

The amount of possible weight reduction suggested has been made conservative intentionally. The present weight of the safety car is considerably more than that of the earliest ones. So, in working toward weight efficiency for other types of cars, we should avoid going too far. While I have talked primarily about high-speed interurban cars, we should not leave the subject without reference to the large field of interurban service at somewhat lower speeds. Many cars weighing from 30 to 45 tons and equipped with from four 75-hp. to four 100-hp. motors are being operated in service which requires no speed higher than 40 to 45 m.p.h. The possibility of economy through car weight reduction in such cases is even greater than has been indicated for the high-speed service. In certain specific cases that have been studied, it has developed that new light cars could be used for the complete retirement of existing cars with economy sufficient to pay for the entire cost of the change in from three to six years.

The variety of conditions to be met in interurban service is not so great as to preclude a certain degree of standardization on general types of cars. I need not go into the economical advantages of reasonable standardization as that question has been frequently presented and discussed. Probably speed is the most important physical factor in determining suitable car weights. On this basis, it is my opinion that the majority of interurban requirements can be well and economically served by, say, four sizes of cars for the usual speed range, namely:

Approximate Total Weight of Car Fully Equipped	Maximum Speed
25,000 lb.	30 to 35 m.p.h.
32,000 lb.	35 to 42 m.p.h.
42,000 lb.	42 to 50 m.p.h.
60,000 lb.	50 to 60 m.p.h.

With the outlook for the electric railways growing more favorable, it seems to me that this is an opportune time for co-operative action by the railways, car builders and equipment manufacturers with a view to reasonable standardization of new cars for greater economy. A thorough analysis of this problem by your association through its Engineering Council would, I believe, produce very great returns for the individual railways.

The "Rubber Urge" in Transportation*

The Author Thus Characterizes the Economic Force Which Has Brought About the Phenomenal Development of the Motor Truck and Bus

By Zenas W. Carter
The White Company, Long Island City, N. Y.

A MIGHTY wave of desire to "ride on rubber" has been sweeping the United States during the past few years. It seems fitting to call this desire of the public a "rubber urge" in transportation.

Just what the psychology is back of this wave, and constantly increasing its size, is of less interest to the electric railway operator than the question of this influence upon his daily problem.

The electric railway operator is in the transportation business. He uses steel rails and electricity as his work tools. Theoretically he is interested only in steel rail and electricity.

Commercially and practically, however, he is in the transportation business, and the "rubber urge" is a feature of the transportation business. It affects both freight and passenger business. Motor trucks and buses are here to stay. Their use is rapidly increasing everywhere and on every highway. They are essentially and actively an important part of the transportation business of today.

Thus, as a transportation man the electric railway operator finds his attention centering more and more upon the problem of co-ordinating motor buses with his electrical operation.

Just how this may be done best to cater to public demand to "ride on rubber" is an individual problem in each particular case. No general rule can be set up which will fit any two cases.

Motor Vehicles Must Pay in One Way or Another

However, this much can be stated most emphatically—motor trucks and motor buses must represent an ultimate economy or they are a distinct liability.

The question of economics in electric railway operation is not necessarily a question of making a specific profit on a definite installation of motor equipment. On the other hand, there are hundreds of profitable motor-bus lines in operation in the United States in territory which was not being served by either the electric or steam companies. It is reasonable to assume that this business belonged to the transportation companies, either the steam or electric operators, but was lost largely through lack of interest in making surveys for motor-bus operation.

Several of the larger electric and steam railway companies have, however, checked over their prospective fields and are now actively in the business of catering to the public idea that they desire to "ride on rubber."

Electric railway operators will be interested to know that an independent bus operator carried more passengers per bus in twenty-three buses which he operated in Wilkes-Barre, Pa., in 1921 than were carried by the same number of the buses of the Fifth Avenue Coach Company in New York City. The figures are: For Wilkes-Barre, 183,891 passengers per bus; for New York City, 174,192 passengers per bus.

Motorization of Highway Traffic Is a Logical Development

Our steam railway and our electric railway operations have been largely revolutionized through the development of the several types of motive forces. The application of these same power forces to industry, electricity, steam and gas has changed our entire country from a manual institution into a mechanical institution. In a measure, motorization of our highways is likewise a change from a manual to a mechanical method of highway transport. With almost 11,000,000 motor vehicles already on our highways, all individual highway transport will soon be by motor.

The steam and electric railways will reap a return ultimately from this motorization, as it will tend still more closely to knit the country into a corporate economic unit to promote quick exchange and rapid interchange.

The motor on the highway offers the opportunity to supply the public with both local and express service operating over the same route, while this is impossible on single line rail. Many electric railway companies could probably operate bus lines paralleling their rails profitably, especially in congested centers, operating the bus lines for express service and using the electric service almost entirely for local stops. In other cases such a service might solve a rush-hour congestion problem profitably where the addition of extra cars would only tend to slow up movement and increase congestion.

Another field for the use of buses in conjunction with electric line operation is in territory where development has spread the area served until a large percentage of possible short-haul passenger business is lost on account of the distance the passenger must initially walk to reach the trolley. The use of buses covering such a section over what might be called a curved or bow route paralleling the trolley service at some distance but not operating on exact trolley schedule would often prove distinctly profitable and prevent competition.

Also, picking up and delivery at curb, whether in urban or in congested city territory is a psychological element to consider in the opportunity to increase short-haul traffic.

Do Not Overtax the Highway Vehicle

There is agitation in some sections to have the motor vehicle more heavily taxed. Fundamentally, this is moving in the wrong direction except in so far as all vehicles using the highways may be taxed in proportion to their proper share of maintenance. Figures show this to be already accomplished.

The motorization of our highways is itself the economic force which has compelled the betterment of our highways and to increase taxation of this special class group would seem to tend to drive backward instead of forward.

Even the interests of the steam and electric roads may ultimately be served better by low taxation of motor vehicles than by high taxation. The steel rail carriers, both steam and electric, are the transportation industry. Sooner or later they will own and operate their own motor-truck and motor-bus lines. For this reason, it seems fitting that all transportation interests can well refrain from agitating for taxation which may ultimately tend to become a boomerang tax.

The Motor Truck Long Useful on Electric Railways

The motor truck in electric railway service departments has naturally been proven economical as a factor in trolley operation much more quickly than the use of the motor bus by the passenger departments. In this service for public utility corporations, there are as many different kinds of uses for the motor truck as there are different types of work to be done.

There is also a use of trucks for supplementary freight service which may soon grow into large proportions. An example is the extension of electric railway freight lines into off-line territory such as has been inaugurated by the Cincinnati, Aurora & Lawrenceburg Electric Railway. An operation somewhat similar to the container plan followed in Cincinnati, but using trailers, is in service in Chicago, as part of the freight system of the Milwaukee Electric Railway.

The total registration of motor vehicles for 1921, as shown by the tabulations of the Bureau of Public Roads, was 10,465,995. Of these 9,342,844 were passenger cars; 982,604

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*Abstract of paper presented before Central Electric Railway Association, June 25-30, on board the S.S. *South American*. A more extended abstract will appear in the August issue of *Bus Transportation*.

were trucks and commercial cars; 50,547 were taxis and buses.

These startling figures are very important in interesting the electric railway industry when compared with the statement from the Jan. 7 issue of the *Electric Railway Journal* to the effect that there was 149.79 less mileage of electric rail in service in 1921 than in 1920 and that the total of cars and locomotives in service was only 106,385 in 1921, compared with 106,688 in 1920.

In the present situation as it relates to the use of the motor truck for carrying freight in co-operation with the electric or steam railway and as it relates to the use of the motor bus or the rail bus for carrying passengers in co-operation with either, this new means of local transport offers an opportunity for the railway interests to be carried along into this new field of transportation. These nearly 11,000,000 vehicles cannot now be superseded by systems of either steam or electric transportation.

The motor truck for short-haul freight service offers the opportunity to pick up freight and make delivery with just two manual handlings of the goods as compared with four handlings if the goods must be loaded into and taken from a box car. In passenger transportation the motor bus offers a system exceedingly flexible which may be co-ordinated profitably with a system rigidly inflexible.

Already many of the electric railway fraternity have been inspired by the profit in motor truck and motor bus operation. They have expended the energy necessary to investigate.. The more carefully they investigate, the more rapidly will this new transport unit—the motor vehicle—be inducted into service as an integral part of electric railway operation. Thus will the "rubber urge" prove to be an economic force in transportation.

Secretary Hoover Opens Meeting of American Construction Council

IN OPENING the organization meeting of the American Construction Council at the Washington Hotel, Washington, D. C., June 19, Secretary of Commerce Hoover stated: "If we would stem the tide tending to refer every little need and complaint to government, action to meet these demands must arise from within industry itself." He declared that in thus bringing all representatives of the construction industry together to see if such a council can be organized the most important step in the history of industry was being taken.

Among the subjects suggested by Secretary Hoover for the consideration of the council were standardization of grades, inspection of and simplification of dimensions of construction materials, the collection of statistics, the encouragement of home building, zoning, proper building codes, seasonal and intermittent employment, jurisdictional disputes, apprenticeship, vocational training and in general the elimination of unnecessary speculation and the better functioning of industry in regard to our national needs.

International Engineering Congress

TELEGRAPHIC dispatches from Rio announce that the Brazilian Government has approved of the plan of holding an international engineering congress in Rio next September.

It is understood that representative engineers from all the American countries will attend and that the principal subjects of discussion will be:

1. The utilization of fuel resources.
2. The best utilization of water power.
3. Recent advances in irrigation methods.
4. The elimination of waste through the standardization of supplies for agricultural and industrial purposes.
5. Coal as a factor in industrial development.
6. Essentials of a national railroad policy.
7. Intercontinental engineering co-operation.
8. Port developments.
9. Terminal facilities.
10. The iron and steel industry.

Electric Power Men Perfecting Organization

ON JULY 12 and 13 there will be held at Madison, Wis., a meeting of the National Technical Executive Committee of the National Electric Light Association. The meeting is called to work out details of a plan for increasing the value of the technical section through the organization of geographic divisions.

At the June meeting of the executive committee it was decided to organize, to the extent necessary in each division, committees comparable to those existing in the technical national section, namely, electrical apparatus, hydraulic power, inductive interference, meters, overhead systems, prime movers, safety rules, underground systems.

The executive committee is organized under the chairmanship of R. F. Schuchardt, Commonwealth Edison Company, Chicago.

Railroad Problems Discussed

THE July number of the "Proceedings of the Academy of Political Science" is devoted to the subject of the relation between the railroads and business prosperity. It includes discussions on such subjects as railroad regulation, railroad labor, functions and policies of the Railroad Labor Board, transportation act of 1920, rate making, etc.

The volume brings down to date much of the material in the Academy "Proceedings" for January, 1920, on "Railroad Legislation," which discussed fully the problems entering into the making of the transportation act of 1920.

Work on Welded Rail Joints Is Progressing

THE executive committee of the committee on welded rail joints, which is functioning under the auspices of the American Bureau of Welding, held a meeting at the offices of the National Research Council in New York City on June 21. Chairman G. K. Burgess presided and the following were present: E. M. T. Ryder, vice-chairman; W. Spraragen, secretary; H. M. Steward, R. C. Cram, W. F. Graves, C. F. Gailor, G. C. Estill and W. F. Hulburt. An extended discussion of plans for obtaining funds for the work took place. The close relation of the committee to the American Electric Railway Engineering Association indicated a need for co-ordinating financial questions to secure co-operation with the committee on way matters of the latter in connection with the testing machine now being considered by that committee.

Plans for getting the several investigations under way were considered and letters to steel companies, railway companies and laboratories, describing the work and the respective parts to be allotted to the above interests, were approved.

It was decided that in all joints use should be made of Association Standard Grade B girder rail with 0.75 per cent carbon content and that the best joints should be submitted to the following tests: (a) tensile, (b) bending, (c) drop, (d) fatigue. These tests will be made under the direction of the committee. The tensile tests were assigned to the Bureau of Standards, the bending tests to Purdue University, the drop tests to the Lorain Steel Company and the fatigue tests to the Philadelphia Rapid Transit Company. The last-named company will presumably use the special machine recently installed by E. J. McIlraith, superintendent of rolling stock and buildings.

Other tests such as conductivity tests, chemical analyses, macroscopic, microscopic, etc., are to be made also. A general method of making up the test joints, to insure uniformity, was devised and will control the work of those who submit joints for test purposes.

A letter from Prof. D. D. Ewing of Purdue University was read tendering the use of certain important facilities for tests and the committee will avail itself of this generous offer.

The work of the committee is getting well under way and its members are pleased with the progress made and with the evidence of great interest in the work which is being displayed by members of the electric railway industry.

[NOTE—Subsequent to the above meeting representatives of the rail joint committee were in conference with members of the executive committee of the American Electric Railway Association, looking toward a closer co-operation and the possibility of financial support.—EDS.]

National Safety Congress in Detroit

THE eleventh annual congress under the auspices of the National Safety Council will be held in Detroit, Mich., Aug. 28 to Sept. 1. The electric railway section session Wednesday morning, Aug. 30, will be under the direction of B. D. Hoskins, Chattanooga Street Railway, chairman of this section; H. B. Potter, Boston Elevated Railway, vice-chairman, and M. W. Bridges, Metropolitan West Side Elevated Railway, Chicago, Ill., secretary. The session will open at 9.30.

Reports of the chairman, secretary and committees will come first, followed by these addresses:

On the Most Efficient Manner of Conducting Safety Work, by C. B. Scott, general manager Bureau of Safety, Chicago, Ill.

On Safety as an Operating Factor, by F. R. Coates, president Community Traction Company, Toledo, Ohio.

American Association News

Executive Committee Meets in New York

THE postponed June meeting of the executive committee of the American Association was held at association headquarters Saturday afternoon, July 1. The committee disposed of a large number of individual items which were before it for attention.

The financial committee presented the quarterly report of the association's auditors which showed everything at headquarters in excellent shape.

The report from the publicity committee showed a very active continuation of the publicity work by the advertising section of the bureau of information and service. In his report for the publications committee, Mr. Storrs mentioned the fact that *Aera* is now under the direction of the new editor, J. W. Colton, and that constructive criticism as to how to make *Aera* a better publication for the association would be welcome. The program committee reported substantial progress on the program for the fall convention.

The membership committee report as usual showed a gain in membership, there being three new railway and three new manufacturer members.

The committee decided to issue a formal invitation to the officers and members of the Canadian Electric Railway Association to attend the October convention. It was voted as member of the American Engineering Standards Committee to admit the Panama Canal to membership in the organization.

The committee approved a resolution of the engineering association executive committee addressed to the Department of Commerce indorsing the simplification of design program. It also gave approval to the action of the engineering association in submitting nine of its standards to the American Engineering Standards Committee. Those present at the meeting were President R. I. Todd, L. S. Storrs, A. W. Brady, W. H. Sawyer, C. D. Emmons, L. H. Palmer, J. N. Shannahan, Carl Beck for C. R. Ellicott, George Haskell for Samuel M. Curwen, and Executive Secretary J. W. Welsh.

The next meeting of the executive committee will be held in Toledo on July 28.

Engineering Association O.K's Simplification Principles

THE following resolution, presented by the executive committee of the Engineering Association, was approved at the meeting of the American Association on July 1:

Whereas the American Electric Railway Association is thoroughly in accord with the proposal of the Department of Commerce looking toward the simplification of practice in industry and the elimination of waste through standardization, and

Whereas the American Electric Railway Association believes it to be the duty of all national industrial organizations to render every possible assistance in this important and far reaching undertaking; therefore, be it

Resolved, That the American Electric Railway Association, as a member of the American Engineering Standards Committee, express its earnest desire to assist the Department of Commerce in this movement, by helping to establish between the Department of Commerce and the American Engineering Standards Committee the greatest measure of co-operation to the end that the work of these two organizations may be properly co-ordinated; and be it further

Resolved, That the executive secretary of the American Electric Railway Association be instructed to inform the Department of Commerce that C. S.

Why a Record Number of Electric Railway Men Will Attend the A.E.R.A. Convention in Chicago Next October

My dear Bozell: I am going to answer your letter asking me for reasons why a record number of electric railway men should attend the A. E. R. A. convention on the Municipal Pier in Chicago, Oct. 2-6, by sending you another letter I have just received from a friend.

This second letter, from an electric railway operator, was dropped on my desk along with yours. It gives his reasons for attending the convention. They appeal so strongly to me that I am sure I could not improve upon them regardless of how much I tried. Here is his letter:

> I AM GOING to see the exhibits. We have not had exhibits since 1920 and there will be many new time and money saving devices which I shall want to see.
>
> I AM GOING to hear the addresses. Preliminary outlines of the subjects to be discussed convince me that every one of them touches some vital problem on my property.
>
> I AM GOING to take part in the discussions. The policy of having liberal discussions of papers appeals to me because under it if I don't hear what I want to learn, I can speak up and find out.
>
> I AM GOING to get more money for my stockholders and make my own job more secure by learning the most economical and attractive operating methods.
>
> I AM GOING to talk with hundreds of my friends who, often in a few minutes, can tell me more about short-cuts to successful operation than I can learn in a year by my own unaided efforts.
>
> I AM GOING to learn all I can about improved operating in order to play square with my customers. When I was almost put out of business by the war, I promised them that if they would help me I would give them improved service as fast as I could. Now that business is improving I propose to keep faith with them.
>
> I AM GOING to have a good time. I've been glum enough and stayed at home enough during the last four or five years. Now I'm going to prance about a bit.

If you will pass this friend's letter along to the industry generally through the medium of the *Electric Railway Journal*, you will do a real service and I shall be sincerely grateful to you.

Robt. I. Todd

President

Kimball, Engineer of Way and Structures, Washington Railway and Electric Company, Washington, D. C., be and hereby is authorized to respond to any call that may come from the Department of Commerce through the American Engineering Standards Committee for representation in connection with any matter of interest to the electric railway industry.

Additional Convention Committee Appointed

PRESIDENT R. I. TODD has appointed a boosters' committee for the purpose of putting additional "pep" into the convention publicity. The personnel is as follows:

Henry A. Blair, president Chicago Surface Lines, Chicago, Ill., and Britton I. Budd, president Metropolitan West Side Elevated Railway, Chicago, Ill., co-chairmen; Edwin C. Faber, vice-president Barron G. Collier, Inc., New York City, vice-chairman; W. R. Alberger, J. P. Barnes, Luke C. Bradley, F. G. Buffe, F. D. Burpee, C. D. Cass, F. C. Chambers, H. E. Chubbuck, J. F. Collins, R. E. Danforth, B. J. Denman, H. F. Dicke, B. J. Fallon, Williston Fish, A. Gaboury, M. L. Garrity, E. M. Graham, Franklin T. Griffith, Frank Hedley, J. R. Jeffrey, A. L. Kempster, C. K. Knickerbocker, Myles B. Lambert, George R. Lyman, C. E. Morgan, Col. A. T. Perkins, A. E. Potter, Harry Reid, G. A. Richardson, John Shartell, Paul Shoup, John J. Stanley, T. H. Tutwiler, S. B. Way, E. A. West, Thomas W. Wilson and C. V. Wood.

Other committees which are looking after convention details are the standing committee on subjects and meetings, C. D. Emmons, chairman; the committee on exhibits, E. J. Blair, chairman (see *Electric Railway Journal*, May 27 issue, page 875); the committee on entertainment, J. V. Sullivan, chairman (see *Electric Railway Journal*, June 17 issue, page 977).

Entertainment Committee

THE first meeting of the convention entertainment committee, of which J. V. Sullivan, assistant to the president Chicago Surface Lines, is chairman, was held in Chicago on June 23. Various entertainment suggestions were discussed and the general decision was reached to hold a reception on Monday night, a ball on Thursday night and some feature entertainment on either Tuesday or Wednesday evening. To facilitate the working out of the various details, the following subcommittees were appointed: Reception—J. V. Sullivan, H. L. Monroe, Thomas Finigan. Music and dancing—John Benham, E. E. Kretschmer, Thomas Finigan. Ladies — W. H. Beattys, Jr., H. J. Kenfield, Martin Schreiber. Feature Night — E. F. Wickwire, J. A. Alexander, Harry L. Brown, J. R. Blackhall. Golf—N. G. Symonds, Frank Porter, G. T. Seely.

In view of the exceptional opportunities for entertainment in Chicago, the committee is anticipating that it will be able to arrange some attractive features for the delegates.

Mr. Glover Appointed to Standard Classification Committee

ON JULY 1 the secretary of the American Electric Railway Accountants' Association announced that M. W. Glover, general auditor West Penn Railways and past-president of the American Electric Railway Accountants' Association, has been appointed a member of the committee on standard classification of accounts in place of W. H. Forse, Jr., resigned. The original committee on standard classification of accounts of the association was appointed in 1897, at the same time the association was organized, and a review of the work of the committee during the twenty-four years of its existence was published on page 175 of the issue of this paper for July 30, 1921.

Mr. Glover will bring to the committee the benefit of an extended experience in accounting matters. In this connection it is interesting to note that he is also now chairman of the committee on classification and application of accounts of the Accounting Section of the Pennsylvania Electric Association and also a member of the classification committee of the Accounting Section of the National Electric Light Association.

T. & T. Association Men Study Psychology

THE principal thing on the minds of the members of the Transportation & Traffic Association committee on personnel and training of transportation department employees, which met at Montreal, Que., on June 30 was the carrying out of the instructions of the executive committee regarding mental tests for applicants for employment in this department. The meeting was attended by Chairman J. E. Wayne, York, Pa., and Dr. John Leeming, E. M. Graham, F. L. Butler, H. H. Norris, A. P. Norris and Arthur Gaboury.

The committee considered in detail the recommendations of a sub-committee on the subject of mental tests and decided to submit a considerable number of such tests to the association for consideration in October. It is the hope of the committee that the member companies will co-operate in carrying out the suggestions which will be made in the report, with a view to securing data for future standardization.

The committee also put the finishing touches on application forms for use in this department, and upon a form for recording the results of physical examination.

After the business session the committee visited the training school of the Montreal Tramways, under the direction of Mr. Gaboury and the instructors in charge of the training, examined the instruction car which is used as a part of the training equipment and made a general study of the Montreal property. The committee was impressed by the satisfactory way in which the details of transportation department employee training had been worked out to fit the local conditions. The meeting was remarkable in that, although it was held considerably off the geographical center of the committee members' homes, it was attended by all but one member, who was unavoidably detained.

Special Reports and Compilations

THE Bureau of Information and Service of the American Association announces that the following special reports and compilations are now available to member companies in good standing, upon request:

Employees' Welfare Work—A summary of measures taken by manufacturing companies to promote better relations with their employees and secure their well-being.

Public Utility Laws—A summary of the laws creating the state public utilities commissions, giving an analytical digest of the main provision covering their jurisdiction and powers over transportation companies. This is the second installment of this compilation, which was begun in June.

Sale of Securities to Employees and Patrons—Contains list of companies that have tried this, the methods used and the results attained.

Motor-Bus Operating Reports — Statements of operations of eight companies, including the London General Omnibus Company, the Baltimore Transit Company and six California companies.

Electric Railways Operating Motor Buses as Auxiliaries—Gives name of company, number and type of bus operated, seating capacity, year purchased and fare charged.

Paving Decisions—These are abstracts of court and public utility commission decisions on the assessment of paving cost against electric railways.

Supplement to Employeers' Welfare Work of electric railways issued last month, containing replies of several companies received too late to include on June 1.

In addition to the above, supplements to the wage bulletin, the fare bulletin and cost-of-living studies have been prepared bringing them up to date.

New Association Publications

THE American Electric Railway Association has recently published in mimeograph form the following publications:

"Employees' Welfare Work"; this is an account of the pension systems, mutual benefit associations, insurance, sale of stock, loan funds, etc., undertaken by electric railways to improve the condition of their employees.

"Public Utility Laws"; this is a summary of the powers of the different state public utility commissions.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Chaos in Steubenville

Refusal of the Company to Recognize Union Factor in Strike Raging Two Months

At the present time there seems to be no indication of a settlement between the Steubenville, East Liverpool & Beaver Valley Traction Company, Steubenville, Ohio, and its striking employees. Operations on all its lines in Columbiana, Hancock and Beaver Counties have been tied up since May 1 and operations on all its lines in Jefferson County have been suspended since May 4. A communication sent by the company after the annual meeting of the directors late in March to each of its employees, notifying them that after May 1 the company would no longer deal with them as a union, but as individuals, caused the carmen to walk out.

WAGES AND FARES NOT FACTORS

The wage question and fare increases play no prominent part in the controversy, according to general belief. The carmen say that all wage differences could be settled without dispute if the company would recognize the union and the company officials enter no denial to this statement. Whether or not the company shall be permitted to raise fares on any of its lines will not be decided until operations on its lines are resumed.

The directors of the company held their annual meeting late in March and following their conference every employee received a notice that after May 1 he would be dealt with as an individual and that after that date he and his fellow workers would no longer be dealt with as a union. May 1 was the date set by the company when it would no longer recognize the union as its contract with the carmen was to expire on that date. Late in April Hugh Thorne, president of Division 52, Amalgamated Association of Electric Railway Employees of America, filed an action in Columbiana county court, seeking an injunction to restrain the company from terminating its agreement with the union. The application was refused and the men decided not to report for work on May 1.

Officials of Division 285, of which additional employees of this company are members, filed an application in Common Pleas Court of Jefferson County on May 1 for an injunction restraining the company from putting into effect at midnight that day a "lock-out." A temporary injunction was allowed, but on May 3 the court refused a permanent injunction. On the morning of May 4 carmen of Division 285 held a meeting and that morning all lines of the company in Jefferson County were tied up, the men deciding that they would not walk out.

Only one attempt has been made by the traction company to operate its cars with non-union men. At East Liverpool on May 4 fifty strike breakers arrived from Cleveland and an attempt was made by five of them to operate a car, but a mob of 200 people attacked them and never since has any attempt been made by the company to operate cars on any of its lines which are tied up.

Within a few days after the lines of the company were tied up efforts to end the controversy were taken. Conferences were called at Steubenville, East Liverpool and Wellsville. Citizens, public officials and representatives of the carmen and company attended, but a settlement seemed impossible. Wellsville and East Liverpool City Councils also met and discussed possible means of a settlement. On May 15 an attempt was made at East Liverpool to arbitrate, but no progress was made, the officials of the traction company refusing to arbitrate because one of the members of the board of arbitration was a member of Division 285. The company at this meeting refused to deal with the union. No further attempts have been made at East Liverpool to arbitrate.

ARBITRATION WITHOUT SUCCESS

The city of Steubenville enforced its ordinance compelling arbitration. The board of arbitration, consisting of one member selected by the employees, one by the company and the remaining three appointed by the Common Pleas Judge of Jefferson County, met at Steubenville on May 24. All attempts to arbitrate failed, the company at this meeting refusing to arbitrate with its men as a union. The board of arbitration has not met since, with the result that the traction situation on the lines of the Steubenville, East Liverpool & Beaver Valley Traction Company is practically unchanged since the inception of the controversy.

New Wage Scale in Effect

A new wage scale and working agreement have been negotiated and signed by the union and Monongahela Power & Railway Company, Fairmont, W. Va., which went into effect on July 1. W. C. Kline, manager of railways, represented the company in all of the negotiations.

The agreement gives men longest in sevice on the interurban runs 55 cents per hour and men longest in service on city lines 54 cents. The scale is graduated from 55 cents down to 42 cents.

No Appeal Filed

Conferences Held Between City and Des Moines Railway—Threatened Five-Cent Fare Not in Force

As yet no definite action has been taken toward appealing the decision of Judge James C. Hume of the Polk County District Court in which he ruled that the franchise granted the Des Moines City Railway last November was invalid.

Attorneys for the city of Des Moines and for the railway have conferred as to a method of procedure and it is said that the city attorneys favor the city taking a part in the appeal if the expense is borne by the Des Moines City Railway. Corporation Counsel J. J. Halloran recently announced that the company had agreed to bear the cost of the transcript, which is the largest part of the expense in connection with the appeal. It is thought, therefore, that definite action will be taken soon toward filing the appeal.

The North Des Moines Improvement League and H. W. Byers, its attorney, who brought the suit to declare the franchise invalid, have as yet failed to make good their threats to force an immediate 5-cent fare. There has been no demand on the part of the public to ride at the lower fare. In fact, the car riders seem entirely satisfied to pay 8 cents in view of the tremendous improvement in service which has been made since the higher fare was granted.

TOTAL REVENUES FOR MAY $204,612

The futility of Attorney Byers' claim that the company can operate with profit on a 5-cent fare is seen in the company's financial statement for the month of May. Passenger revenues for the month according to the report filed with the city were $198,731. There were other revenues of $7,811, bringing the total revenues for the month up to $204,612. Operating expenses and depreciation charges for May totaled $149,997 and taxes amounted to $15,000. This left $39,606 from the revenues, of which $20,588 was set aside for fixed charges, including bond interest, note interest and other interest items, leaving $5,901 for the cushion fund. Total revenues for May were $2,500 less than those of April while operating expenses increased approximately $8,000 during the month over April. Coal costs are eating up the profits. At the present time the company is paying $8 a ton for coal.

It is interesting to note that had a 5-cent fare been in effect during May instead of a profit of $5,901 for the cushion fund the company would have operated at a deficit of $55,598, providing the traffic had remained the same.

Buffalo Lines Tied Up by Strike

Mitten Management Rejects the Closed Shop—Prepares to Rebuild Entire Transportation Staff—Service Promised on Monday—Wage Cut Has Become Minor Issue in Struggle of Railway Against Union Domination

About 2,350 employees of the International Railway in Buffalo, Niagara Falls and Lockport and on the interurban lines between these points are on strike. They include motormen, conductors, carhouse men and shop workers, members of the Amalgamated Association.

The only point at issue between the employees and the company is union recognition. Two days before the strike order went into effect, Thomas E. Mitten, president of the Philadelphia Rapid Transit Company and chairman of the board of directors of the International Railway, announced the withdrawal of the wage cut of 2½ cents an hour which was to have been put into effect on July 1.

Herbert G. Tulley, president of the International Railway, made this statement of the situation to the *Electric Railway Journal:*

> The union which now demands a contract with International broke such a contract in 1918 and subjected Buffalo to a long-drawn-out strike. This contract covered the period from May 1, 1918, to May 1, 1919. The strike was called in October, 1918.
>
> The present non-observance by the union of an understanding by its national president, the terms of which, if observed, would have prevented the present difficulty, again demonstrates that the International Railway cannot secure permanent peace nor properly operate its cars through a contract with this union, which neither recognizes the need of good railroading nor the necessity of living up to its understanding.
>
> The International Railway under Mitten Management never interferes with the men belonging to the union. On the other hand, it never makes a contract with a union, but stands foursquare for the open shop.

The understanding referred to by Mr. Tulley as existing between Mr. Mahon and Mr. Mitten was that there should be no change in the situation existing between the employees and the company until May 1, 1923. Mayor Schwab had said the men had promised him that if such an understanding was in effect and the company would produce the correspondence, the men would return to work. Mr. Mitten did produce correspondence, but Mayor Schwab then contended that the evidence was insufficient and he would take no action.

Efforts of the Mayor to bring about a settlement through arbitration were met by Mr. Tulley with the statement that union recognition cannot be arbitrated. He added that "the International stands four square for a continuation of the open shop principle, and cannot, in the interests of permanent peace and continued service, agree to a contract with the union."

The striking employees sent by messenger to President Tulley of the railway company and Mayor Schwab a proposed basis of settlement of the strike which would provide for reinstatement of all employees in their former positions; recognition of the union; a written contract between the company and the organization covering wages and working conditions; wages paid by the company as of June 30, 1922, to remain in effect for a period of one year; a written agreement providing for arbitration of all disputes which cannot be settled by the two parties to the agreement.

Platform men on the International lines had been receiving a maximum of 55 cents an hour.

Service to Be Resumed Monday

Plans are being made by Mr. Mitten and President Tulley to operate cars over several of the local lines of the International in Buffalo. A large number of men are being brought to Buffalo from Philadelphia and other cities where the company has been recruiting an operating force for about ten days preceding the strike. The men are housed in the various carhouses. Car windows will be screened by a heavy wire mesh and armed guards and city policemen will follow each car on motorcycles and automobiles provided by the company.

Mail cars are being operated twice daily over the Olcott-Lockport interurban division of the International by A. S. Henry, superintendent of the division. The cars are plainly marked "Mail Car" and no attempt has been made by the strikers to interfere with their operation. This division of the International serves a large rural territory in Niagara county not served by any other means of transportation. No attempt has been made by the company to carry passengers on these cars.

Many of the striking employees are members of the Mutual Benefit Association, which was organized by the International on the lines of a similar organization in Philadelphia.

In its statement to the public, the striking employees said:

> We want our rights as citizens of Buffalo to associate ourselves into mutual society, and will resist any un-American attempt to force us into social subjection, though the plan may be governed by the most benevolent despot on earth.

All kinds of motor trucks, buses and small automobiles were pressed into service during the strike. More than 5,000 automobiles were licensed by the city to carry passengers at a fare not exceeding 10 cents and many large trucks, carrying posters announcing that they carried insurance for passengers, transported passengers from the heart of the city to Riverside Park, a distance of 6 miles for 5 cents.

At the outset of the strike the municipal authorities started to regulate the bus traffic and within twenty-four hours, buses were running over regularly established routes at a uniform rate of fare but were closely watched by motorcycle traffic officers detailed to facilitate the movement of jitneys throughout the congested retail shopping district.

In the congested section of Main Street, bus drivers were ordered to use the street car tracks and load passengers only from the platform loading stations at street corners. Private vehicles were ordered to operate near the curb so as not to interfere with the loading of jitneys at street corners.

The state authorities announced that owing to the emergency in Buffalo, Niagara Falls and Lockport it would not be for the best interests of the people to enforce the new law requiring the owners of cars operating for hire to comply with the insurance requirements.

The Buffalo Chamber of Commerce has come out in support of the open shop stand taken by the International and in a series of display advertisements in the daily newspapers says:

> The closed shop is not a matter of arbitration. We pledge to the Mayor and the Councimen of the city our full support in the discharge of their duty in preventing, in case of need, interference with those seeking employment and in the use, for this purpose, of all the forces of law and order to protect them and punish those who, by violence, intimidation or ostracism, restrict their freedom.

The Employers' Association of Buffalo has pledged its full strength to the International in its efforts to restore service over local and interurban lines with an open shop organization. The association in a resolution says the strike represents no issue other than a vain attempt to fasten "the closed shop system upon the company, and the compulsory payment of union dues upon the employees of the company."

All the Buffalo papers deplore the strike. The *Commercial*, however, is most outspoken in upholding the attitude of the company. In a recent editorial it said:

> The leaders of the street car men's union have taken the gamblers' chance. Their future existence hangs upon a single throw of the dice. If they win the union will hereafter be able to dictate to the International in the matter of wages and working conditions. If they lose they lose everything. The Amalgamated on the Niagara frontier will be destroyed and in its place we shall see put into effect the Mitten idea, which has won golden opinions from sociologists as well as from working men who are familiar with it.

About thirty platform men employed on the Buffalo & Lackawanna Traction Company's line between Buffalo and Lackawanna also went on strike at midnight July 1. The strike is for union recognition only, no question on wages being involved. The line is operated by Harry L. Evers as receiver and is part of the Buffalo & Lake Erie Traction Company system operating between Buffalo and Erie, Pa. The line west of Lackawanna, however, is not affected by the strike as the Amalgamated has a contract in force with the company.

Ordinance Submitted

Louisville's Mayor Approves of Sliding Fare Scale with a Seven per Cent Return on a Five-Cent Fare

Immediate return to a 6-cent fare if tickets are purchased, surrender of all franchises by the Louisville (Ky.) Railway, some of which are perpetual, and its acceptance of a blanket franchise for twenty years covering all its lines, establishment of a sliding scale of fares to be adjusted according to fluctuations in the company's income, and municipal regulation of the company through the board of public safety, with the right given to the city to purchase the entire system at the expiration of the twenty-year franchise if the voters so desire, are some of the outstanding points in the ordinance prepared by Mayor Quinn and submitted to the City Council. The general opinion is that the ordinance will be accepted as it stands. If the ordinance is accepted litigation between the city and the company will be discontinued and no rebate will be required of the company on the 7-cent fare it has been collecting.

ARBITRATION OF DISPUTES PROVIDED

Provisions scarcely less important establish means for arbitration of disputes that may arise between the company and the board of public safety. The board is empowered to employ technical assistance for carrying on a continuous audit of the company's books, which will be balanced every six months. The fare for the six months following each audit will range from 5 to 7 cents according to the showing of the books. The company is required to pay $10,000 annually into the city treasury to defray the expense of this work, this amount not to be charged to operating expenses.

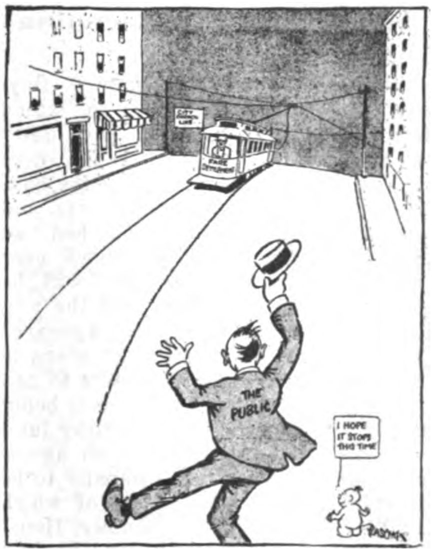
The sliding scale of fares is as follows: 5 cents cash with six tickets for 25 cents; 6-cent fare with five tickets for 25 cents; 7-cent fare with five tickets for 30 cents; and 7-cent fare with five tickets for 35 cents. The latter is the maximum rate, the one now in effect. No charge will be made for transfers.

The company now has on hand, according to the city auditor's office $700,000, from which a "barometer fund" of $350,000 will be created by the terms of the ordinance. All income shall be deposited to the credit of this fund. Whenever this fund reaches $500,000 during any six months period the fare will be automatically reduced to the next lowest schedule of fares. When the barometer hits below $200,000, the rate automatically increases to the next highest fare schedule.

The surplus over $300,000 which the company now has on hand, together with surplus accumulated between now and Dec. 31, 1922, will be spent on improving the service and facilities of the company. This fund is estimated at $900,000.

Bond and stockholders of the company will be protected under the ordinance. The company's bonded indebtedness, preferred stock and common stock make the total capital liabilities $20,542,600. The plan is to permit the company to earn 5 per cent on common stock at a 7-cent fare, 6 per cent on a 6-cent fare, and 7 per cent on a 5-cent fare. Thus it is in the interest of the company to maintain the lowest fare possible.

It is estimated that the $900,000 to be spent on improvements will materially lower the company's operating cost, with the possibility thus of reaching the minimum fare. In case the "barometer fund" goes over $500,000 on the minimum fare, the surplus will be divided three ways: One-third to the company, one-third to employees and one-third to the city. Employees are also taken into consideration in the spending of the $900,000 for improvements. Some of this money will go for rest-rooms and other conveniences.



LOUISVILLE "TIMES" SEES FARE SETTLEMENT IN SIGHT AT LAST

Public hearings will be held on the ordinance before it is acted on by the Council. The Council will then take it up. Within ten days after its passage, company stockholders will vote on its acceptance. President Barnes seems pleased with the ordinance and it is generally expected that all concerned will find it satisfactory.

Tacoma Considers Use of Weekly Pass

Members of the City Council of Tacoma, Wash., will be addressed by Walter Jackson, street railway expert, who is making a survey of the Tacoma railway system. It is expected that Mr. Jackson will explain to the Council in detail the pass system suggested by him for use on the lines of the Tacoma Railway & Power Company.

A preliminary conference was held recently by Mayor A. V. Fawcett, Frank R. Spinning, state supervisor of transportation, department of public works, Mr. Jackson and J. Charles Dennis, city attorney. The whole matter now rests on the price for these passes submitted by the Tacoma Railway & Power Company, according to Mayor Fawcett, and this price cannot be determined until Mr. Jackson completes his survey of the entire transportation system.

Mr. Spinning expressed the opinion that if the price for the pass is right, its use would be the best thing for the city. Mayor Fawcett, while still holding to the hope of a 5-cent fare for the city, stated that he could see where the pass system might be of benefit to working men who would use it regularly every day and who could then turn it over to some other member of the family for use during the evening.

In an interview which he gave to the Tacoma *Times* shortly after his arrival in that city Mr. Jackson is quoted as saying:

> I am not absolutely certain that the weekly pass system would do for Tacoma. I believe, however, that conditions here are favorable. All street railways have one failing in common—the tremendous waste of service. The Tacoma street railway, I have found, is no exception.
>
> The problem, I believe, is to make the street railway more of a business than an industry, to sell more rides to the people, to sell them by way of the weekly pass so that people may ride more economically and ride when they want to ride. I believe the weekly pass quickens the entire life of the city, improves business, and is more popular with the people than the straight fare system.
>
> Though I have been in Tacoma before, I put in Sunday walking all over the city. I first want to put myself in the position of the citizen who patronizes the street railways. I have not gone into any of the figures with Richard T. Sullivan, the local manager, as yet, but I will do all that later.

People Vote for Railway Service

By popular vote of more than four to one, Sault Ste. Marie, Mich., decided that it could not get along without street railway service. At an election held on June 26 it freed the Sault Ste. Marie Light & Traction Company from the franchise obligation of paving between tracks and thus made it possible for the cars to continue in operation.

Three years ago the company was taken out of a receivership and during that time fell more than $17,000 short of operation costs in its total gross revenue. Recently, it was decided to resurface the main business thoroughfare of the city, and according to the ancient franchise the company was informed its share would be about $5,000. The company informed the city that the money was not on hand and that the operation losses had ruined the company's credit. No legal means of relief was available, so the company went before the Michigan Public Utilities Commission and asked the right to suspend operations entirely.

The commission granted the company's request, effective on July 15, provided that no means of relief appeared before that date. The city then called a special election to permit the voters to express themselves. When the ballots were counted, it was found that 1,023 persons had voted to relieve the company from paving as against 223 opposed. Sixty per cent was needed.

Plan Under Way

Committee Has Several Undertakings in Prospect — Cincinnati Traction to Be Reorganized

A reorganization of the Cincinnati (Ohio) Traction Company, scaling down of the capital and the dissociating of the company from all other contributory companies not directly interested in the operation of an electric railway system are some of the things to be undertaken by members of Mayor George Carrel's street and railway committee formed on June 27. Mayor Carrel has already announced his plans to the committee. The movement for an investigation of the traction situation has been on since the beginning of the Carrel administration.

It is the aim of the municipal officials to bring about an arrangement whereby the city will deal only with one company directly. It is believed that the City Council will work hand in hand with the street railway committee for a one-way street plan which will fit in with the decisions of the traction arrangements. Traction company officials have expressed their willingness to co-operate with the Mayor's committee. The committee named by Mayor Carrel really is a combination of several committees which will work as one body, combining the ideas of each unit.

Besides the general citizens' committee there will be representatives named by organizations. Another unit will be made up of city officials; this unit will be headed by Mayor George Carrel.

COUNCIL WILL BE REPRESENTED

Frank Duttenhofer, chairman of the street railway committee of Council, and Councilman Clifford Martin will represent City Council. During the wind-up of the administration of the late Mayor John Galvin the traction situation became acute and a traction committee was named by the Mayor. The new franchise ordinance was drawn up by the Galvin committee and the financial reorganization phase of the traction problem extended over into the present administration.

The appointing of the committees and the work which is to follow are the outgrowth of a letter sent to W. Kesley Schoepf, president of the company, by city officials on Jan. 1 of this year. In this letter it was said by the officials that a readjustment and scaling down of capital and a reduction of fixed charges in the minds of the officials would do a great deal to help the situation. It also was said that a readjustment or consolidation of the companies now involved in the traction system should be brought about so that the city could deal directly with one organization.

Mr. Schoepf consented to the plan of the city officials and the action of Mayor Carrel put the entire affair upon an active basis.

At the organization meeting of the committee, Mayor Carrel was designated chairman; Edward J. Dempsey, vice-chairman, and Mrs. Wilmer Crawford, secretary. Walter Draper, vice-president of the Cincinnati Traction Company, was present, as were Rufus B. Smith and Robert Taft, who represented the Cincinnati Street Railway. General plans of the committee were discussed, and while no definite action was taken it was decided that the enormous task which confronted the mayor's organization would be gone into at once. Night meetings are to be held and no time is to be wasted in working out the various phases of the situation.

Mr. Draper said that his presence was for the purpose of informing the committee that the traction company would be only too glad to furnish complete and full data desired by the members. Mr. Draper gave a sort of résumé of the affairs of the Ohio Traction Company, Cincinnati Car Company and Cincinnati Street Railway.

Franchise for New Interurban in Prospect

Promoters of the Houston & Bayshore Interurban, which is to extend from the City of Houston, Tex., down the Houston Ship Channel to the shore of Trinity Bay, thence around the bayshore, touching the various resorts, and summer colonies, have reached an agreement with the City Council over the form of franchise that will be granted. The promoters and the city had been in a controversy that appeared for a time as likely to disrupt plans to the extent of causing promoters to call the project off. The franchise is being sought by John H. Kirby, wealthy lumber man of Houston, under an agreement to transfer it to a company to be organized, the first directors of which shall be himself, John S. Bonner, Houston oil man, and W. C. Munn, Houston merchant. Col. J. F. Wolters is attorney for the promoters.

Under the agreement, the city of Houston will grant a franchise for the line, including permission to use the tracks of the Galveston-Houston Interurban. The total mileage will be 37 miles and an extension into Texas City to connect with an hourly ferry service into Galveston is contemplated soon. Construction must start by March 1, 1923.

Chicago Men Voting on Wage Cut

Union conductors and motormen of the Chicago Surface Lines were expected to vote during the week ended July 8 on the question of accepting the proposal of the management for a reduction in wages. The terms of the offer were kept secret, the only announcement being that labor would have to stand the greater part of a $9,000,000 cut in operating expenses made necessary by the loss of revenue under a 7-cent fare. A committee representing the company and the men has been in session for several weeks considering how the situation can be helped.

$462,395 for Improvement

Half Million Will Be Spent by Dallas Railway in Return for Six-Cent Fare Extension

The city of Dallas, Tex., and the Dallas Railway have settled the controversy involving the extension of the 6-cent fare and the expenditure by the company of approximately $500,000 in extensions and betterments. The city has agreed to extend the 6-cent fare for a period of one year from June 27, and in return the railway has agreed to expend approximately $500,000 within a period of eighteen months in improvements, betterments and extensions, as directed by the city authorities.

COURT ACTION WAS THREATENED

The settlement followed what had appeared to be an inevitable break between the city and the company. The city had threatened to relicense jitneys and permit them to operate unhampered as a club with which to whip the company into line. On the other hand, the officials of the company had threatened to bring action in Federal Court seeking relief from what they termed confiscatory fares.

The ordinance providing for the extension of the 6-cent fare was based on a report by Supervisor of Public Utilities J. W. Everman, submitted on June 17, in which the officials of the railway set forth what they agreed to do in the way of extensions and betterments.

The improvements are divided into three groups. The first group includes the Lindsley Avenue extension from Stonewall Street to Christler Avenue in connection with the Forney Avenue line to be built by the Texas-Interurban Company for the Terrell Interurban, as set out in the Everman report, estimated to cost $110,000; the rebuilding of Lamar Street from the Santa Fé Railroad to Alexander Avenue, paving of intersections and parking of the balance of track, estimated to cost $30,000, and the Haskell Avenue extension from State Street to Cole Avenue at the North Dallas High School, estimated to cost $50,145.

OAK CLIFF LINE

The second group includes the Oak Cliff cross-town line, estimated to cost $11,000; rebuilding of the Live Oak Street tracks, estimated to cost $60,000, and rebuilding and paving of Forest Avenue between Meadow Street and Second Avenue, estimated to cost $35,000.

The third group includes a single track extension on Second Avenue to the T. & N. O. Railroad, estimated to cost $15,000; the Myrtle Street extension, estimated to cost $15,000; rebuilding and paving of Knox Street from Cole Avenue to the M., K. & T. Railroad, estimated to cost $19,000, and rebuilding and paving of Munger Avenue between Peak and Haskell Avenues, estimated to cost $16,980.

While the total cost of these improvements will amount to from $30,000 to

$60,000 more than the funds available for improvements and extensions during the coming year, according to estimates of both the city and the company, the company nevertheless agrees and obligates itself to make these improvements within eighteen months, regardless of business conditions or the amount of its revenues.

In the proposal accepted by both the city and the company the company states that:

> We believe that operating costs during the next eighteen months will be so heavy that as a matter of justice to the company the 6-cent fare should continue at least during the eighteen months period of construction, but inasmuch as your honorable body has indicated an unwillingness to continue said fare for a longer period than twelve months at a time we accept twelve months' extension, relying upon the sense of fairness and justice of the Board of Commissioners again to extend the said 6-cent fare if conditions twelve months from now warrant such extension.

The company further agrees that it will not request or permit any part of its earnings, during the year the 6-cent ordinance is in force, to be applied to the payment of the past deficit on its 7 per cent authorized return. This was the issue over which the controversy originally started in March, when the company sought to apply $111,000 surplus to payment of back dividends, and Mayor Aldredge insisted the surplus should be used for improvements and extensions. The $111,000 surplus was returned to the treasury.

The ordinance extending the 6-cent fare for a period of twelve months from June 27 and embodying the proposal as accepted by the city and company was passed by the Board of Commissioners under an emergency clause.

Work on the improvement called for under the agreement will begin at once, according to W. M. Holland, president of the company.

In consideration of the city continuing the 6-cent fare ordinance for a maximum period of twelve months from June 27, 1922, the railway has formally agreed to make, within a period of eighteen months from June 27, 1922, the following improvements:

PROGRAM OF IMPROVEMENTS

	Estimated Cost.
First Group	
Lindsley Avenue extension from Stonewall Street to Cristler Avenue in connection with the Forney Avenue line to be built by Texas Interurban Ry. Co. as set out in Everman Report	$110,000
Bebuilding Lamar Street from Santa Fe Railroad to Alexander Avenue, paving intersections and parking balance of track.	30,000
Haskell Avenue Extension	
Second Group	
Oak Cliff cross-town line	111,000
Rebuilding Live Oak Street tracks	60,000
Rebuilding and paving Forest Avenue between Meadow Street and Second Avenue	35,000
Third Group	
Single track extension on Second Avenue to T. & N. O. Railroad	15,000
Myrtle Street Extension	15,000
Rebuilding and paving Knox Street from Cole Avenue to Katy Railroad	19,000
Rebuilding and paving Munger Avenue between Peak and Haskell	16,980
	$462,395

One-Man Cars Operate

Commissioner Hopes New Type Will Reduce Toledo Expenses—Lower Fares the Objective

Following the approval of the Mayor and several members of his cabinet the new converted one-man cars were placed in operation by the Community Traction Company, Toledo, on the Bancroft Belt line on July 1. The city officials, with Street Railway Commissioner Wilfred E. Cann and newspaper men, made a trial trip in one of the cars earlier in the week.

OLD CARS BEING CONVERTED

Ten of the old 600-type cars were fitted with turnstiles at rear door, new dead-man type controller, several new seats, watt-meters, and fare boxes placed at the left of front door. The cars were also repainted and thoroughly overhauled. At the conclusion of the trial President Frank R. Coates announced that sixty of the same type of cars would be converted into one-man cars and put into operation on a number of lines. The operators are given 55 cents an hour for operation of this type of car—an advance of 5 cents an hour above the maximum for all other platform men.

In speaking to a group of business men recently the commissioner said that independent buses had taken away from the car lines about $400,000 in the last sixteen months during which time the Milner service-at-cost ordinance has been in effect. He said that $100,000 in added street car service would easily have provided equivalent service to what the buses added and that would have left $300,000 to go into the fare stabilizing fund. The result, he said, would have been lower fares at the present time.

Many Passengers Overcome by Fumes in Subway

About 150 passengers on a ten-car Jerome Avenue express train of the Interborough Rapid Transit Company, New York, N. Y., were partially asphyxiated on July 6 when gas swept through the train, stalled by a short circuit in the Lexington Avenue subway, about 100 feet below the street and just north of Fifty-ninth Street. Although ninety persons were reported by the police as receiving medical attention, only two of the twenty who remained in hospitals on the night of July 6 were in serious condition.

Both the railway and the New York Transit Commission are investigating the causes which led up to the accident. Both the railway and the commission agree, however, from their initial studies of the matter that a short circuit developed in a car near the middle of the train in the left hand forward corner of the car where the electrical apparatus is enclosed behind the metal panel. The arc which developed was so intense that it destroyed all the switches, wiring, terminals, connections and insulation. The Pyrene fire extinguishers with which the car was equipped were used to put out the fire, but the smoke generated by the burning insulation, together with the fumes from the fused metal, more or less confined by the circumstances, resulted in a number of people being overcome.

In the report of the Transit Commission the statement was made that the injury caused by the smoke was "possibly augmented by the fumes from the chemcials of the fire extinguishers," and the same charge was made more directly by city officials.

Passengers made their way to the street through the emergency exits leading to the sidewalks.

A statement by Frank Hedley, president of the company, follows in part:

> It is impossible to determine just what caused the short circuit to start, because everything was destroyed; the smoke came from the burning insulating material together with vapors of the metals which were fused; the train crew acted promptly in causing the power to be shut off, and it was kept off for nearly two hours in the interest of the safety of passengers so that by no possibility could any trains be moved into the zone affected by the smoke and so that no further short circuits might be caused upon the stalled train; when everything was found to be safe the power was restored.
>
> The train was provided with Pyrene fire extinguishers, which were used by the train crew in an effort to subdue the flame and prevent the smoke, but without success, as the arc was too intense; it is a mistake to place the cause of the smoke upon the fire extinguishers; they are standard everywhere and are approved by the Fire Underwriters' Association and by the United States Government. The electrical apparatus which short-circuited was inspected and tested last week and found in good order in every respect.
>
> While such short circuits have happened before, they have always been checked before any considerable noxious vapor developed; we have already started our electrical and other technical men making studies to see what if any improvements can be devised to prevent a recurrence of such an event. I regret very much the trouble and suffering caused to the passengers and I hope that no serious injury may result after the immediate effects of the fumes pass away. If further investigations develop any new facts they will promptly be made public by me.

The commission said:

> Our engineers and experts are investigating the accident. Until their reports are received the commission will not undertake to determine what additional safeguards, if any, it is possible to devise and install in the subway to prevent accidents of this character.

No Attempt Being Made to Circulate Franchise Petitions

Recently a franchise was offered to the Council of Saginaw, Mich., for presentation to the electors, but the Council declined to submit it unless the citizens' committee, which had sponsored the plan in conjunction with the receiver of the Saginaw-Bay City Railway, presented a sufficient number of signatures to the Council to call for an election. This position was taken by the Council although the election would not have cost the city a dollar as under the state constitution all public utility franchise elections must be paid for by the company asking for the contract. As yet the petitions have not been presented although the committee received the decision from the Council several weeks ago. As far as is known, no attempt has been made to circulate them.

Financial and Corporate

Successor Organized

Final Details Carried Out in Reorganization of Third-Rail Line Out of Chicago

The final steps in the reorganization of the Third-Rail Division of the Aurora, Elgin & Chicago Railroad were taken on July 3 with the delivery of the deed of this property to the Chicago, Aurora & Elgin Railroad and the election of permanent officers and directors of that company.

The officers of the new company are: Thomas Conway, Jr., president; Edwin C. Faber, vice-president; J. H. McClure, vice-president and general manager; Gordon B. Anderson, treasurer, W. D. Turner, secretary, and Alfred E. Pfahler assistant secretary, and B. P. Alschuler, attorney for the company.

The board of directors of the new railroad consists of Thomas Conway, Jr., chairman of the board; F. G. Adamson; George E. Hunter; Frank W. Renwick; Lewis B. Williams; Alfred E. Pfahler; W. D. Turner; E. C. Faber and B. P. Alschuler.

MANY DIRECTORS LOCAL MEN

A majority of the members of the board of directors are prominent local citizens representative of the communities served by the property. Fred G. Adamson is with the Stephens-Adamson Company, Aurora; George E. Hunter is superintendent of the Elgin National Watch Works; Frank Renwick, Geneva, Ill., is president of the Chicago Gravel Company; Lewis B. Williams is a member of the firm of Hayden, Miller & Company, Cleveland, Ohio, is a director of the Federal Reserve Bank of Cleveland, and is a director and treasurer of the Nickel Plate Railroad; W. D. Turner is a member of the firm of M. B. & H. H. Johnson, Cleveland, Ohio, and served as counsel for the bondholders protective committee throughout the receivership and reorganization; A. E. Pfahler resides in Philadelphia and represents an extensive group of investors in Pennsylvania and New England.

The directors voted to authorize the creation of a new mortgage and for the immediate issuance and sale, subject to the approval of the Illinois Commerce Commission, of $1,050,000 of bonds thereunder, the proceeds of which will be used to finance the new construction work.

The stone ballasting of the main line from Chicago to Wheaton was authorized. This work is already under way, several miles of line having been put in shape in and near Maywood.

Extensive improvements in the power plant were authorized which will effect further economies in the generation of power.

The board authorized extensions to be made to the Wheaton car shops necessary to take care of the growing volume of maintenance and inspection work on the equipment, required by the growing traffic of the company.

Construction of a new freight house in Aurora to be located on North Broadway was also authorized.

The purchase of twenty new all-steel cars was authorized by the board and negotiations are now in progress for placing the order for this equipment.

An extensive program for increasing substation capacity was also authorized, providing for the erection of two new substations and for extensive changes in the existing substations.

The completion of the improvements authorized by the board of directors will enable the company to give a standard of service never heretofore possible.

Extension of Time in Pittsburgh

C. K. Robinson, special city solicitor at Pittsburgh, Pa., in charge of public utility legislation, has received official notification of the approval by the Public Service Commission of a petition requesting an extension of time for the appointment of a traction conference board for reorganization of the Pittsburgh Railways as provided in the agreement which has been reached by the city, the railway and the Philadelphia Company.

Under the terms of the agreement, the board should have been named not later than June 1. The date has been extended to Aug. 1. Four boroughs have approved the reorganization agreement, Mr. Robinson said, and others are considering it. The board will be appointed after each borough and city outside of Pittsburgh has taken action. Mr. Robinson said that the necessary legal steps to terminate the receivership probably would be taken by July 1.

Eliminates Duplication of Service

The Tenth Street car line, owned and operated by the Idaho Traction Company, will be abandoned, and the Eighth Street line, owned by the Boise Railroad, will be turned over to the former company, under the terms of an arrangement which has just been made by officials of both companies and the Mayor and City Council. This move, officials explain, is made with the view of eliminating duplication of service by both lines. Under the terms of the agreement the Idaho Traction Company assumes the liabilities of the Eighth Street line and turns over to the Boise Railroad approximately six blocks of rails and ties now in use on Tenth Street.

Another Reorganization

Peru Division of Winona Road Will Become a Separate Company—Prospects for Success Bright

The Goshen Division of the Winona Interurban Railway, Winona, Ind., is to be reorganized separately from the Peru Division. This course has been decided upon following conferences with representatives of the holders of the bonds of the Peru division. In the opinion of the committee representing the holders of the first mortgage bonds secured by the Goshen division, the relative earnings of the two divisions of the company have been fairly definitely established and it now seems clear that no plan of financial reorganization of the two divisions as a whole could be devised which would equitably recognize the larger earning power of the Goshen division.

The Winona Interurban Railway was placed in the hands of a receiver on July 24, 1916, upon application of the First Trust & Saving Bank, trustee, representing the holders of the first mortgage bonds secured by pledge of the property of the Goshen Division. Since then the accounts of the two divisions have been kept separately. Prior to the receivership, $700,000 of the authorized issue of $750,000 of bonds had been sold, with the other $50,000 pledged as collateral for loans. The loan covered by the bonds pledged as collateral was not repaid so the collateral was foreclosed, making $750,000 of bonds outstanding.

The Goshen Division will be foreclosed and title conveyed to the Winona Northern Railway, which will have an authorized capital stock of $750,000. It will issue $572,500 of stock and $187,500 of 6 per cent twenty-year first mortgage bonds in payment for the property. Under the terms of the proposed reorganization each holder of $1,000 of bonds of the Goshen division who accepts the plan will receive in exchange for his bond fifteen shares of stock of a par value of $50 and $250 in bonds. Upon completion of the reorganization of the Goshen division bondholders will have received $187,500 of bonds and $572,500 of capital stock in lieu of the bonds now held. The cash in the receiver's hands assignable to the Goshen division will be used for working capital and to pay the expenses of the reorganization.

Heim Interests After Belt Line

The Kansas City-Outer Belt Railway may be sold to J. J. Heim and other interests owning the Kansas City, Kaw Valley & Western Railway, an electric railway. Mr. Heim's agents were high bidders at the sale of the Outer Belt on June 28, but the sale is held up ten days at the instance of the bondholders. If the sale is confirmed the Outer Belt will be made an electric railway for terminal and industrial district service. Construction of the road was started about seven years ago, but the line was never completed.

New Expert to Testify

M. R. Maltbie Will Assist D. F. Wilcox in Minneapolis Valuation—Report Shows Possible Savings

The City Council of Minneapolis, Minn., on June 30 authorized city attorney Cronin to engage the services of Milo R. Maltbie of New York to assist in the valuation of the Minneapolis Street Railway. Dr. Maltbie will assist Delos F. Wilcox, the city's present valuation expert, at the coming hearing before the Minnesota Railroad & Warehouse Commission for the determination of a fare that will make a fair return on the company's investment.

EXPERT ESTIMATES INCOME

Dr. Wilcox on June 23 made a report to the Council pursuant to a recent resolution instructing him and the city attorney, Neil M. Cronin, to make a plea before the commission for a lower rate of fare than the 6 cents straight now prevailing. It shows the saving to patrons resulting from reductions down to the old rate of 5 cents straight.

The estimated present income under the 6-cent fare is annually $2,502,653, 6 per cent on an investment of $41,710,899, or 8 per cent on $31,238,174, 12 per cent on $20,855,449 and 16 per cent on $15,641,587. A reduction of 1 cent in fare would mean a drop of $1,359,977 in passenger revenue to the company, while a one-fourth cent reduction would mean a loss of $339,874. On the other hand a 6-cent cash fare with four tickets for 22 cents, or an average of 5.6 cents per passenger, would return an operating income of $1,956,855, a return of 6 per cent on $32,647,590 or 14 per cent on $13,991,824. A 6-cent cash fare with five tickets for 25 cents, an average of 5.1 cents per passenger, would return an income of $1,279,107, or 6 per cent on $21,318,461, or 9 per cent on $14,212,307. A straight 5-cent fare would bring in an income of $1,143,157, or a return of 6 per cent on $19,071,929, or 8 per cent on $14,289,471. This is on the basis of 1921 passenger traffic and revenue.

ADJUSTMENTS CONSIDERED TO BE NECESSARY

According to the report certain adjustments should be made not contained in the emergency report of last August to the commission relating to distribution of interest, depreciation and taxes as an element in the cost of power and shop work; elimination of expenses operating the Fort Snelling extension and the Columbia Heights extension, the latter in Anoka County, and the former in Hennepin County, but on the government reservation. Under the theory of the Brooks-Coleman act these latter expenses must be eliminated as the fare to be fixed must be based on operation and valuation of property within the city limits.

The report reads in part:

> Conditions have radically changed since last year. The neutral zone has been abolished and the 50-50 rule of division in intercity lines abandoned, resulting in a large increase in the gross revenue and net operating income of the Minneapolis Street Railway. Wages of employees were reduced at the beginning of the current year an average of approximately 12 per cent. The number of car-miles run in proportion to the number of passengers carried has also been reduced.
>
> To arrive at a reasonable approximation of the company's true annual operating income under conditions that will prevail when the valuation is determined and the permanent fare fixed, I have taken the net operating income for the first five months of 1921 and have found what proportion it is of the total operating income for the full year of 1921. I have then taken the net operating income for the first five months of 1922 and have estimated for the full year 1922 using the same proportion.
>
> The total annual passenger revenue of the Minneapolis Street Railway under the 6-cent fare, and the amounts by which this revenue would be reduced with the average fare paid lower than 6 cents, are approximately as follows:

Passenger revenue as reported by company for 1921	$7,927,173
Addition by adjustment of intercity line division	229,804
Revenue on a 6-cent fare	$8,156,977
Reduction of 1 cent	1,359,496
Reduction of 9/10 cent	1,223,547
Reduction of 3/4 cent	1,019,622
Reduction of 6/10 cent	815,698
Reduction of 1/2 cent	679,748
Reduction of 4/10 cent	543,798
Reduction of 1/3 cent	453,165
Reduction of 1/4 cent	339,874

Sale of Collateral Ordered

Judge Julius M. Mayer has ordered the sale at public auction of 339,128 shares of capital stock of the Interborough Rapid Transit Company, New York, N. Y. The order was issued on petition of the Empire Trust Company, as substitute trustee and successor to the Windsor Trust Company, James R. Sheffield as trustee in bankruptcy for the Interborough Consolidated Corporation, and committee of bondholders.

The sale, it was explained, is designed to eliminate the Interborough Consolidated and its bondholders, who will become stockholders in the Interborough Rapid Transit Company. This conversion, effected legally through the sale of the stock, will simplify subsequent transactions involving the finances of the Interborough companies. Ninety per cent of the bonds have already been deposited. The sale was ordered for not earlier than Aug. 1.

The certificates are held by the Empire Trust Company as collateral for a bond issue amounting to $70,000,000, under a trust agreement of March 5, 1906, made by the Interborough-Metropolitan Company, the predecessor to the Interborough Consolidated Corporation, to the Windsor Trust Company, for which the Empire Company is now acting.

Of these bonds $63,808,600 are now outstanding, and are due and payable as a result of the bankruptcy. Interest charges in addition to this amount, are $11,362,158, making total debt on bonds plus interest $75,170,758.

Bonds of the Interborough-Metropolitan amounting to $4,017,000 held by Mr. Sheffield were ordered surrendered to the Empire Trust Company for cancellation.

Judge Mayer appointed Mr. Sheffield to act with the trust company as special master in the sale.

$120,000 Involved in Power Dispute

Judge Kimbrough Stone has authorized Francis Wilson and Fred W. Fleming, receivers of the Kansas City Railways, to sell the surplus energy of the railways power plant and any additional surplus which might be produced above the company's requirements at a price which in their opinion would be profitable to the railways "estate."

An additional order, permitting the receivers to sue the power company for $120,000 or such amount as they considered due the railway under the old "stand-by" agreement, has also been granted by Judge Stone. The receivers, it is set out in the order, might adopt the alternative of submitting testimony in the "stand-by" litigation to John T. Harding, special master, for settlement.

The railway and the Kansas City Power & Light Company, which prior to 1916 were one, were divorced by order of Judge Hook. The railway then entered into a contract with the power company to furnish it current. In April, 1921, the old contract between the companies expired. An agreement, known as the "standby," was made at that time, according to James E. Goodrich, counsel for the receivers.

Under the terms of the agreement, Mr. Goodrich said, the light company was to pay to the railway $10,000 a month for twelve months for the assurance of the railway that in the event of a breakdown at the power company's plant, the railway would be prepared to furnish 10,000 kw. an hour. The energy used in event of a breakdown, was to be paid for at an agreed rate in addition to the $10,000 guarantee.

Surface Line Valuation Figures Presented

Valuations of their properties more than double those of the engineers of the Transit Commission were submitted on June 29 for the Eighth Avenue Railroad and the Ninth Avenue Railroad. These surface lines were formerly part of the New York Railways under lease and are now operated by their owners.

The Eighth Avenue Railroad estimated the value of its property at $8,862,159, on the basis of cost to reproduce new at 1919 prices. The estimate of the commission's valuation bureau was $1,350,000 for "property used in operation" on the basis of "original cost less cost to put in first-class condition." More nearly comparable with the company's figures was the Valuation Bureau's estimate of $3,732,226, on the basis of cost to reproduce at 1921 prices, with $11,969 additional for property not used in operation.

The Ninth Avenue Railroad estimated the value of its property on the 1919 cost to reproduce basis at $6,121,133. The commission's "original cost" estimate was $1,269,470 and its estimate on the basis of 1921 reproduction cost was $3,002,249 with $22,959 additional for property not used in operation.

Financial News Notes

New Twin City Director.—W. O. Washburn, managing director for the American Hoist & Derrick Company, St. Paul, Minn., has been elected a director in the Twin City Rapid Transit Company to succeed W. A. Read, deceased.

Protective Committees for Ithaca Issues.—A committee of bondholders is now being formed for the purpose of protecting the interests of the holders of the following three issues: $175,000 of Ithaca (N. Y.) Street Railway first mortgage 6's due July 1, 1922; $75,000 of Ithaca Street Railway second mortgage 6's due July 1, 1922, and $25,000 of Cayuga Lake Electric Railway first mortgage 6's due June 1, 1922.

Announces Bond Issue.—The Georgia Railway & Power Company, Atlanta, Ga,. has made application to the State Railroad Commission for authority to issue $3,500,000, par value, twenty-five year 6 per cent general mortgage gold bonds. The bonds are to be dated April 1, 1922, and are to mature April 1, 1947. The proceeds are to be used in paying for extensions and improvements.

Income for Eleven Months Reported.—For the eleven months ended May 31, 1922, the Brooklyn (N. Y.) Rapid Transit System reports a gross income of $10,939,493 against $3,375,404 for the eleven months' period ended May 31, 1921. With total income deductions amounting to $8,124,110 the net income for the 1922 period was $2,815,383 against a deficit a year ago of $5,045,791.

Another Dividend at Worcester.—The directors of the Worcester (Mass.) Consolidated Street Railway have declared a semi-annual dividend of $2.50 per share on the preferred stock payable on July 1 to holders of record of June 20. This is the second distribution on the preferred shares since December, 1917, and reduces the dividends in arrears to $17.50 per share. A like amount was paid in April last.

Tracks to Be Abandoned.—The receivers of the Pittsburgh (Pa.) Railways have received permission to enter into a contract with the city to abandon the tracks on St. Clair Street and Euclid Avenue. At the same time the receivers will be allowed to resume operation of the streets after twenty years. It is claimed that the tracks are very little in use, the one car being operated to maintain the franchise obligation of the Highland Park Passenger Railway, a subsidiary of Pittsburgh Railways.

Low Yield on Refunding Issue.—Dillon, Read & Company and Tucker, Anthony & Company, New York, N. Y., are offering the unsold balance of $2,059,000 Manchester Traction Light & Power Company first refunding mortgage sinking fund gold bonds, at 93¾ and interest, to yield about 5.40 per cent. The bonds, dated Aug. 1, 1917, are due Aug. 1, 1952. The company owes and operates hydro-electric power plants in Manchester and Nashau, N. H., and nineteen surrounding towns.

Railway Pays Debt.—The War Finance Corporation announced recently that the Commonwealth Railway, Power & Light Company, Grand Rapids, Mich., has repaid its entire remaining indebtedness to the corporation, in the amount of $2,216,000. This represents the anticipation of indebtedness outstanding under two advances, one of $676,000 maturing Nov. 1, 1922, and one of $1,540,000 maturing May 1, 1923. The government advanced $4,800,000.

Non-operating Lines Sold.—The Norfolk & Bristol Electric Railway, operating 22 miles between the two towns of that name in Massachusetts, has been purchased by Samuel Krueger, vice-president of the Capital City Trust Company, Trenton, at a receiver's sale recently. The line, which has not been in operation for more than a year, touches Norwood, Mansfield, Wrentham and East Walpole. Mr. Krueger says that if he does not find a suitable purchaser who wants to put the line in operation he will dismantle the road.

Sale Postponed.—The sale at public auction of the Pottstown & Phoenixville Railway, Pottstown, Pa., by the Norristown Trust Company, has been postponed until July 24, at one o'clock in the Court House, Room No. 2, at Norristown, Montgomery County, Pa. No bid for less than $75,000 will be entertained. Prospective bidders in order to qualify must deposit a certified check for $1,000 with the Norristown Trust Company, trustee, one day before sale. The sale had been previously announced for June 29.

Favors Discontinuance.—The City Commission of New Brunswick, N. J., has adopted a resolution granting permission to the Public Service Railway to discontinue service on the Burnet Street branch, from Neilson and Albany Streets to the Raritan River steamboat dock. The tracks will be torn up immediately. It is believed that the Board of Public Utility Commissioners will grant the application of the railway for the abandonment of this line. The Burnet Street line has been unprofitable for many years.

Receivership Order Signed.—By a recent order of Judge Julius M. Mayer in the United States District Court the authority of Job E. Hedges, receiver of the New York Railways, has been extended to include the Sixth Avenue Railroad. Heretofore this road was not included in the receivership of the New York Railways. The road had asked that it be made a party defendant in the suit brought by the American Brake Shoe & Foundry Company. H. V. Poor, counsel for the road, said that the order was made by Judge Mayer for technical and financial reasons and in no way affected the present operation of the Sixth Avenue line.

$1,200,000 Short-Term Loan for New Orleans.—The New Orleans Railway & Light Company, New Orleans, La., has arranged for a short time loan at 7 per cent, it was revealed, when Judge R. E. Foster of the United States District Court granted the petition of Receiver J. D. O'Keefe for the issuance of $1,200,000 of receiver's certificates. The loan was made by the Girard National Bank, Philadelphia. It is to run for six months from June 1. The receiver said the fund would be used in paying for the 20,000-kilowatt generator unit being added to the Market Street power plant, and for the re-enforcement of the electric distributing system.

Foreclosure May Follow.—Sale under foreclosure may follow default by the Concord, Maynard & Hudson Street Railway, Maynard, Mass., on July 1 of the principal of the $230,000 of first mortgage bonds. The receiver of the company is D. P. Abercrombie. He was named for that post on Dec. 20, 1921, by a decree of the Supreme Judicial Court of Massachusetts. A committee of bondholders headed by A. F. Drummond, treasurer of the Waterville Savings Bank, Waterville, Me., is seeking a deposit of the bonds under a deposit agreement. It is reported to be the intention of the committee to ask the trustees to intervene in the receivership proceedings with a possible view to sale under foreclosure.

Extension of Bonds Underwritten.—The North American Company, New York, N. Y., controlling the United Railways, St. Louis, Mo., has underwritten an extension of the bonds of the Cass Avenue & Fairgrounds Railway. The holders of the $1,640,000 of first mortgage extended 4½ per cent bonds of that company due on July 1, 1922, are to be permitted to extend their bonds with the present mortgage security so that they will mature on Oct. 1, 1923, the principal to be then payable at the office of the Mercantile Trust Company, St. Louis. The bonds as extended are to bear interest at the rate of 6 per cent. The principal and interest on the bonds as extended are to be unconditionally guaranteed by the United Railways.

Reorganization Details Being Arranged.—Federal Judge George W. Ray, at Binghamton, N. Y., has issued an order allowing William G. Phelps, as receiver, to approve of an offer from H. S. Fleming, New York, for the entire issue of Series "A" Binghamton Railway bonds, amounting to $700,000 to be sold to finance and reorganize the corporation. The directors of the railway had previously voted approval. Thomas J. Keenan, one of the attorneys for the road, is now preparing an appeal to the Public Service Commission for approval of the offer so that the entire program for reorganization of the company may go through. Argument of a motion made several months ago by the Fidelity Trust Company, Buffalo, N. Y., that the receiver be discharged and the property sold to the highest bidder, was postponed indefinitely.

Traffic and Transportation

Fares Cut in Albany

Order of Commission Advances Rates, However, on So-Called Troy Zone —Company Accepts Order

The Public Service Commission on June 30 announced that it had fixed a uniform rate of fare in all zones of the United Traction Company, Albany, N. Y., at 7 cents. This ruling reduces the fare rate in Albany from 8 to 7 cents, and increases the rate in municipalities in the Troy zone, including Troy, Cohoes and Rensselaer, from 6 to 7 cents. The order took effect July 6.

The 7-cent fare in all zones of the United Traction Company follows the decision of the commission upon the petition of the company for an 8-cent fare. It follows a number of hearings before Chairman Prendergast in which the operation conditions of the company were reviewed to May 1, 1922.

FAIR RETURN ALLOWED

The 7-cent fare will give the company a return of 8 per cent upon a property valuation of $5,850,000. This is $3,150,000 less than the claimed value by the company of the property used by it in giving transportation service in the Capitol district. The estimate of the company for 1922, submitted on the hearing, based on present fare rates, showed a deficit of $195,338 for the year, and based on the 8-cent fare or four tickets for 30 cents there would be a net income of $61,330. The decision of June 30, the commission figures, will give the company a reasonable return based on a valuation of $5,850,000.

The evidence presented at the hearings showed that riders in the Troy zone were not entitled to a lower rate than riders in Albany. It was also shown that operation in Albany cost a little less per car mile than in Troy, while the revenue in Albany at the present rate is much greater and will continue to be greater under the new rate. The evidence disclosed that profits of operation in the Albany zone were applied to losses in operation in the Troy zone.

The new 7-cent fare arrangement will result in a reduction in the number of zones, leaving two local zones as described in the order of June 30, and one through zone, the 7-cent fare to prevail in each local zone and a 14-cent fare in the through zone. It will abolish the separate Rensselaer zone and permit residents of Rensselaer to ride to any point in Albany, and vice versa, for the single fare of 7 cents.

Provision will also be made for the redemption at their face value of all outstanding metal tokens, or for the acceptance of such metal tokens in lieu of cash fares.

All existing transfer privileges will be continued unchanged.

The through fare between Albany and Troy will remain unchanged.

The order of the commission prescribing the new fare is to remain in effect until Jan. 1, 1923, and thereafter until otherwise ordered by the commission.

The order of June 30 abolishes the existing zones and provides for two local zones. A 7-cent fare is good from any point to any other point within each local zone. These zones are fully described in the order.

The decision ordering the 7-cent fare will affect the greater majority of the patrons of the United Traction Company as the evidence in the investigation disclosed the fact that 63 per cent of the company's revenue was in the Albany zone, while 37 per cent was in the Troy zone.

The evidence also showed that the actual railway operating revenues for the first four months in 1922 exceeded the amount estimated by the company by approximately 20 per cent, while its actual operating expenses exceeded the estimate by only 8⅓ per cent. This estimate was made before the termination of the strike and did not include all operating expenses which would have to be made by the company, there being an increase of approximately $166,000 expenses such as paving, track reconstruction, etc., in Troy and Albany. These expenses could not be foreseen at the time the estimate was made.

The order of the commission has been accepted by the United Traction Company.

Passenger Rates Inter and Intrastate Made Uniform

A reduction in the rate of passenger fare between points in Illinois and St. Louis, Mo., has been announced by the Illinois Traction System to become effective on July 15. A basis of 3 cents per mile for the interstate trip will prevail after that date, instead of the basis of 3.6 cents per mile as at present. The rate within the State has been on a basis of 3 cents per mile for some years past and the present adjustment of fares is made, according to officials of the company, in order to relieve any discrimination against interstate rates and to produce a uniform passenger tariff to apply to travel both intra and interstate. Under the new tariffs, for example, the present fare of $5.82 between Peoria and St. Louis will be reduced to $5.21.

The railway company put into effect on July 1 a reduction in freight tariffs of 10 per cent, in accordance with the recent ruling of the Interstate Commerce Commission affecting all steam and electric carriers.

Jitneys Eliminated

Commission Believes Service of United Electric Adequate—Jitneys Did Not Develop as Real Agency

To take the place of the jitney and bus service recently eliminated by the Public Utilities Commission, acting under provisions of the Joslin jitney act of the 1921-22 Legislature the United Electric Railways, Providence, R. I., will provide adequate transportation. This announcement was recently made by A. E. Potter, general manager of the company. Besides increasing the present service, the company has planned to lease buses on the several rural lines where they have been authorized by the Public Utilities Commission.

The recent act of the Public Utilities Commission practically abolished jitneys in the State of Rhode Island. Only twenty-six of the 391 applications were granted by the commission and in no case where a route was served entirely by an electric line was a bus certificate issued. On four of the routes approved by the commission there are now no transportation facilities while the other five are served only in part by trolleys.

In its decision the commission said that the jitneys during 1921 carried 17.8 per cent as many passengers as the trolleys and that the jitney revenue for 1921 was 20 per cent of the gross passenger earnings of the electric railway. It was of the opinion that the railway should have the benefit of the additional revenue "in order that the travelling public may have the benefit of improved service or a lower fare or both, which the receipt of such additional revenue would appear to make possible in the near future."

In commenting upon the present railway service the commission stated that the railway service over all or any part of the jitney routes was adequate and sufficient to meet the demands of patrons seeking transportation over such lines. The commission also was of the opinion that in the seven years that jitneys had been operating in Rhode Island there had been little if any real development as a transportation agency; that it was apparent that one new set of men after another proceeded to engage in the business; that for the most part the applicants who testified at the hearings had operated jitneys for less than two years.

In concluding the commission expressed the hope that the elimination of the competition would enable the United Electric Railways to offer cheaper transportation to the public, especially in the suburban area. The commission said that the denial of the jitney applications placed an added responsibility upon the railway to supply adequate service at reasonable rates, but the commission believed further that those who control the operation of the railway under the recent financial reorganization appreciate the responsibility they must shoulder.

Increased Rates Suspended

The Public Service Commission has suspended the proposed increase in local fares on the International Railway in Tonawanda, North Tonawanda, Niagara Falls and Lockport until Aug. 30. The commission also notified the City Council of Buffalo that it could not order a reduction in the fare charged in Buffalo from 7 to 5 cents without the facts upon which to base a decision. In the Buffalo case the commission holds that the burden is on the company to justify its present rate of fare of 7 cents or four tokens for 25 cents. The commission will hold hearings, if the city so desires, but it points out that there is at present an examination being made of the books of the International Railway to determine whether or not the continuance of the 7-cent fare is justified.

The Niagara Falls municipal authorities have engaged John C. Brackenridge, New York, expert engineer and accountant, to handle its fight against the proposal of the International to raise local fares from 5 to 7 cents or four tokens for 25 cents. Mr. Brackenridge had previously been engaged by the city of Buffalo in determining rate questions with the International. He will make a complete survey of the company's records as involves the Niagara Falls local lines.

The International has made some concessions in the rates to be charged for interurban commuters' tickets on the Buffalo-Niagara Falls, Buffalo-Lockport and Lockport-Niagara Falls divisions as a result of complaints filed with the commission by the municipal authorities of Niagara Falls and Lockport. Commuters' books of fifty single-trip tickets formerly sold for $8. The company proposed a rate of one-half the cash fare rate, but has now offered a slight reduction which would make the Niagara Falls-Buffalo rate $12 instead of $15; Niagara Falls-Lockport, $15 instead of $16.25. Further rate concessions are sought by the municipalities and additional hearings will be held by Commissioner W. R. Pooley.

Railway Wins Point in Fare Fight

The Birmingham Railway, Light & Power Company, Birmingham, Ala., recently won a point in its fight with the city over the 8-cent fare now being charged, when Judge Locke upheld a plea of the railway that the chancery court had no jurisdiction in the case. He contended that the company since it was in receiver's hands came under federal jurisdiction.

In bringing the suit attorneys for the city contended that the traction company was charging an 8-cent fare in conflict with the franchise agreement with the city. The court was petitioned to enjoin the company from collecting more than a 5-cent fare or else forfeit the franchise right to operate on the streets of the city. The court ruled that it could not condemn property already taken into possession legally by another court with competent jurisdiction.

L. C. Bradley, receiver of the property, and Francis Brown argued the case for the railway. It was their contention that the 8-cent fare was granted by the commission and ordered effective by a federal court judge. It is probable that the city will appeal the case to a higher court in an effort to secure the 5-cent fare.

Plan of City Commission Will Affect Atlanta Railway

The city planning commission of Atlanta expects shortly to announce the results of a city-wide traffic survey that has been in progress for some time. It is apparent that the recommendations of the commission if adopted by the city government are likely to cost the Georgia Railway & Power Company several hundred thousand dollars in making changes in its downtown railway lines.

At least twelve streets close to the business district will be recommended for widening, extending, regrading and repaving, and for revising the transit lines. In fact, the commission reports that every street in Atlanta with railway tracks on it is too narrow. Four through routes are to be recommended for automobile traffic only, in which event railway lines on any of these streets would have to be removed. Furthermore, tracks on a number of other streets will have to be removed if the recommendations of the planning commission are carried out.

Officials of the Georgia Railway & Power Company have advised the commission that the company is favorable to any reasonable changes that would improve traffic conditions in Atlanta. Engineers of the power company are working with the planning commission in making the city-wide survey.

City Commissioners Stand Firm for Five-Cent Fare

Final rejection of the petition of the Galveston (Tex.) Electric Company for an increase in fares was voted by the City Commission in a recent session. The refusal to grant the petition was based on the report of the city attorney that the traction company is earning a fair return on invested capital at the present fare. No amount was stipulated by the company in its petition for authority to raise fares. The company is now charging a fare of 5 cents, the company having lost its fight in Federal court for a 6-cent fare. However, the refusal of the City Commissioners to grant authority for a fare increase is believed to presage another legal fight.

The report of the city attorney declaring that the company is now earning a fair return on invested capital was based on an audit of the company's books made by Ernst & Ernst, accountants.

The electric company had submitted with its petition a report showing earnings, operating costs and other items on which its petition for an increased fare was based. The city attorney disallowed a number of these, greatly reducing the operating costs and increasing the operating revenue of the company. Following the submission of the report of the city attorney on the audit of the company's books a public hearing was held by the city commission, and representatives of the company were allowed to present evidence before the commission showing the need of increased fares.

Transportation News Notes

Through Freight Service Established.—The Ohio Electric Railway, Springfield, Ohio, has added a through freight service from Toledo to Cincinnati, intermediate and connecting line points providing next day delivery.

Freight Rates Cut.—The Rochester & Syracuse Railroad, Syracuse, N. Y., has announced an approximate 10 per cent reduction in freight rates of all classes, effective July 2, between Rochester and Syracuse. This reduction is made so that electric shippers may enjoy the same privilege as the steam lines enjoy by the recent reduction of the Interstate Commerce Commission. The company plans similar reductions on inter-line rates within a short time.

Grants Fare Petition.—Allowing the application of the Boise Valley Traction Company, Boise, Idaho, to make reductions on all round-trip rates where the fare is greater than 36 cents, the Public Utilities Commission has granted the company's petition to lower the loop rates and make important changes in time tables. The reduction will be about 20 per cent of the present round-trip rate and be effective from June 16 for ninety days. The new rate will be 180 per cent of the present single-trip fare. Competition with the Oregon Short Line is given as the reason for the company's asking a reduction in fares.

Higher Rates in Effect.—The 6-cent fare on the railway in Eugene and Salem, Me., operated by the Southern Pacific Railway, recently went into effect. At the same time, the fare between Eugene and Springfield was advanced from 10 cents to 12 cents. The 6-cent fare replaced the former 5-cent charge. The company several weeks ago gave notice of its contemplated advance, and as there were no protests on the part of the City Council or individuals, the Public Service Commission allowed the company to carry out its plans. The company made an effort, some time ago, to advance its fares to 8 cents in Eugene and to 16 cents for the Eugene-Springfield fare. Protests from both cities caused the commission to refuse the increase.

Personal Mention

Young Leader in St. John

M. A. Pooler Takes Up Work as General Manager of New Brunswick Power Company

M. A. Pooler, for the past seven years general manager of the Potomac Public Service Company, is now general manager of the New Brunswick Power Company, St. John, N. B. From his reticence in giving out information concerning himself, it might be deduced that Mr. Pooler has something to conceal. And he really has—a career of remarkably successful service with the Potomac Public Service Company, formerly the Hagerstown & Frederick Railway, and the Pennsylvania-Ohio Power Company of Youngstown, Ohio, which furnishes electric railway, electric light and power service.

M. A. Pooler

Mr. Pooler admits that he was graduated from Purdue University, Ind., and from the Case School of Applied Science, Cleveland. Even without the enthusiastic embellishments of these plain facts which come from Mr. Pooler's associates, any railway Sherlock Holmes could deduce what sort of man this must be.

Many Improvements Under Mr. Pooler

For he has been with the Potomac Public Service Company for seven years, and in addition he is the youngest general manager the New Brunswick company has ever had. This company operates traction lines in St. John and the suburbs of Fairville, Coldbrook, East St. John, West St. John and Lancaster, a total of more than 25 miles. The company also operates the electric light, power and gas plant in St. John.

Under his management the southern company extended its field of service, and now operates in Maryland, Virginia, West Virginia and Pennsylvania. Four hundred miles of high tension transmission lines are operated by the company.

Paul R. Smith succeeds Mr. Pooler as general manager of the Potomac Public Service Company.

Mr. Hemming Resigns

R. N. Hemming has resigned as superintendent of transportation of the Indiana Service Corporation, Fort Wayne, Ind., to accept the appointment as supervisor of the western division of the Railway Audit & Inspection Company. Mr. Hemming will be in charge of the Detroit office.

For six and a half years Mr. Hemming was superintendent of motive power for the Union Traction Company of Indiana, Anderson, Ind. Previous to that he was electrical engineer for the Buckeye Steel Casting Company. His former connections also include positions with the Ohio & Southern Traction Company, Columbus, Ohio, where he was general manager, and Municipal Light Plant of Columbus, where he was chief electrician.

Mr. Hemming was for three years chairman of the standardization committee of the Central Electric Railway Association and he has served on several committees of the American Electric Railway Association. He has also been very active in safety first movements, having been chairman of the electric railway section of the National Safety Council. While in Fort Wayne he organized and was elected president of the Fort Wayne Safety Council.

Mr. Jewell Is Counsel

Ralph H. Jewell has been appointed general counsel and assistant to the president of the Salt Lake & Utah Railroad. Mr. Jewell came to Salt Lake City from Washington, D. C., where he has been attorney-examiner for the Interstate Commerce Commission for the past year. Previous to that he was a practicing attorney in Minneapolis for four years, and for two years was assistant trust officer for the Wells-Dickey Trust Company of Minneapolis, in charge of the corporation bond department.

L. C. Ream Made Auditor

L. C. Ream has been appointed auditor of the Spokane & Eastern Railway & Power Company and the Inland Empire Railroad, with office at Spokane, Wash. Elmo Edwards, formerly auditor of the companies, has resigned. Mr. Ream's jurisdiction will extend over accounting, freight claims, car service, taxes, and right-of-way matters. F. Weidmer has been appointed claim agent, with office at Spokane, to fill the position left vacant by the resignation of J. M. Hone. Mr. Weidmer's jurisdiction will extend over all claims other than freight claims.

R. Paul Smith, General Manager

Succeeds M. A. Pooler in Charge of the Potomac Public Service Company in Maryland

It has taken R. Paul Smith just thirty-three years to learn to walk and talk, to master a variety of engineering matters, and to become general manager of the Potomac Public Service Company. As a matter of fact, only since 1909 has he been connected with railways at all. It was then that he walked out of the Blue Ridge College with his diploma to join the Washington, Frederick & Gettysburg Railway, which is a part of the present company, as clerk and assistant to the general manager.

General Superintendent at Twenty-eight

By 1912 Mr. Smith was division superintendent of the company with offices at Frederick, Md., in the intervening three years having served as agent, general agent and general freight and passenger agent. In 1917, and it must not be forgotten that Mr. Smith was then—figure it for yourself—only twenty-eight, he was made general superintendent. This means that his work was all over the place, for he had supervision of the railway, gas and electric departments of the company. His was real supervision and his the real supervisor's mind, for he let each individual in the company develop his ability to the utmost. Because he can successfully develop the power which lies latent in others and thus increase the efficiency of the organization as a whole, Mr. Smith was unanimously appointed general manager of the Potomac Public Service Company. His headquarters will be at Frederick.

R. P. Smith

Assisting Mr. Smith will be Charles H. Leatham, who has been commercial engineer of the company. Mr. Leatham also served as clerk and division superintendent of the company. Previously he had been associated with the Westinghouse Company and with the West Penn Traction Company at Pittsburgh, Pa.

Mr. Conway Made President

Noted Consultant Heads Reorganized Aurora-Elgin Third-Rail Line—Other Officers Named

Thomas Conway, Jr., has been elected president and chairman of the board of the Chicago, Aurora & Elgin Railroad, the successor company under reorganization to the third-rail division of the Aurora, Elgin & Chicago Railroad.

Mr. Conway is generally recognized as one of the leading public utility consultants of the country. He has served the Aurora, Elgin & Chicago Railroad first and refunding mortgage bondholders' protective committee as technical adviser since the formation of the committee, and upon the death of R. M. Stinson succeeded to the chairmanship of the committee.

MR. CONWAY FAMILIAR WITH PROPERTY

Mr. Conway is largely responsible for the policies which resulted in an increase of almost 50 per cent in the traffic of the third-rail system in the last three years. He has served as a member of various committees of the American Electric Railway Association; was retained as expert adviser to the New York State Electric Railway Association in a consulting capacity, also many other of the largest electric railway properties of the country in similar capacity, including the Public Service Railway, the Connecticut Company, the Pittsburgh Railways, the Wilkes-Barre Railways, the Lehigh Valley Transit Company, the Eastern Pennsylvania Railways and the Utah Light & Traction Company.

E. C. Faber, who some months ago accepted a position as vice-president of Barron G. Collier, Inc., will continue with the property as senior vice-president, devoting part of his time to the interests of railroad. Mr. Faber is well known to the people of the Fox River Valley as the result of twenty years of active work in that vicinity. He is known nationally among electric railway men both as an operator and because of his activities in connection with the work of the American Electric Railway Association.

MR. MCCLURE GENERAL MANAGER

J. H. McClure will have direct charge of operation as vice-president and general manager. He has been connected with Day & Zimmermann, Inc., Philadelphia, since 1910, in charge of various public utility properties controlled by that organization located in Pennsylvania and Ohio. Mr. McClure was general manager of the Citizens Traction Company and the Citizens Light & Power Company of Oil City and Franklin. Pa.. during the years 1912 to 1920. During the latter part of this period he filled the position of vice-president in charge of operation of the Youngstown Suburban Railway, Youngstown, Ohio, and Salem Light Company, Salem, Ohio. In April, 1920, Mr. McClure went to Lima, Ohio, as vice-president in charge of operation of the Ohio Electric Railway, and, in connection with the financial readjustment of the affairs of that company, has served as receiver of the Indiana, Columbus & Eastern Traction Company and as general manager for the receiver of the Columbus, Newark & Zanesville Electric Railway with headquarters at Springfield, Ohio. His headquarters now will be in Aurora, but he will devote part of his time to directing affairs in Springfield.

Publicity Man for Texas

Utilities There Place George McQuaid in Charge of Information Bureau at Dallas

George McQuaid, well-known Texas newspaper man, has been employed by the public utility organizations of Texas, and is in charge of the Texas Public Service Information Bureau recently established in Dallas, Texas, with offices at 1004 Magnolia Building. The bureau is issuing a weekly news bulletin giving current news and interesting information regarding the public utilities operating in Texas, and about public utilities in general. This bulletin is supplied to the weekly and daily newspapers of Texas and to others interested in utilities.

GEORGE MCQUAID

Mr. McQuaid has been connected with various newspapers in Texas for the last thirty years, serving in different capacities from reporter to managing editor and editor. He was born in Virginia in 1875 and was reared in Kansas. He was educated at Georgetown University, Washington, D. C., receiving both the A.B. and B.L. degrees. Soon after graduation from college, he entered newspaper work in Oklahoma, and shortly thereafter became managing editor of the Guthrie (Okla.) *State Capital.* This was before Oklahoma was admitted as a State. Later he joined the staff of the San Antonio (Tex.) *Express,* and was managing editor of this paper from 1905 to 1910. He then went to Galveston as editor of the Galveston (Tex.) *Daily News,* where he remained for three years, being forced to give up this position on account of failing health.

After recuperating in El Paso for more than a year, Mr. McQuaid went to Oklahoma City as staff correspondent for the Dallas (Tex.) *Morning News,* in charge of the news service in Oklahoma. While in Oklahoma, he made an enviable record by building up a news-gathering organization second to none in that State. After about two years, he returned to Dallas and assumed charge of the oil development news of the Dallas *Morning News,* serving in the field as oil editor and staff correspondent.

Mr. McQuaid left the Dallas *Morning News* for about a year to serve as townsite manager for Hamon & Kell, builders of a railroad in the West Texas oil fields. He returned to newspaper work as managing editor of the Dallas *Morning News,* a position he held until December, 1921. He then purchased the Mexia (Tex.) *Evening News* and was editor and publisher of this paper until he sold his interests and accepted the position with the Texas utility organizations.

B. J. Yungbluth has been apointed supervisor of purchases and supplies of the Philadelphia, Pa., Rapid Transit Company. He succeeds G. A. DuCasse, who has resigned.

S. F. Hunter, who has been local agent at Toledo, Ohio, for the Ohio Electric Railway, Springfield, for several years, has been named district passenger and freight agent. R. M. Fisher becomes local freight agent for the railway.

J. H. Pardee, president of the J. G. White Management Corporation, New York, N. Y., has just returned from a trip to the Philippines, where he has been for the past six months, looking after the affairs of the Manila Electric Company and the Philippine Railway.

C. G. Adsit, formerly chief engineer of the development department of Georgia Railway & Power Company, Atlanta, and consulting engineer of the executive department, is now executive engineer of the company, with authority over the engineering work of all departments of the company.

Polk Laffoon, secretary and treasurer of the South Covington & Cincinnati Street Railway, Covington, Ky., has been named a member of the Kentucky Racing Commission by Governor Edwin P. Morrow. Mr. Laffoon succeeds J. O. Keene. He is the only northern Kentuckian on the commission. Mr. Laffoon is a resident of Erlanger, Ky., south of Covington.

W. R. Dunham, Jr., formerly engineer of maintenance-of-way of the Connecticut Company, New Haven, Conn., is now engaged in special work for the International Steel Tie Company, Cleveland, Ohio. He is acting also as Eastern agent of the company with headquarters at 69 Stanley Street, New Haven, Conn. Since leaving the Connecticut Company in 1921, Mr. Dunham has also done some consulting work in the track field.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Traffic Congestion Retards Coal Delivery

The thirteenth week of the coal strike has been marked by recurrence of traffic congestion in certain of the non-union fields, and as there has been no compensating increase in the fields affected by the strike the production of bituminous coal will be slightly less than in the week preceding. Production of anthracite is still practically zero.

Complete returns for the twelfth week, June 19-24, show a production of 5,337,000 net tons of bituminous coal and 24,000 net tons of anthracite, a total of all coal of 5,361,000 tons. In the corresponding week a year ago the total raised, including anthracite, was 9,550,000 tons. In 1920, when business was active, it was 11,960,000 tons. In terms of all coal, therefore, the quantity now being mined weekly is five to six million tons below normal.

Philip L. Maury Goes to Detroit Graphite Company

Philip L. Maury has become associated with the Detroit Graphite Company as a vice-president, with headquarters at Detroit. He will have direct charge of all the activities of the company pertaining to its paint and varnish business with railroads, street railways and allied interests. He is well known to the railway and supply world throughout his many years' connection with the Sherwin-Williams Company as manager of railway and industrial sales, which position he leaves to take up his new duties with the Detroit Graphite Company.

During the war he was in charge of the government activities of the Sherwin-Williams Company and was closely identified with the work of the war service committee of the Paint Manufacturers' Association and was active in the preparation of government specifications and development of special coatings for many uses brought about by war conditions.

Dissolution Distribution Held Up

The protective committee of the bondholders of the Barney & Smith Car Company, Dayton, Ohio, in letters sent out recently announced that the committee will hold in its possession the distribution recently ordered on the bonds. Each bond received $162.18 from a fund in the hands of the Guaranty Trust Company, which had been accumulated from the sale of parts of the plant at Dayton.

The committee announces that it has invested $206,098.76 in United States Treasury certificates of indebtedness which have been placed in the Citizens National Bank & Trust Company, Cincinnati. The letter says:

> The committee deems it in the interest of the depositing bondholders not to make distribution of this fund at present, because it hopes that the retention of the fund will place the committee in a position to gain advantage for the depositing bondholders when the property is sold or when reorganization is effected.
>
> Depositors may feel assured that the committee will not retain the fund any longer time than shall appear to be essential in the interest of the depositor.

The communication is signed by the committee, of which Leo J. Van Lahr is chairman and Hugh P. Colville is secretary.

$100,000 to Be Spent on Track in Memphis

Memphis (Tenn.) Street Railway has been authorized to construct additional tracks on McLemore Avenue in accordance with an amendment to the charter filed with the county register in pursuance of its plan to establish a continuous car line from Overton Park to Riverside Park. The proposed improvement will cost more than $100,000, according to T. H. Tutwiller, one of the receivers, and it is probable it will be completed within two years. The plan includes the construction of three stretches of tracks necessary to complete the cross town line through the center of the city from the northeast to the southwest, including the work that is now being done at the McLemore Avenue viaduct. The proposed cross-town line, when completed, will establish a one transfer system between Riverside Park and Raleigh Springs and Binghamton, the transfer point being Poplar Avenue and North Cleveland Street. Construction of the three links that will complete the proposed cross-town line is largely dependent upon the city's construction of the subway on South Bellevue boulevard since the street railway must pass under the railroad at this point. There will be constructed a short stretch of new track on Beale Avenue between South Orleans Street and Myrtle Street. This line will connect the present Beale car line with the Peabody line and the result will be the rerouting of the Peabody cars.

Large Expenditure Involved in Improvements

According to a recent statement of A. E. Potter, president of the United Electric Railways, Providence, R. I., about $300,000 would be spent out of earnings this summer to co-operate with the city on paving work. In addition, there will be spent, out of the $1,000,000 bond issue contemplated by the plan of reorganization and current earnings, more than $500,000 for fifty new forty-passenger cars already ordered, and about $1,300,000 for improvements to the power house, new high-tension wires and laying of wires underground. The fifty cars now on order are in addition to the twenty-five one-man cars already received.

Frankford Elevated Signal Contract Awarded

The Department of City Transit of Philadelphia has awarded a contract to the Union Switch & Signal Company for the complete installation of an automatic block signaling and interlocking system on the Frankford Elevated Railway. The installation comprises, essentially, double track signaling extending from Arch Street, where the new elevated joins with the Philadelphia Rapid Transit existing elevated lines, north to Bridge Street, a distance of approximately 6 miles. Within this territory electro-pneumatic interlockings, utilizing alternating current throughout, will be installed at Arch Street, Girard Avenue, Dauphin Street, Torresdale Avenue and Bridge Street.

At Arch Street a nineteen-lever-frame electro-pneumatic machine comprising nine working levers for the control of twenty-seven signals, three levers for control of four switches and four levers for traffic control, and three spare spaces, will be required. At Girard Avenue, Dauphin Street and Torresdale Avenue three eleven-lever electro-pneumatic machines will be installed, each involving three working levers for the control of eight signals, one lever for two switches and four levers for traffic. Three spare spaces will be provided in each of these machines. At Bridge Street an electro-pneumatic machine, involving seven working levers for the control of twenty-two signals, three levers for the control of six switches, two levers for traffic and ninteen spare spaces will make up the thirty-one lever-frame machine.

Fifty automatic block sections with electro-pneumatic automatic train stops and three indication color light signals will be involved. Alternating current will be used exclusively for the control and operation of all the signal and interlocking in this contract.

Metal, Coal and Material Prices

Metals—New York	July 4, 1922
Copper, electrolytic, cents per lb.	13.875
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	5.75
Zinc, cents per lb.	5.72
Tin, Straits, cents per lb.	31.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.17
Somerset mine run, Boston, net tons	$3.47
Pittsburgh, mine run, Pittsburgh, net tons	....
Franklin, Ill., screenings, Chicago, net tons	...
Central, Ill., screenings, Chicago, net tons	...
Kansas screenings, Kansas City, net tons	3.05
Materials	
Rubber-covered wire, N. Y., cents per lb.	6.25
Weatherproof wire base, N. Y., cents per lb.	15.50
Cement, Chicago net prices, without bags	$2.07
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	92.50
White lead, (100-lb. keg), N. Y., cents per lb.	12.50
Turpentine (bbl. lots), N.Y., per gal.	$1 25

Rolling Stock

Wellsburg, Bethany & Washington Railway, Wellsburg, W. Va., has just placed a new passenger car in service.

Olean, Bradford & Salamanca Railway, Olean, N. Y., is equipping single and double-truck cars for one-man operation.

Chicago Surface Lines is about ready to place orders for fifty or more new trailers and about twenty-five double truck one-man safety cars.

Trenton & Mercer County Traction Company, Trenton, N. J., expects to purchase two double-truck snow sweepers, two single-truck snow sweepers, one snow plow and one nose plow.

Indiana Service Corporation, Fort Wayne, Ind., will shortly place an order for about fifteen one-man safety cars of the type now in use in Fort Wayne, Ind.

Chicago, Aurora & Elgin Railroad, Aurora, Ill., the successor to the third-rail division of the Aurora, Elgin & Chicago Railroad will purchase twenty new all-steel cars under authorization of the board of directors.

Kentucky Traction & Terminal Company, Lexington, Ky., is reported to be considering the purchase of several more one-man light-weight interurban cars of the type described in the *Electric Railway Journal*, issue of June 3, 1922.

Kansas City (Mo.) Railways has placed an order with the J. G. Brill Company, subject to approval of the court, for twenty double-truck motor cars arranged for train operation and for one or two men when operating as single units. They are equipped with the HL control, safety devices and G.E. 247 motors.

The Chicago North Shore & Milwaukee Railroad, Highwood, Ill., has placed an order with the Cincinnati Car Company for forty new cars. These include fifteen motor merchandise cars, seven motor limited coaches, one motor dining car, two parlor observation trailers, one utility line car, twelve safety cars for the Milwaukee city lines operated by the North Shore Railroad and two lightweight interurbans for the Libertyville branch.

Community Traction Company, Toledo, Ohio, has converted six double-truck city cars for one-man operation by installing turnstiles on the rear platforms. By placing seats in the extra space made available the capacity of each car has been increased from forty-eight to fifty-three passengers. In connection with this change the usual safety devices have been added. The company expects to convert a total of sixty cars to the one-man turnstile variety.

Cincinnati (Ohio) Traction Company will procure approximately seventy-five new double-truck cars of the lighter type, to replace the small cars on lines on which the larger cars now can be operated. Arrangements for securing the money to buy the cars were started July 1, when authority was requested from the directors of the Cincinnati Street Railway and from the Ohio State Public Utilities Commission to issue $725,000 first lien equipment trust certificates. This is in accordance with the car trust certificate plan for buying cars. The last cars purchased by the traction company two years ago were procured under that plan. The new cars will be approximately the same capacity as the large double-truck cars now in use, but will be much lighter in construction. Walter Draper, vice-president of the traction company, announced that the cars would be of a type that can be operated by either one or two men as may be desired.

Track and Roadway

Guelph, Ont.—The City Council has authorized an expenditure of $150,000 on the Guelph Radial Railway.

Trenton & Mercer County Traction Company, Trenton, N. J., expects to rebuild 35,000 lineal ft. of city track under pavement.

Shreveport (La.) Railways expects within a few weeks to build a loop at the end of the Cedar Grove line for turning the cars. Only a diamond switch and frog are needed.

Chicago, Aurora & Elgin Railroad, Aurora, Ill., has already started on the stone ballasting of the main line from Chicago to Wheaton. Several miles of line have been put in first class shape in and near Maywood.

Philadelphia, Pa.—The contract for completing the work on the Frankford "L" has been awarded to F. J. Boas. The Boas' bid of $534,180 was $32,000 lower than that of the Philadelphia Rapid Transit Construction Company.

Northern Ohio Traction & Light Company, Akron, Ohio, has recently been making extensive repairs to the Cleveland Alliance & Mahoning Valley Railroad property between Ravenna and Warren in order to accommodate the limited service which has recently been inaugurated over this line. The overhead construction is also being rehabilitated on the Myers Lake line, with extensive changes in Myers Lake Park, which will add greatly to the reliability of service this summer.

Power Houses Shops and Buildings

Wichita Falls (Tex.) Traction Company is drawing up plans for a new carhouse which will be of steel and concrete fireproof construction.

Tarentum, Brackenridge & Butler Street Railway, Tarentum, Pa., expects to build a small machine shop and to include a 24 in. x 12 ft. lathe, a 20 in. drill press and grinder in this shop, all equipment to be motor driven.

New York, N. Y.—The Transit Commission has approved the plan for the reconstruction of the Queens Plaza station to enable the Brooklyn Rapid Transit Company to participate in the operation of the Astoria and Corona branches. Because of the difference in the width of the Brooklyn Rapid Transit and Interborough Rapid Transit Company's cars the Interborough alone has been operating these branches. This improvement will cost $100,000 for structural changes to the stations and $60,000 for track work.

Trade Notes

American Bridge Company, New York, N. Y., announces the removal of its vice-president's department, chief engineer's department, eastern division contracting department and treasury department on and after June 24 to the Empire Building, New York.

Wilson Welder & Metals Company, Inc., New York, N. Y., recently appointed King-Knight Company, Underwood Building, San Francisco, Cal., exclusive representatives in central and northern California for Wilson plastic-arc welding machines and Wilson "Color-Tipt" metals.

Pittsburgh High Voltage Insulator Company will carry on its business in the future under the name of the Westinghouse High Voltage Insulator Company, according to an announcement made by C. M. Semler, general manager. The change in name, which was made by vote of the company's stockholders does not affect the management or method of conducting the business of the company which will be carried on as it has been in the past.

The National Railway Appliance Company, New York, N. Y., is selling a new product known as "Themec" paint. The principal use of this material is the protection and rustproofing of metals and other materials. The pigment of Themec paint is portland cement. Exposure to the elements gradually turns this cement content into a thin veneer of stone. Tests indicate that this material provides an increased protection coating. It is being used by several roads for general and miscellaneous work.

New Advertising Literature

John A. Roebling's Sons Company, Trenton, N. J., has issued a small booklet on electric welding wire and also wire for gas welding.

Truscon Laboratories, Detroit, Mich., has issued a specification handbook of 108 pages. This contains specifications on steel coatings, floor hardeners and damp and waterproofing products.

Terry Steam Turbine Company, Hartford, Conn., has issued an attractive booklet describing its turbine units and blowers. Information is also furnished regarding improvements in design.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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Dallas and Its Railway Reach a Settlement

DALLAS has done the sensible thing. The city and the local railway have settled in conference a controversy that at one time threatened to reach the courts. As a result of this amicable adjustment the Dallas Railway is to be permitted to continue to charge a 6-cent fare for another year and in return agrees to spend approximately $500,000 on a program of improvements. Both sides to the controversy gave ground. Each expressed confidence in the other. Each had respect for the motives that prompted the other in the stand which it took. Honest differences of opinion have arisen before in Dallas between the railway and the city, but in every case a way out has been found that has left no feeling of remorse on either side. That there is an unusual degree of respect for each other between the parties at Dallas is reflected in the statement of the local company that "we rely upon the sense of fairness and justice of the Board of Commissioners again to extend the said 6-cent fare if conditions twelve months from now warrant such extension."

It is generally agreed that credit for hitting upon the terms of the present settlement basis is due to Supervisor of Public Utilities J. W. Everman. His part in the negotiations certainly was a large one and his efforts bespeak for him a real understanding of the functions of the post which he so creditably fills. All in all, the settlement there is certainly a most propitious arrangement for all concerned.

Accident Reduction Should Appeal to the Men Higher Up

THE safety movement is one worthy of the most enlightened interest of electric railway managers. They have in the past, however, left the matter largely to their claims departments, accepting the conclusion that some loss of life and a greater maiming of employees and the general public form a necessary accompaniment of the transportation business. Their attitude was in part justified by the willful risks taken by Mr. Average Citizen, who nullifies many of the best-intentioned efforts to safeguard him from injury. However, the managerial attitude is changing rapidly now.

Probably the most cogent reason for the improved status of the safety movement in the electric railway field is the demonstration that accidents can be prevented. "No-accident weeks" tell their own story. Another powerful stimulus to interest is furnished by the tremendous cost of accidents in many localities. Increasing vehicular and pedestrian congestion, combined with recklessness, cut into the net income seriously. So with the growing conviction that accidents can be prevented comes the growing necessity for preventing them. This situation will be clearly portrayed in a group of articles in next week's issue of this paper.

One thing that, more than anything else, will help the safety movement in the electric railway field is that it be taken seriously. Too often it is looked upon as a "hot air proposition" and given only scant encouragement. The manufacturing industries are in the lead here, due in part to the fact that they deal almost altogether with employees, while in the case of the electric railway public accident hazards prevail. At the same time the electric railway has more to gain from effective safety work because the risk is greater. Money saving, improvement in public good will and reduced interference with operation are only three of many desirable results in this field.

What Is the Present Status of Rail Standardization?

THE Cleveland Railway has a new T-rail section of its own and the Market Street Railway (San Francisco) is branching out with a new girder grooved rail. What, if anything, is the matter with the association standard sections, that these important properties have to go outside the list for their recent construction? This is a question which will arise spontaneously in the mind of every engineer who is desirous of securing the savings that standardization will ultimately bring.

It is obvious that the engineers of the two properties mentioned did not decide to incur the extra expense of having special sections rolled without carefully weighing the merits of existing standards. They decided that the special sections were worth the extra money. They wanted to be able to express their engineering convictions in cold steel and were willing to pay the price. No one can blame them, and at the same time there is no reflection on the standards. Why? Because on the one hand if an engineer has a good idea he ought to be allowed to try it out if he can get the money. On the other hand, the standards represent the best average practice and tendencies and are offered to the industry for what they are worth. Most railways can save money and trouble by using them. They cannot cover all conditions and merit the approval of all individuals. Their use cannot be enforced by law, nor will loyalty to an association outweigh engineering considerations. Hence failure to use them in particular cases simply means that the appeal of the local problem prevailed.

These generalizations suggest a little specific calculation. How much extra does a special rail section cost? Of course this depends on the quantity rolled and the terms of purchase agreed upon. The most satisfactory plan to follow, when a railway wants a new section rolled, is for the railway to put up the money for the rolls, the amount to be rebated eventually if the section proves popular. Thus, assume for purpose of calculation that a set of rolls for a T-rail section costs $6,000. If other railways desiring to use these rolls will pay a premium of a dollar a ton for their rails the cost would be recouped in a short time if the section made a hit.

This would involve the rails for less than thirty-five miles of single track, assuming a 100-lb. rail. Thus, the industry would pay 2.5 per cent extra for this rail for a limited time, after which the price would fall to the market value. A dollar a ton appears to be a reasonable premium. Obviously it would not pay to design a special section for a few hundred tons of rail, but if the immediate and prospective demand is such as to amortize the extra cost without excessive premium one can understand the occasional ordering of new designs by large companies.

At the same time standardization should be fostered by the industry to a much greater extent than it is. All companies, and particularly the smaller ones, will profit by it. This paper has been a consistent advocate of the movement for many years. It takes a skeptical attitude toward an apparent need for new designs when there are old and tried ones in the field. But standards, like everything else, are subject to improvement. So along with standardization must go experimentation. The engineering and economic problem is to strike a proper balance between the two. But it should be clear that there is a real need for any new rails, or other non-standard products, before new ones are adopted. If possible any proposals for new designs should first be discussed with organizations responsible for the strong efforts at standardization which are now being made. The present tendency is toward lessening varieties of manufactured products as much as possible.

Reserve Bank Shows Stability of Electric Railway Business

VARIOUS measures for determining the trend of business activity in a community have been suggested. They include activity in the building industry, extent of bank loans, bank clearances and real estate sales, number of telephone calls, amount of post office receipts, the trend of raw material prices, and street railway traffic. In the monthly review for June of the Federal Reserve Bank of Boston considerable space is given to the discussion of the use of street railway traffic statistics for such a purpose, and while it is admitted that there is no exact measure for business activity, the opinion is expressed that street railway figures afford a good guide. For this purpose a composite chart of nine Massachusetts companies has been prepared and adjusted for seasonal variations, because of the larger business always done by these companies in summer over that in winter. According to the Reserve Bank the fluctuations as shown in this chart correspond closely to the general trend in business as shown by other indices for the years under consideration.

The chart also proves an interesting point not mentioned in the bank comment. This is that while the line of street railway traffic may follow the general trend of other business conditions, it does not swing so far in each direction, and consequently as an investment it is much more to be desired by those who want steady, continuous performance rather than wide fluctuations.

For example, in the chart, after being adjusted for seasonal changes, the greatest rise between January, 1919, and May, 1922, over the 1921 average seems to be in about September, 1920, when the increase was about 14 per cent, and the depth was reached at about 85 per cent in August, 1921. This is a maximum swing of about 34 per cent based on the lower number.

Here are the figures of all of the other manufacturing and financial charts, on the same basis and for the same years, as checked roughly from the diagrams given in the same report:

Manufacturing activity in New England[a]	67% to 105% or 57%
Brokers' commercial paper	3.5% to 7.8% or 123%
Rediscount rate of Federal Reserve Bank of Boston	4% to 7% or 75%
Woolen manufacturing activity in New England[a]	32% to 120% or 275%
Cotton manufacturing activity in New England[a]	44% to 107% or 143%
Shoe manufacturing activity in New England[b]	46% to 140% or 204%
Paper production in United States	380,000 tons to 650,000 tons or 71%
Construction in New England[c]	33% to 118% or 257%
Net sales of eight department stores in Boston[d]	80% to 215% or 169%
Net sales of eighteen department stores in New England outside of Boston[d]	88% to 225% or 156%
Exports of boots and shoes	40,000 pairs to 230,000 pairs or 475%

(a) A basis of average rate, year ended June 30, 1920; (b) on basis of 1920; (c) on basis of 1913; (d) from January, 1921, to May, 1922, basis of first half of 1919.

All of these figures are approximated from the chart and not from tables, but they show that every industry quoted has a much wider swing than the electric railway industry.

As explained, this is an important feature from an investment point of view. It is also desirable from the standpoint of the employee, as he is not so liable to be thrown out of service on account of lack of work as he would be if the swing were wider.

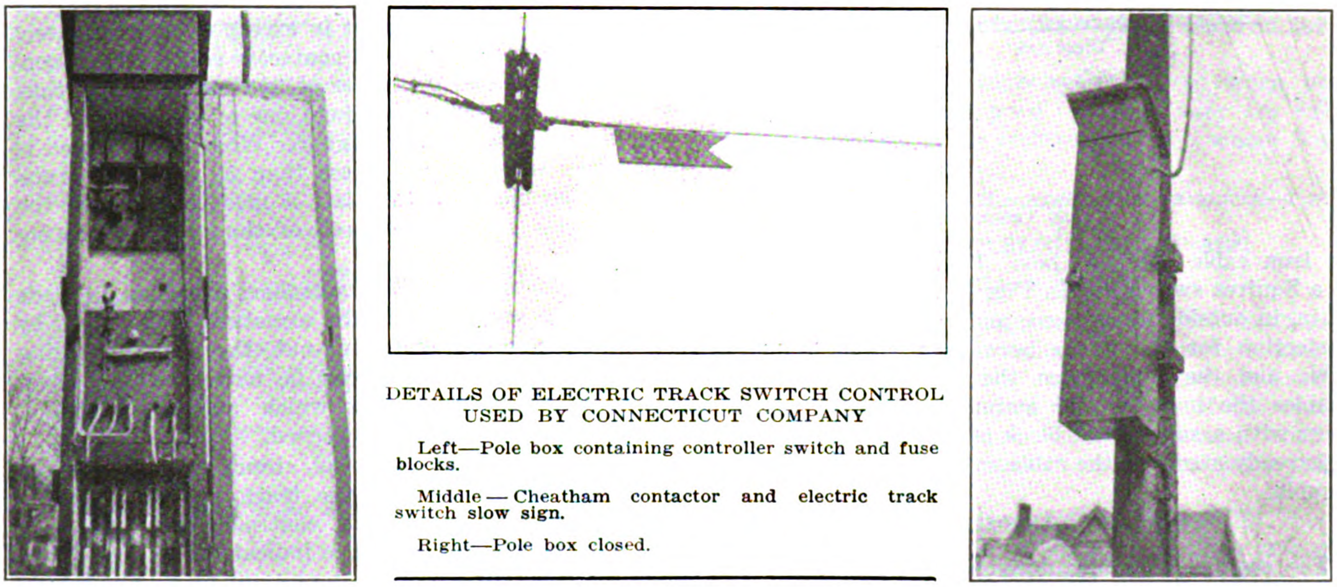
Des Moines Decision Only an Annoyance

OPPONENTS of the settlement franchise in Des Moines are gloating over their victory before Judge Hume in the Polk County District Court. On their face the counts which that court makes against the franchise grant appear formidable, but they are not so bad as would at first appear. Moreover, the higher courts must pass upon them. Even if it is assumed that the decision of the State Supreme Court should uphold all the contentions of the lower court—an assumption which appears to be most unlikely—the fact remains that the people of Des Moines in their vote on the franchise registered overwhelmingly their desire that the railway controversy be removed from politics and that the company be permitted to operate under conditions that would make it possible for the railway adequately to serve the public. Events since the decision of the lower court was handed down confirm the fact that the decision is not popular with the great bulk of the people. Should it finally materialize that the settlement matter must again go before the public, there is little reason to doubt that the grant will be promptly re-enacted.

The Special Safety Issue of This Paper Will Appear Next Week

Increasing Reliability of Track Switch Operation

During the Past Two Years the Connecticut Company Has Reduced Track Switch Interruptions to an Almost Negligible Element in Operation—This Was Accomplished Through Close Attention to Detail in All Parts of the Electromechanical Apparatus



DETAILS OF ELECTRIC TRACK SWITCH CONTROL USED BY CONNECTICUT COMPANY

Left—Pole box containing controller switch and fuse blocks.

Middle — Cheatham contactor and electric track switch slow sign.

Right—Pole box closed.

THE Connecticut Company has in successful operation a large number of track switches on its several divisions, most of these being of Squires' or Cheatham make. During 1921 the average number in operation on the Bridgeport division was twenty, on the Hartford division twenty-four, on the New Haven division thirty-three, on the Waterbury division between five and six and on the New Britain division four. The total of these is so large that it has been practicable to give much expert attention to their installation and maintenance. During the past two years, after careful study of causes of interruptions, improvements have been introduced here and there which have greatly reduced such interruptions.

Typical interruption records are reproduced to show how effective this work has been. The reports show that many individual switches operate for long periods without failure of any kind, and many of the failures reported are due to trifling causes.

Taking the reports for a recent month in the winter, when interruptions are most likely to occur, there are found the following typical descriptions of causes of interruptions together with the action taken by the maintainer:

Not throwing power off. Contact point burned off. Renewed same.

Installed one coil slate controller. (This controller is described later in the present article.)

Wishbone stuck. Adjusted same. Impulse contact loose. Tightened same. Installed one coil slate controller.

Impulse lead burnt off at contactor. Installed one coil slate controller.

Leads to magnets burnt off.

Impulse fuse blown.

Feed and ground fuses blown.

Power off. Lead burnt off in pits.

Found flash "short" in off coil of magnet due to its being water-soaked. Will dry out same. Installed new magnet.

Lead "shorted" in conduit. Will have to dig up conduit. Removed magnet and installed new one.

Open coil in magnet. Replaced it.

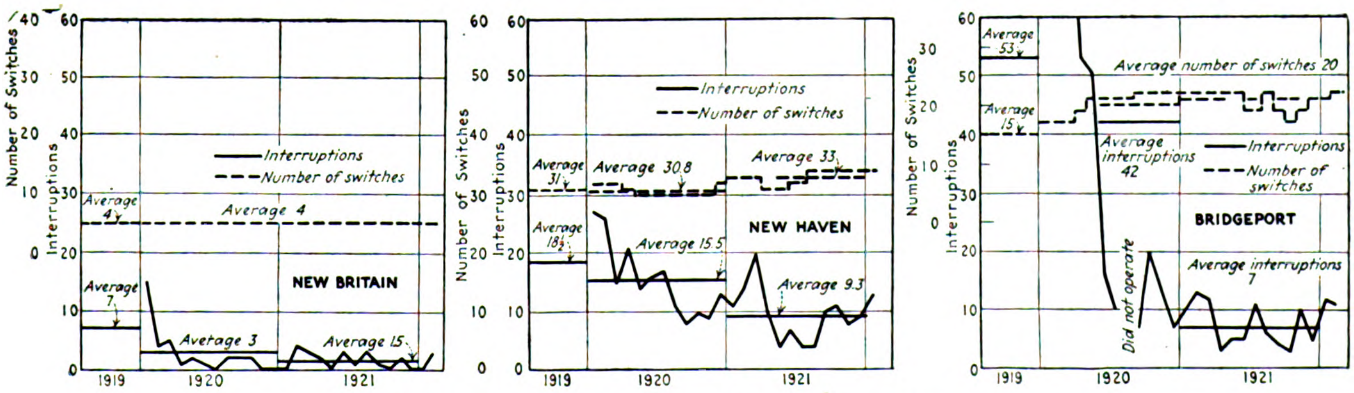
Magnet leads burnt off. Repaired same.

Controller out of adjustment. Adjusted same and switchboard is O. K.

"Magnet" shorted. Installed new magnet and underground cable.

Controller moving element frozen.

One auxiliary to the track switch proper which has been found effective in keeping down cable troubles is



TYPICAL ELECTRIC TRACK SWITCH INTERRUPTION RECORDS

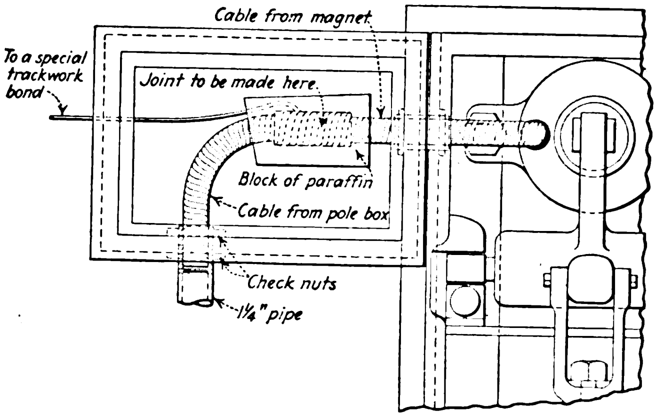

Cable from magnet
To a special trackwork bond
Joint to be made here
Block of paraffin
Cable from pole box
Check nuts
1¼" pipe

FIG. 1—AUXILIARY TRACK SWITCH BOX DESIGNED TO ELIMINATE CABLE TROUBLES

an iron cable entrance box. This is shown attached to a Squires switch box in Fig. 1. This box is 9 in. by 13 in. in outside dimensions, and provides a mechanical protection for the joints between the switch magnet cable and the cable from the overhead contact. It enables the installer and maintainer to surround the joint with a substantial block of paraffin. It also permits ready access to the cable entry in case of electrical trouble.

A SPECIAL CONTROLLER IS USED

The company has also developed a track switch controller, the one referred to in the report quotations herewith. This is mounted with a switch and fuse blocks in a substantial cabinet on a pole adjacent to the switch. The features of this controller are shown in Figs. 2, 3 and 4.

In Fig. 2 the controller is shown mounted in the pole box, with a three-pole, double-throw switch above, and a row of three fuse blocks below.

The controller consists simply of a car circuit magnet coil, which when energized attracts a hinged armature carrying on its end a brass contact. When the magnet is energized with a current in excess of approximately 30 amp. from the overhead contactor rail it causes contact to be made on the upper of two contact studs, thus completing the circuit through one of the coils of the track switch operating magnet. When the magnet is energized with a current less than 30 amp. the armature is not moved and contact is made to complete the circuit through the other coil of the switch operating magnet.

For adjustment of the controller, provision is made for raising and lowering the armature hinge pivot by means of a screw and wing-nut, the armature being hinged on a plate which can be moved by the screw when the machine screws which normally clamp it securely in position are loosened.

Fig. 4 shows the electrical circuits connecting the overhead contactor with the track switch operating magnet through the switch, controller and fuses. In the diagram the car circuit is indicated by a heavy line and the track switch operating circuit by a light line.

The feature of this simple controller is its mechanical reliability. The electrical contact which is made between the brass contact piece on the armature and the brass studs has proved to be reliable without platinum or other facing because the current is not broken at this point during a correct operation.

The mechanical details of the controller are given in Fig. 3.

The maintenance of these electric track switches is

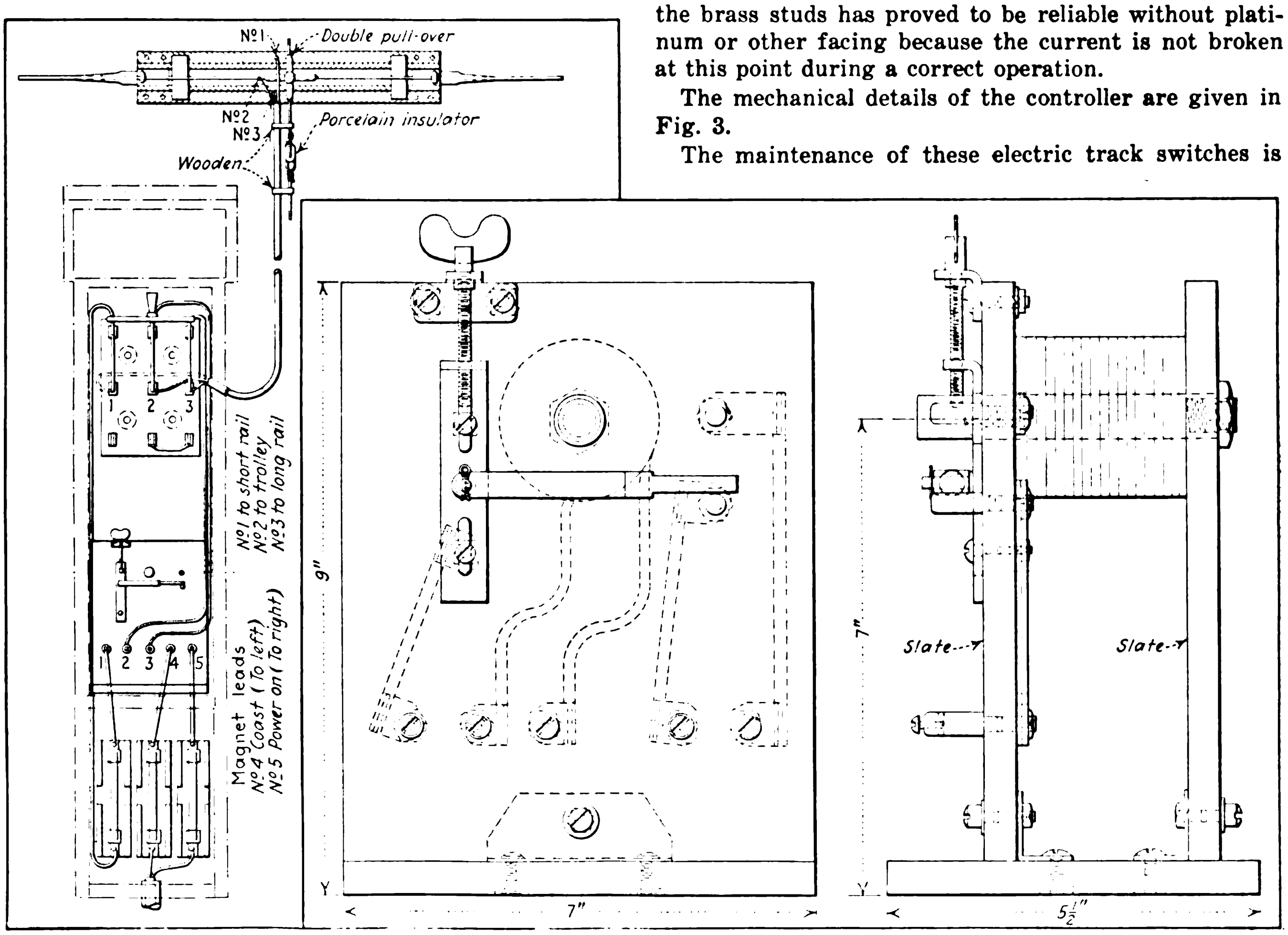

No. 1
Double pull-over
No. 2
No. 3
Porcelain insulator
Wooden
1
2
3
No. 1 to short rail
No. 2 to trolley
No. 3 to long rail
1
2
3
4
5
Magnet leads
No. 4 Coast (To left)
No. 5 Power on (To right)
X
9"
Y
7"
X
7"
Y
Slate
Slate
5½"

FIG. 2 (AT LEFT)—DETAILS OF MOUNTING AND CONNECTING OF ELECTRIC TRACK SWITCH CONTROLLER AND AUXILIARIES. FIG. 3 (AT RIGHT)—MECHANICAL DETAILS OF ELECTRIC TRACK SWITCH CONTROLLER

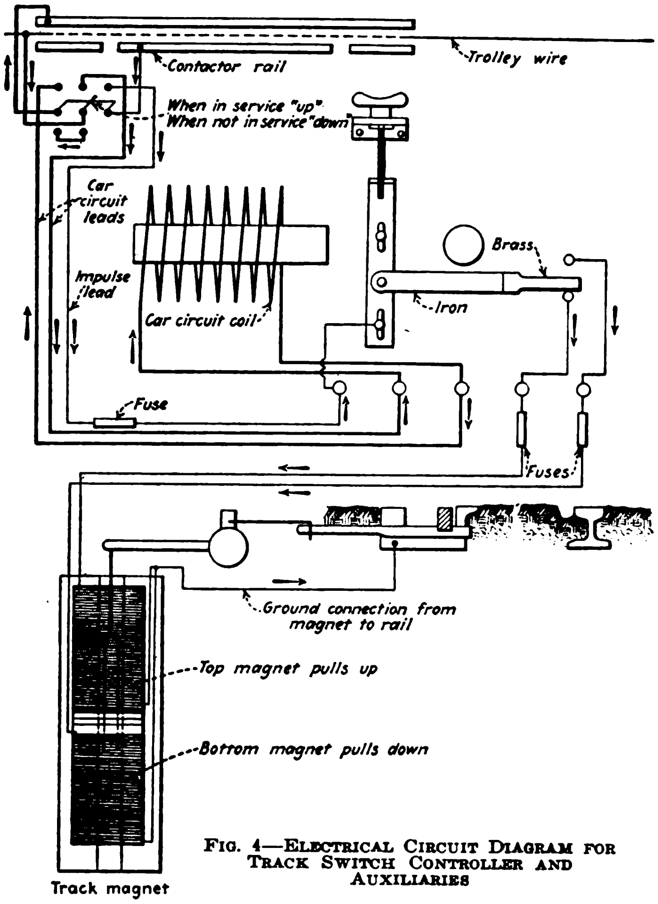
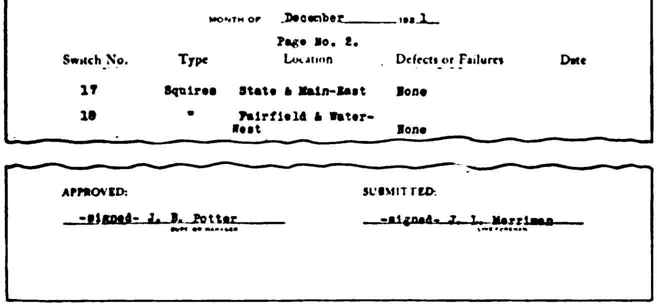

Contactor rail
Trolley wire
When in service "up"
When not in service "down"
Car circuit leads
Impulse lead
Car circuit coil
Brass
Iron
Fuse
Fuses
Ground connection from magnet to rail
Top magnet pulls up
Bottom magnet pulls down
Track magnet

FIG. 4—ELECTRICAL CIRCUIT DIAGRAM FOR TRACK SWITCH CONTROLLER AND AUXILIARIES

under the supervision of two departments, namely, the line department and the track department. The line department maintains all the electrical parts, such as the contactor, the pole box and its contents, the overhead and underground cables, the track magnet, and the overhead sign. The track department maintains the main track box together with its links, the switch tongue, the auxiliary box, the underground conduit and the drain to the sewer.

The line department effects this work by means of a switch and signal maintainer, who is equipped in most cases with a Ford car and on the larger divisions he also has a helper. The track department likewise has a man who is experienced in the upkeep and adjustment of the links in the track box.

When a switch fails to operate as it should, it is the duty of the crew so finding it to report the trouble to a starter or dispatcher, who in turn reports the matter to the line department. These maintainers, in general, keep in close touch with the dispatchers, who more often report the trouble directly to the maintainer so that it may be repaired speedily.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REPORT OF OPERATION OF ELECTRIC TRACK SWITCHES

____ BRIDGEPORT . DIVISION

MONTH OF December ______ 192 1

Page No. 2.

Switch No.	Type	Location	Defects or Failures	Date
17	Squires	State & Main-East	None	
18	"	Fairfield & Water-West	None	

APPROVED: -Signed- J. B. Potter

SUBMITTED: -Signed- J. L. Merriman

FIG. 5—REPORT FORM USED FOR RECORDING TRACK SWITCH INTERRUPTION RECORDS

The line department makes it a point to inspect these switches once a week and at that time all the contacts are cleaned and renewals made.

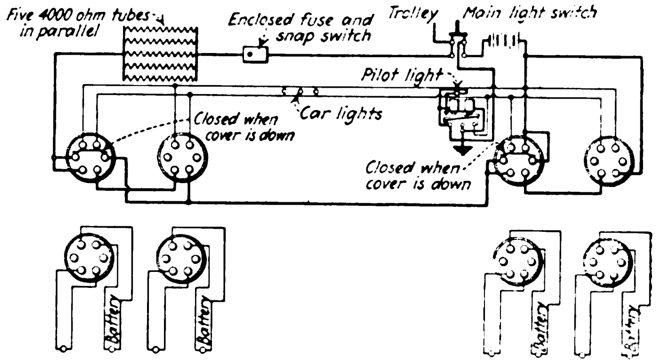
The track department inspects all switches every day, both those which are electrically operated and those which are not. At this time the working parts in the track box are cleaned.

When controllers or magnets become so worn or burned as to be unfit for good operation they are removed and delivered to the reclamation shop, where the necessary repairs are made.

Electrically Operated Marker and Classification Lamps

THE accompanying diagram shows the method adopted by the San Francisco & Sacramento Railroad to provide electrically operated markers and classification lamps which are not a part of the car. Lamps may be used the same as standard lamps, using two classification, or two markers, or all four lamps as desired.

The standard marker lamps were adapted to this purpose by the installation of 4 cp. automobile lamps with bayonet sockets to overcome the possibility of the lamps coming loose in sockets due to constant handling. A 6-volt battery was installed to provide current for the lamps when the trolley was off. This was also extended to provide lights inside of the cars at the same time and to give the train crew a visible warning that marker lamps were operating on the battery side.


Five 4000 ohm tubes in parallel
Enclosed fuse and snap switch
Trolley
Main light switch
Pilot light
Car lights
Closed when cover is down
Closed when cover is down
Battery
Battery
Battery
Battery

WIRING DIAGRAM OF BATTERY CHARGING CIRCUIT AND BATTERY LIGHTS FOR CARS AND MARKERS

Small coupler sockets were made and installed in the letterboards, and the ventilating top of the markers was removed and tubes were installed to carry a plug on the end of the cable when the lamps are being carried on hooks inside of the car, or being carried from one car to another.

No switches for connection were installed in this circuit, it being only necessary to hang the markers and insert the plugs. When lights are turned on inside of the cars the markers or classification lamps, or both, are also lighted. This is done to overcome the possibility on the part of the trainmen of forgetting to turn the lights on when it grows dark. This lighting circuit requires ½ amp. when operating the lamps, and it also provides ½ amp. trickle charge for the battery.

How to Get the Most Out of Energy-Saving Work

By William Arthur
Electric Railway Engineer, New Haven, Conn.

Employees Can Prevent the Waste of Energy in Many Ways — Saving Begins in the Power Department and Includes the Cars, the Carhouses and Shops, Distribution System and Property Generally

IT IS sometimes lost sight of that on a street railway the coal or power bill, except for wages, is the largest single item in operating expenses. As a general thing it will be found that with, say, a 6-cent fare, 3 cents will go for wages and 1 cent for coal or power, while the remaining 2 cents will be subdivided among all the other departments such as maintenance of tracks, maintenance of cars, interest and other items. To reduce the power bill, therefore, offers a most obvious and easily accomplished means of economy.

Many people, when they think of a power-saving campaign, have in mind only the economies to be made by motormen. While this is important, the writer believes the fact is not sufficiently appreciated that there is hardly any department in a street railway which cannot influence the coal or kilowatt-hour consumption per car-mile. To be really effective, a power-saving campaign should extend its activities until it brings about power economies everywhere, in the power station, in transmission lines, in trackwork, in repair shops and in many other departments.

With the above in mind, it has appeared to the writer worth while to make a list of the chief ways in which coal and power can be saved in the various departments of a street railway, so that men working in these departments might study the specific recommendations and endeavor to carry them out from day to day. Any property on which this is done will find that the cumulative effect of so many departments co-ordinating in the matter of power consumption will have a very gratifying result.

In the Power Station

Men in the Boiler Room Can Save Coal by

(1) Seeing that fires are kept at the proper thickness, neither too thick nor too thin.

(2) Avoiding all holes in the fuel bed.

(3) Avoiding unnecessary leaks of air into the combustion chamber.

(4) Seeing that too many boilers are not in use to take care of the load at each hour of the day.

(5) Reporting leaky flues and pipe connections.

(6) Keeping the brickwork of the boiler settings, also observation, fire and dust doors tight, thus preventing excess air entering the furnace.

(7) Seeing that all dampers are in good operating condition, so that the draft may be ample and under control at all times.

(8) Keeping the interior of all boilers free from scale and keeping the exterior of the heating surface and back connections free from soot. It has been estimated that 100 lb. of scale causes the waste of 400 lb. of coal each twenty-four hours.

(9) Keeping all baffles in good condition, so preventing the gases from being short-circuited to the flue connection.

(10) Not opening the fire or observation doors more than is necessary.

(11) Firing moderate quantities of coal each time.

(12) Exercising care at times of fire cleaning and dumping to prevent coke being thrown out with the ashes.

(13) Exercising care in feeding water to the boilers.

(14) Controlling the drafts so as to prevent safety valves from wasting steam by "blowing off."

(15) Maintaining normal pressure in boilers, as low steam pressure means more steam used by the engines.

(16) Stopping all leaks in blow-off valves, gage cocks, gage glasses, boiler drips, and pipe joints, also by keeping all valve packings tight. Many tons of coal are wasted each day by these items.

(17) Keeping all pipe covering and boiler covering intact. A bare pipe or surface radiates five times as much heat as a well-covered surface.

(18) Keeping the feed water at a maximum temperature; every 10 deg. F. increase saves 1 per cent of coal.

(19) Keeping feed pumps and feedwater heaters in good condition.

Men in the Engine Room Can Save Coal by

(1) Seeing that machinery is not allowed to run idle.

(2) Turning off unnecessary lights.

(3) Avoiding leaks by seeing that all valve mechanisms on engines and turbines are properly adjusted and the valves and seats in good condition.

(4) Seeing that piston packing rings and piston rod stuffing boxes do not leak.

(5) Having all moving parts in proper alignment, thus reducing friction.

(6) Keeping all cylinder drain and relief valves in good condition.

(7) Keeping all receivers well covered.

(8) Seeing that all steam traps are in good condition and are returning all clean condensation to the heaters.

(9) Keeping the condensers in good operating condition in order to maintain the proper exhaust pressures.

(10) Loading all generators to full load and shutting down all idle units, keeping the capacity in service as nearly corresponding to the load as possible.

(11) Avoiding all pipe joint leaks and defective pipe covering.

(12) Keeping accurate records of plant performance and investigating the causes of wide variations in results obtained.

(13) Substation operators can save coal by operating rotary converters at full load.

On the Cars

Motormen Can Save Coal by

(1) Running as little time as is necessary on resistance notches.

(2) Not holding power on too long.

(3) Coasting more.

(4) Not braking car too slowly.

(5) Not spending more time at end of line than schedule calls for.

(6) Not running too close behind another car.

(7) Not applying brakes unnecessarily.

(8) Reporting places where voltage of power seems low. This low voltage may be due to defective bonding or feeders, and so be a cause of wasted power.

(9) Being alert at all times, watching for persons wishing to board car, watch-

ing for vehicles ahead or any other thing in the street which might cause a delay.

(10) Using foot gongs; many slow downs or stops may be avoided by the timely use of gong.

(11) Promptly reporting car trouble in such a way that carhouse men will understand what the trouble is. Nearly every defect increases the amount of power used.

(12) Helping your conductor as much as possible. This means "team work." Don't lose interest if he holds you a few seconds at a stop. Sometimes he can't help it.

(13) Not talking to the motormen of the cars you ride on while they are on duty.

(14) Not trying to coast going up a grade, as this wastes power in resistances by causing too frequent notching up.

(15) Releasing your brakes as much as possible when stopped on level track; this saves time and power too.

(16) Using sand at all places where rail is bad. This enables all the power passing through the motors to be used to speed the car up, not in spinning the wheels.

(17) Stopping your car with the doors as near as possible to where passengers are standing; this saves many seconds at each stop.

(18) Opening all doors at places where a number of persons board car; this is a great time saver and therefore a coal saver.

(19) Passing over and through special work and curves at a safe speed with power off and brakes released. You are then less likely to have to stop due to pole coming off. Thus you save time and power.

(20) Using power for as short a time as possible to throw electric switches. The switch pan is not more than 3 ft. long, yet some motormen have power and brakes on for 100 ft.

(21) Passing under section insulators with power off.

Conductors Can Save Coal by

(1) Attention to doors and starting signals and being quick with change, causing motormen not to lose time and so not requiring more power to make it up.

(2) Turning off lights and heaters whenever possible.

(3) Removing trolley pole as soon as car is placed in carhouse.

(4) Calling names of streets. This gets the passengers to the door ready to get off when car stops.

(5) Looking ahead when car slows up or when motorman strikes gong and being ready to give go ahead signal if car shall pass obstruction.

(6) Reporting as soon as possible everything that might cause a delay.

(7) Opening back doors when several passengers are leaving car.

(8) Being alive at all times to methods of avoiding delay; the more time wasted, the more power wasted.

In the Shops and Carhouses

Repair Men Can Save Coal by

(1) Adjusting brakes so that the full efficiency of the brakes is obtained and yet so they do not hold the shoes tight against the wheels when brakes are released.

(2) Keeping all bearings and rubbing parts clean and well lubricated; this decreases friction and therefore the power required.

(3) Adjusting controllers so that a motorman can feed them properly, seeing that all connections are tight and that no arcing takes place when handle is moved on or off. A controller which is arcing causes a motorman to lose time and so wastes power.

(4) Seeing that all air leaks are taken up, that all packings are tight, that the motorman's valves work freely, and that the governors are set with the proper margin of variation.

(5) Keeping sand boxes full, also that sanding apparatus is in good working order and sand pipes over the rail.

(6) Adjusting trolley base tension properly, seeing that collector springs bear on wheels; that bushings are not badly worn. Defects in trolleys cause delays and so force the motormen to use more power to make up for lost time.

(7) Adjusting foot gongs so that they ring loud enough, and so that foot plugs do not stick or jam.

(8) Sectioning resistances so that the car shall start smoothly. This is most important.

(9) Keeping all insulation in good condition, so there shall be no leakage of current when car body becomes wet.

(10) Avoiding unnecessary shifting of cars in shops.

(11) Turning off all unnecessary lights, compressors and heaters, and shutting down all machinery running idle.

(12) Adjusting circuit breakers to act at proper current value. Defective circuit breakers waste time and so waste power.

(13) Not causing cars to be held at carhouses, waiting for cars from shop.

Cleaners and Others
Can Save Coal by

(1) Turning off lights and heaters whenever possible.

On the Road

Line Men Can Save Coal by

(1) Avoiding unnecessary mileage of line cars or trailers.

(2) Having all feeder taps and ears tight. Loose connections mean increased resistance and so loss of power.

(3) Adjusting all circuit breakers in feeder jumpers so that they do not act at too low a current value, thereby causing unequal voltages.

(4) Insulating feeders that pass through branches and foliage of trees. This will prevent slight leakages of current.

(5) Keeping electric switches in working order, as there is a large amount of power wasted by motormen when switches operate sluggishly.

(6) Setting overhead work so as to reduce number of dewirements.

(7) Using lights and heaters in line cars only when necessary.

(8) Not holding cars more than necessary at places where gangs are working.

Line Repair Men Can Save Coal by

(1) Seeing that defective feeders are promptly repaired.

(2) Seeing that lamps and heaters in line cars and linemen's quarters are turned off when not actually required.

(3) Using automobile tower trucks, when they are available, in preference to line cars.

(4) Using the lowest permissible wattage lamps in lamp banks, waiting stations, etc.

(5) Removing trolley poles from trolley wire when cars are not in use in carhouses and yards.

Roadmasters and Track Men
Can Save Coal by

(1) Caring for bonding, seeing that no bonds are loose or broken.

(2) Operating welding, grinding and tamping machines as economically as is possible, and seeing that they are in good condition.

(3) Avoiding unnecessary mileage of work cars.

(4) Not holding cars longer than necessary at points where gangs are working.

(5) Keeping curves and special work well greased.

(6) Removing flags used to protect workmen as soon as possible.

Dispatchers, Inspectors, Starters
and Instructors Can Save Coal by

(1) Not causing unnecessary mileage.

(2) Observing car defects and reporting them as soon as possible.

(3) Seeing that lights and heaters are in use only when necessary.

(4) Cautioning or advising car crews, when observed to be operating improperly.

(5) Pointing out to new men or others whom they instruct the necessity of economical operation.

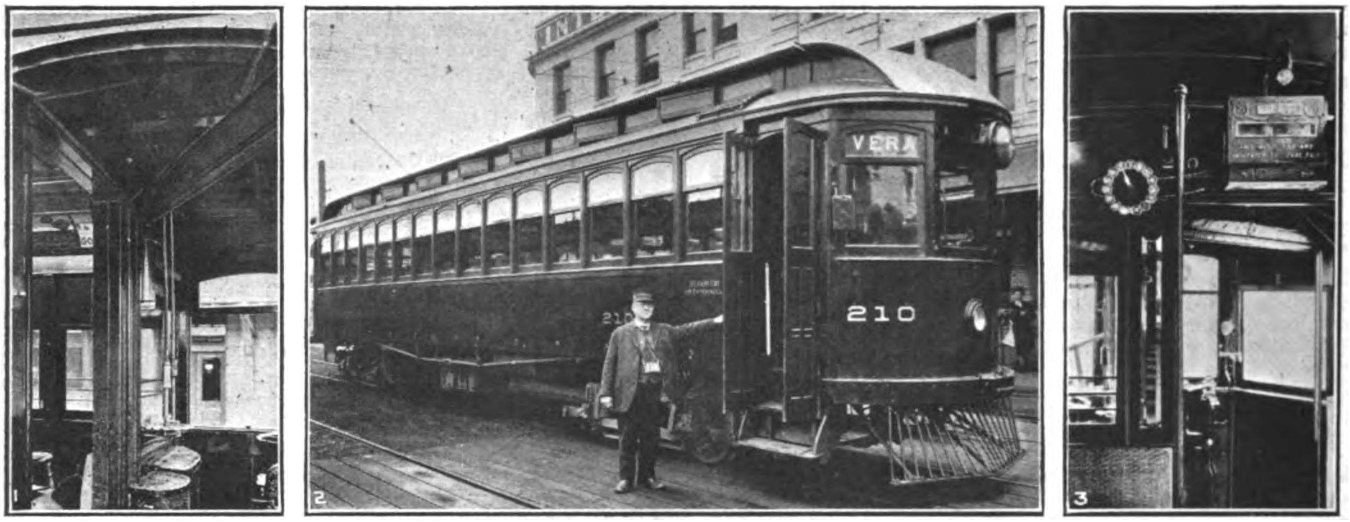
Other Employees in Offices and
Elsewhere Can Save Coal by

(1) Being near exits when car is stopping, so as to avoid delay.

(2) Setting example to other passengers in regard to being at proper stopping places, and in other ways so acting as to avoid delay.

(3) Reporting anything noticed which may cause delay, for delay in the end always means more power to make up for lost time.

(4) Not using lights or heaters in offices when not necessary.



LEFT—INSIDE MOTORMAN'S CAB, SHOWING REGISTRATION DIAL AND VERTICAL RODS. CENTER—ONE OF THE SPOKANE CARS IN SERVICE. RIGHT—REGISTER AND DIAL ON BULKHEAD INSIDE CAR

One-Man Interurban Cars Used in Spokane

The Spokane & Eastern Railway Has Remodeled Several of Its Interurban Cars to Permit of One-Man Operation—Competition from Buses Made Economical Operation a Necessity

ONE-MAN interurban cars to compete with one-man interurban motor buses have been introduced in Spokane by the Spokane & Eastern Railway with good results. Motor buses have invaded the territory of the Spokane & Eastern interurban lines both east and south of Spokane and particularly between the city and Liberty Lake. It is on this run that the company is introducing one-man interurban cars.

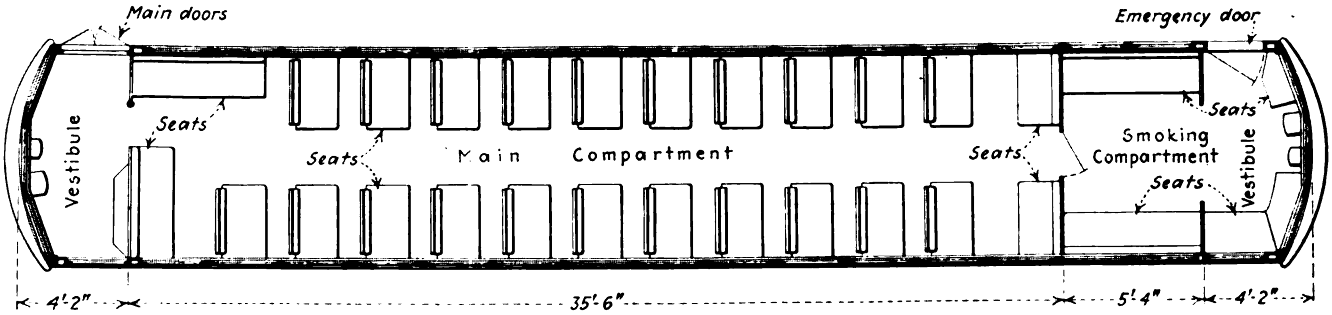
The Spokane & Eastern interurban cars were built here two years ago in the company's shops. New trucks and electrical control were installed. These cars have now been rebuilt for one-man operation. During the reconstruction the cars were "turned around"; that is, the motorman's cab was constructed on the rear vestibule of the old cars.

One of the remodeled cars is shown in the accompanying illustration. They are 52 ft. 7 in. long, 8 ft. 6 in. wide and 8 ft. 6 in. high, inside. The seating capacity is sixty-five passengers and the standing capacity about 110.

The car will make the 19 miles to Liberty Lake, with twenty-one flag stops, at an average of 18.95 miles an hour. The maximum speed will reach 30 to 35 miles an hour between stations. Hourly service is scheduled for the line. Five one-man cars are now completed and seven more will be added to the service in a short time. The company has also reconstructed several of its old two-man cars into the one-man type with a motorman's cab at each end. The reconstruction of all cars was done under the direction of Superintendent J. F. Gannaway and A. H. Mayham, master mechanic for the Spokane & Eastern shops.

In order to facilitate the rapid handling of fares and tickets and to assist the auditors of the company in analyzing the day's business the Ohmer fare register, No. 60, was installed in the cars, as shown in the illustrations. Two dials are used for indicating the registration. One of these is located inside the motorman's cab in a horizontal position on the bulkhead just at the bottom of the window. The other is located at the top of the bulkhead inside the car. When a fare is received the operator sets the dial in his cab according to the fare to be registered. Two vertical rods connect this dial with the one inside the car so that the indications are the same on the two dials. The registration is made by pulling down on the handle which slides on one of the vertical rods. This system has proved very satisfactory.

Twelve Ohmer registers of the new No. 62 model have been ordered by the company for use on this type of car. The arrangement in the motorman's cab and in the passenger compartment is practically the same, but the register is built to record any amount from one cent to $9.99 and nine separate ticket fares. In addition, each station is given a zone number, and from this the auditors can ascertain the record of passengers picked up at each station. A record is automatically made of the zone number, the direction of the car, the register number, the amount of cash received or ticket fare, a consecutive fare number, the date and the conductor's number.



FLOOR PLAN OF ONE-MAN INTERURBAN CAR

Relation Between Temperature and Power Used by Electric Cars

Tests Indicate That More Power Is Used During Cold Weather—Present Methods of Lubrication Appear to Be Responsible for a Large Part of the Increase

By A. W. Baumgarten
Electrical Engineer Chicago & Joliet Electric Railway, Joliet, Ill.

IN THE past few years much time and study have been devoted to obtaining more efficient operation in order to reduce the power costs of electric railways. Railways are now realizing that the weight of the heavy type cars is responsible for a large part of the power cost, and they are resorting to the lighter type car to save power. However, most of the methods used to improve power efficiency and savings involve a large expenditure of money and consequently most of the railways are not in a position to adopt them.

One very successful method of obtaining power efficiency in use on many properties today is to improve the operating efficiency of their motormen by the use of meters installed on the cars. This does not involve a very large financial investment, and it offers a very good means of studying other faults involved in car operation and maintenance.

The writer has had the opportunity of studying and instructing carmen in the operation of cars through the use of watt-hour meters installed on the cars for the past seven years with good results. The watt-hour meter has also been used to check up the adjustment of equipment. For instance, too much stress cannot be put on the proper adjustment of brake equipment. It has been found that a car can easily use 10 per cent to 25 per cent more power than necessary by having tight or unequal brake adjustment and causing large friction losses. We must bear in mind that every foot-pound of energy expended in friction must come from the trolley.

A very interesting problem which the writer observed, and which has probably not been seriously considered in connection with car operation heretofore, is the effect of temperature on the energy per car-mile. In order to determine the effect of temperature alone, it was necessary to study the effect of passenger loading.

To do this, graphs similar to those in Fig. 1 were plotted for a period of several months showing the average kilowatt-hours per car-mile for the system, the average atmospheric temperature, and the passengers per car-mile for each day.

Table No. 1 was obtained from these graphs by recording the kilowatt-hour per car-mile and passengers per car-mile for each of the temperatures given, and by calculating an average for each temperature.

Table II was obtained by taking the kilowatt-hours per car mile and the temperature for various loading of passengers per car-mile in groups from 3.60 to 4.20 passengers per car-mile, and an average calculated for each group. The figures thus obtained were then corrected to 30 deg. and 75 deg. temperature from a preliminary curve plotted from Table I, and the corrected values are given in Table II.

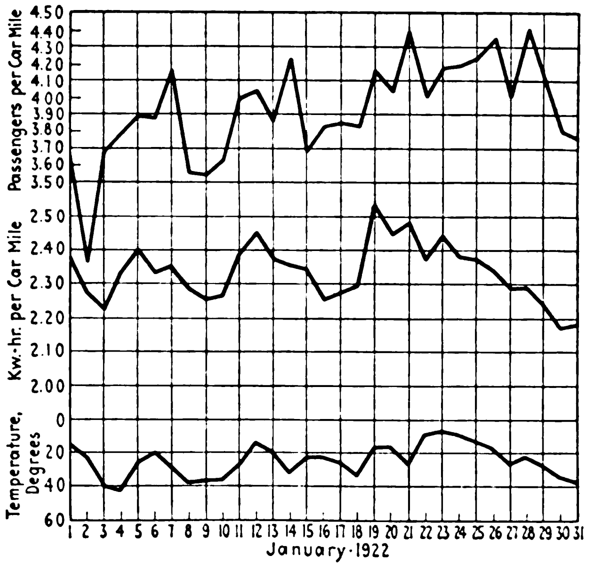


FIG. 1—TEMPERATURE. POWER CONSUMPTION AND PASSENGERS CARRIED DURING JANUARY, 1922

These figures were plotted giving the two curves at 30 deg. and 75 deg. temperature, the points of which are shown in Fig. 3.

From these curves the figures of Table I were corrected for a uniform loading of four passengers per car-mile as shown in Table III.

These figures were then plotted as shown in Fig. 2. The other curves for each 5 deg. change of temperature on Fig. 3 were interpolated from Fig. 2. It is interesting to note that the effect of passenger loading on the power per car-mile becomes less at the lower temperatures—that is, the slope of the curve becomes less and approaches zero. Although the power per car-mile from the curves of Fig. 3 probably will not apply to other properties, it will be found that the rate of change

TABLE I—RELATION OF POWER CONSUMED IN OPERATION TO TEMPERATURE

Atmospheric Temperature, Degrees F	Average Passengers per Car-Mile	Average Kilowatt-Hours per Car-Mile
15	4.01	2.410
20	3.92	2.380
30	3.86	2.320
40	3.82	2.240
55	3.96	2.120
65	3.79	2.070
75	3.87	2.080
81	3.86	2.030

TABLE II—AVERAGE POWER CONSUMED AT TEMPERATURE OF 30 AND 75 DEGREES F.

Passengers per Car-Mile	Temperature, Degrees F.	Average Kilowatt-Hours per Car-Mile	Temperature, Degrees F.	Average Kilowatt-Hours per Car-Mile
3.60	30	2.280	75	2.03
3.70	30	2.290	75	2.045
3.80	30	2.300	75	2.052
3.90	30	2.290	75	2.065
4.00	30	2.310	75	2.075
4.10	30	2.312	75	2.082
4.20	30	2.320	75	2.093

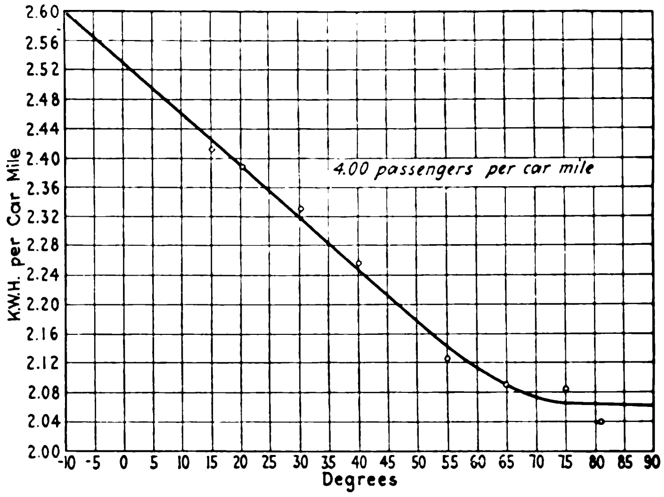


FIG. 2—POWER USED PER CAR MILE WITH VARIATION OF TEMPERATURE

of energy per car-mile with the atmospheric temperature and with the passenger loading will be about the same.

As to the causes of this variation of power with temperature, it is the writer's opinion that present methods of lubrication are responsible for a large part of the power loss. It is not only the quantity of lubricant but the quality and physical properties as well that causes this rapid increase of power at the lower temperatures. With lubricants of lower viscosity and with a lower cold test than those in present use which will at the same time withstand the bearing pressures, we should be able to reduce the slope of the power—temperature curve and effect considerable savings of power.

TABLE III—RELATION OF POWER CONSUMED TO TEMPERATURE WITH UNIFORM LOAD

Atmospheric Temperature, Degrees F	Average Passengers per Car-Mile	Average Kilowatt-Hours per Car-Mile
15	4.00	2.410
20	4.00	2.385
30	4.00	2.330
40	4.00	2.255
55	4.00	2.125
65	4.00	2.090
75	4.00	2.085
81	4.00	2.040

In the automobile industry the manufacturers endeavor to lubricate every part where friction occurs—not as little as possible, but all that each part will take without undue loss of oil. With railways it has been the custom to do as little lubrication per 1,000 car-miles as possible, without consideration of the power losses.

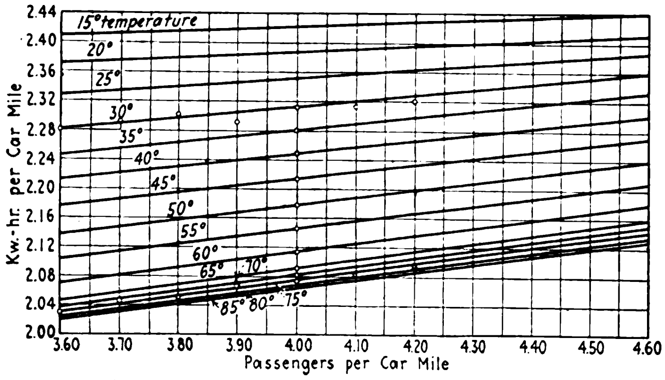


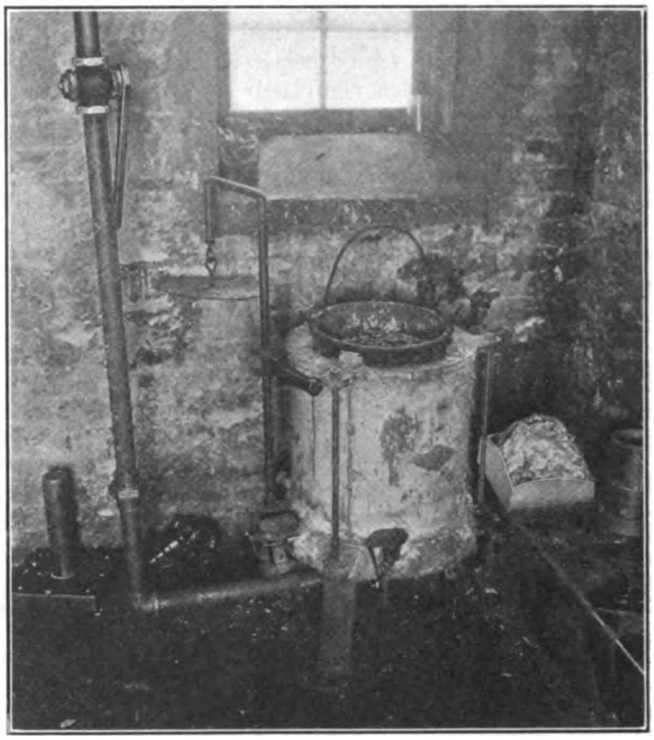
FIG. 3—POWER USED WITH VARIATION OF TEMPERATURE AND PASSENGERS CARRIED

The majority of hot journals and bearings occur in the cold weather which in itself is an indication of poor lubrication due to the low temperature at which the oils do not feed properly. Also there are many parts such as parts of the brake rigging of the railway car which is lubricated very little or not at all, causing the brakeshoes to drag against the wheels with high friction losses because the release springs cannot react properly. The writer has observed losses of 50 to 75 kw.-hr. per car per day for this reason alone.

Therefore, it seems possible that considerable saving of power and equipment can be accomplished by a change of lubrication methods at very little additional cost.

Convenient Babbitting Furnace

THE accompanying illustration shows a Johnson direct-jet No. 600 furnace used in the shops of the Eighth Avenue Railroad, New York, for melting babbitt. It also has been found convenient for tempering, case hardening and annealing, as well as for soft metal melting. The furnace proper is 18 in. high and sets on three legs, which raise the bottom 10 in. from the floor. This gives an over-all height of 28 in. An attachment at the side supports a cover for the melting pot and a wooden handle at the side provides for swinging this out of the way as required. The furnace is of sufficient size to take a 400-lb. melting pot, but a size holding from 200 to 350 lb. is used by the Eighth Avenue Railroad. The gas supply pipe is 1¼ in. in diameter, and is provided with a shut-off cock which can also be used to regulate the supply. The furnace is fitted with six Johnson direct-jet atmospheric burners which mix the right amount of air with the gas to produce complete combustion and to obtain the maximum heat possible without the use of a forced air blast. This type of jet directs the flame in correct alignment with the Bunsen, and maintains the highest possible velocity at the nozzle. The orifice is adjustable, as is necessary to provide for variations in the pressure of gas.



FURNACE USED FOR MELTING BABBITT

The gas consumption is 75 cu.ft. an hour, and the furnace will melt 350 lb. of babbitt in fifty minutes. Other soft metals, such as lead, zinc, and tin, can also be efficiently melted if desired.

Equipment and Its Maintenance

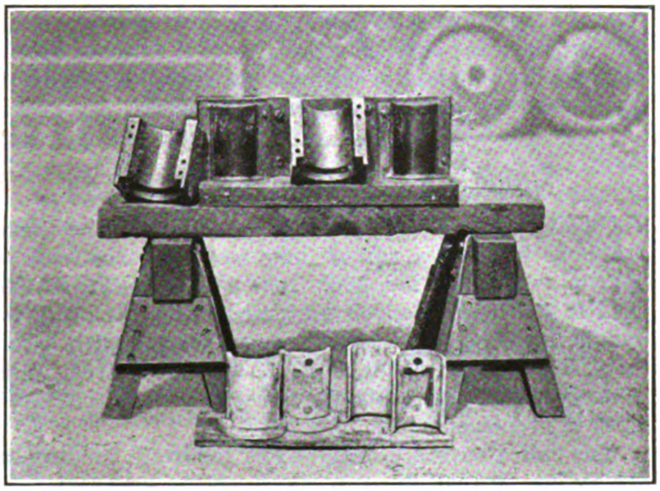
Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Aluminum-Base Metal for Motor Bearings Gives Low Cost

Use of This Material in Youngstown Involves a Net Cost Lower than for Bronze, with Equivalent Wear During a Year's Test

By A. B. Creelman
Master Mechanic Youngstown (Ohio) Municipal Railway

ABOUT four years ago when it was difficult to get bronze a set of four molds was made up with which to pour solid babbitt bearings for G.E.-247 motors. After trying out a dozen different brands of ordinary babbitt metal, this practice was given up as too expensive, for many of the bearings were too hard and broke and others failed because the babbitt was too soft. Since that time, an aluminum base material, called "Elmore U. S. metal," has been tried for motor bearings and it has worked out satisfactorily. Bearings of this material have been in service for about a year on the motors of twelve cars and they are apparently giving as good wear as the bronze bearings.



Molds for Casting Finished Babbitt Motor Bearings

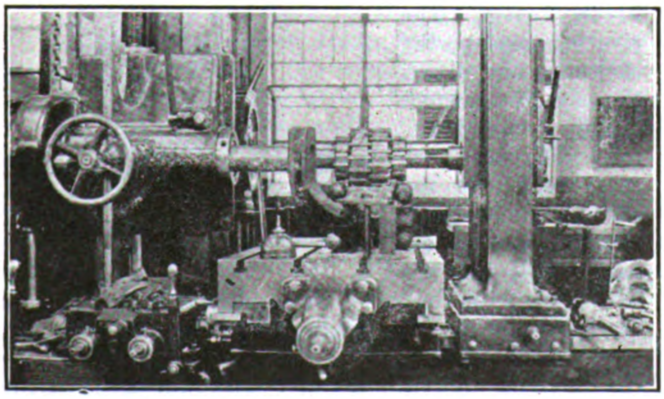
The net cost of bearings made with this aluminum base is about 12 per cent of bronze bearings. Bronze bearings cost $5.30 per pair for labor and material and have a scrap value of 70 cents, leaving a net cost of $4.60 per pair. The aluminum-base babbitt bearings cost $2.70 a pair and have the high scrap value of $2.16, since the material can be remelted. Therefore the cost of the useful wear in a set of these bearings is only 54 cents.

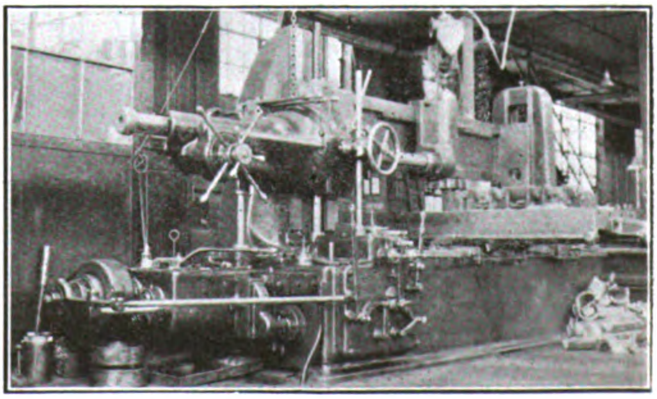
The molds into which these bearings are poured are so arranged that the bearings require no machine work after they are cast. After they are merely cleaned up around the edges on an emery stone, they are ready for service in the motor. When the motor axles are badly worn some breakage has occurred with both bronze and babbitt bearings, but when the bearing and the axle have a snug fit the aluminum babbitt metal is showing just as good service as the bronze. Since the test on these twelve cars is not yet completed, it is not possible to give figures as to the exact performance cost per thousand car-miles.

Milling Pedestal Jaws

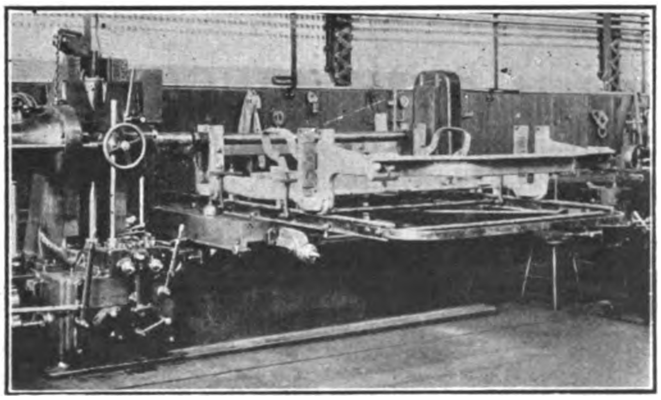
Special Frame Fitted to Horizontal Boring Machines for This Work—Machine Also Adaptable to Many Other Types of Work

A HORIZONTAL boring, drilling and milling machine, which has been in use for a number of years in the Harvard Shops of the Cleveland Railway, has been found to be one of the most valuable of any of the machine tools installed. The adaptability of this tool is such that it can be set up for a number of jobs that must be done in an electric railway shop, but which usually require the use of a number of separate machine tools. Three of the accompanying views show as many distinct operations for which the machine is ordinarily employed. The first of these illustrates the set-up of the machine for milling the pedestal jaws of a truck frame to the correct width so that wearing plates can be inserted between the jaws and the





At Left, Milling the Pedestal Jaws of a Truck Frame with a Horizontal Boring, Drilling and Milling Machine. At Right, Milling Axle Caps for Dowels



PLANING AXLE BRASSES

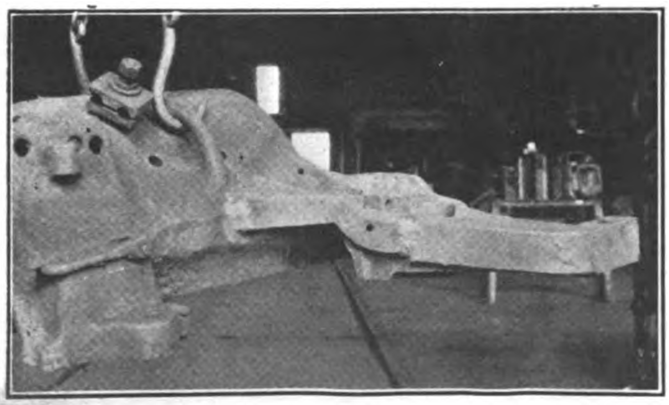
journal box. For this particular work, a special frame on which to mount the work has been constructed from two lengths of rail and several rods. The base of one rail is secured to the platen while the other rests on the base of the back rest. The truck frame is held down with pins, eyebolts and plates connected as shown. The horizontal milling attachment, consisting of two cutters mounted on an arbor, is used, thus making it possible to resurface the corresponding sides of opposite pedestal jaws simultaneously. To bring the other pair of jaws into position for milling, the auxiliary and truck frame must be turned end for end.

A simpler operation performed on this machine is the milling of axle bearing caps for dowels as shown in an illustration. The back rest is moved up to the platen and a gang cutter mounted on a short arbor is inserted in the driving spindle.

A third set-up, one for planing axle brackets, is also shown in an accompanying illustration. For this job, the vertical milling attachment is inserted between the head and back rests and a shell-end cutter is used. Work of this sort is done principally to fill in among the more difficult milling operations, for which the tool is especially adapted.

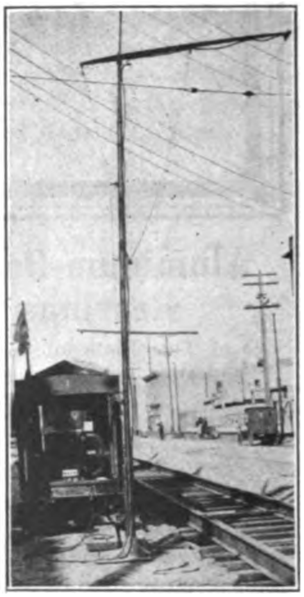
There are three other distinct operations which are customarily done on this machine but which are not illustrated herewith. These are the drilling and facing of car couplers, the lining up and tightening of armature cores which have become loose and skewed on the spiders, and the reboring of motor housings which have been repaired by welding. One of the illustrations shows a repaired motor casing which has been welded across one bearing and is ready to be rebored. More than 100 housings have been welded and machined thus without single failure.

The Lucas Machine Tool Company, Cleveland, is the manufacturer of this horizontal boring machine.



WELDED MOTOR HOUSING READY TO BE REBORED

Tapping Trolley Wire Without Interrupting Car Traffic

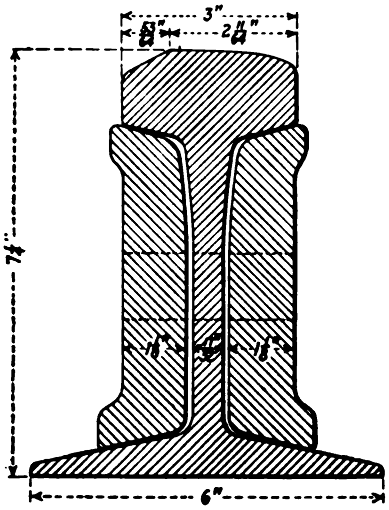


TAKING CURRENT FROM TROLLEY WIRE IN SAN FRANCISCO

A PORTABLE equipment for making contact with the overhead trolley wire in order to obtain current for operating tools for track repairs has been built by the Market Street Railway of San Francisco. This trolley wire tap is arranged so that it is not necessary to remove the device when a car passes. The device consists of a broad based steel standard, which can be set at a proper distance from the track. This has an arm at the top of sufficient length to extend to the trolley wire. At the outer end of the arm is a contact plate which fits about the underside of the wire so closely that it does not interfere with the passing of a trolley wheel. Ropes are provided for adjusting the arm to the proper height, and the current is carried by cable from the contact to the machinery to which power is supplied.

Novel Rail Section for Cleveland

THE Lorain Steel Company is rolling for the Cleveland Railway a rail of new section, which will be known as Sec. 102 No. 506. It is a modification of Sec. 95 No. 400, with the web thickened under the head, the height increased ¼ in. and the head formed with a contour like that of the A. E. R. A. standard girder rails. This section is added to the present series; that is, it does not replace another.



RAIL AND JOINT-PLATE SECTION LORAIN 102-506 NOW BEING ROLLED FOR CLEVELAND

The splice bars are designed to facilitate welding, as they are used in making what is known as the C. H. Clark joint. The bars clear the rail web by about 1/16 in.

In Cleveland the joints are made with 8-hole plates, riveted together with 1 1/16-in. Myari steel rivets 5¼ in. long. The riveting takes up the clearance and draws the bars to a perfect bearing top and bottom. The plates are seam-welded to the rail top and bottom. Base plates underneath the joints are used also, with the rail base welded to the plate. Mr. Clark reports that the joints so far installed are giving good satisfaction.

In making the joints the Cleveland Railway is cutting the rail ends on a 10-deg. miter.

Combination Rest Room and Repair Shop Under Ferry Loop

THE accompanying illustration shows the entrance to the repair shop and rest room for railway employees which has recently been built under the ferry in front of the ferry building in San Francisco. This space was previously occupied by an old cable car loop pit, and half of the space available has now been transformed into the rest room and repair shop. There are lockers for the men with wash rooms, etc. The entrance is closed by two steel doors, around which there is a pipe railing. Access to the rest room is gained by means of a steel ladder. A large electric gong is installed at the opening for calling various employees, such as superintendents, inspectors, repairmen, starters, etc., each of which has a code number.

ENTRANCE TO REST ROOM AND REPAIR SHOP UNDER FERRY LOOP

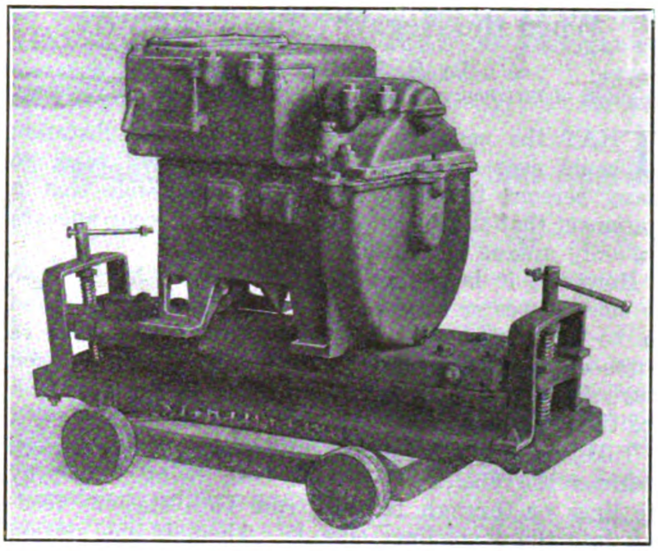
A Convenient Compressor Truck

The New York State Railways Has Supplied Its Maintenance Shops with a Platform Truck with Movable Table for Removing and Reinstalling Compressors on Cars

THE accompanying illustration shows a type of truck constructed in the shops of the New York State Railways and used for removing and reinstalling compressors on cars. This truck has a platform which can be raised and lowered by means of screws at either end, so that a compressor can be lowered from its position on the car body sufficiently to clear any obstructions and then be hauled away to the compressor overhauling bench by one man.

The frame of the truck is made of 1-in. x 2-in. channel irons and is $22\frac{1}{2}$ in. wide x 31 in. long. Two axles are located 4 in. from the ends of the frame by boring holes in the channel iron framework. The axles are clamped to the frame. The wheels are 6 in. in diameter and 2 in. wide, made of wood with band iron tires and steel bushings in the center to serve as bearings. They are fastened on the axles by means of cotter pins.

The stationary platform is made of oak $13\frac{1}{2}$ in. wide x 47 in. long x $1\frac{3}{4}$ in. thick. This is securely bolted to the channel-iron framework. The raising and lowering table is also made of oak 12 in. wide x 37 in. long. It is raised and lowered by means of two small screws at the ends of the table. These screws are $1\frac{1}{8}$ in. in diameter and 8 in. long. They are threaded four threads to the inch and have a large nut $1\frac{1}{2}$ in. x $2\frac{1}{2}$ in. x 8 in. at either end, which works up and down between guides as the screws are turned. The ends of the table rest on two pieces of strap iron, which in turn rests on the nut, so that the table is raised or lowered as the screw is turned. As constructed the table has a range of 8 in. in travel, which has been found ample for removing all ordinary compressors from cars. The general details of construction are shown in the accompanying illustration.



COMPRESSOR TRUCK WITH RAISING AND LOWERING TABLE

Construction of Edinburgh's Overhead Line Finished

AS already announced in these columns, the Edinburgh Corporation Tramways is changing to overhead current collection. The acompanying illustration shows the connecting up of the final section of its first overhead electric line.

TOWER TRUCK CREWS COMPLETING EDINBURGH'S OVERHEAD LINE

When the Negative Bus Is Positive

By G. H. McKelway
Engineer of Distribution, Brooklyn (N. Y.) Rapid Transit Company

THAT the negative bus of a power or substation could ever be positive to anything will seem to many persons to be so manifestly impossible that a statement that such a condition does often occur appears not only untrue but absurd as well.

However, it is a fact that on systems having two or more power or substations there will often be found to be differences of potential between the negative buses of the different stations, which is only another way of saying that some of the negative buses will be positive to others.

Take, for instance, a system of lines fed from two stations the positive buses of both being joined by tie lines or through feeders from both stations feeding into the same lines outside. Then, if one station should be shut down, but its bus kept alive from the other station by means of these ties, current would still continue to flow out from the positive bus through its feeders and much of this current would return to the negative bus of the idle station, although all of it, eventually, would return to the negative bus of the station where it was generated. Therefore, at the station that had been shut down, there would be found to be current returning to the negative bus over certain of the return wires, and leaving that bus for the negative bus of the generating station over other return wires.

In the same way, although not so obvious, it will be found that it is not necessary for one of the stations to be entirely shut down before the potential of its negative bus is higher than that of a neighboring station, but that it will be necessary only that one station lower its voltage enough to permit the other to pick up a part of what would normally be the first station's load, and the same condition will occur although much less noticeably.

In fact, with two or more stations close together and all feeding into approximately the same lines, the fluctuations of voltage caused by ordinary variations in load will be sufficient to cause current to flow out from the negative bus many times in a day.

This fluctuation of voltage and current flow makes it unwise, on a large system, to follow the same practices for the prevention of electrolysis of the cable sheaths that are considered as standard on smaller roads. On a small line the cable sheaths are generally bonded to the negative bus of the station and that is all that it is considered necessary to do to prevent any trouble. But, as has been shown above, on a larger system it is not certain that such drainage will prevent electrolysis. On the contrary, at some hours of the day, the cable sheaths, if connected to the negative bus, may furnish a path whereby current may leave that bus and, after following the sheaths for some distance, leave them at some remote point or points and there cause more trouble than would have occurred if the sheaths had not been bonded.

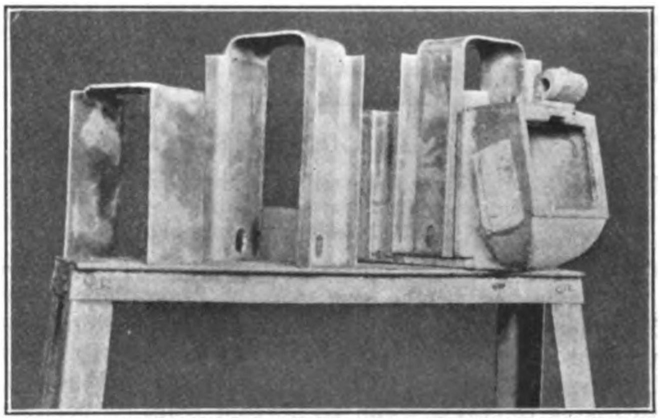
Therefore on many of the larger systems it is no longer the practice to attempt to drain the sheaths of negative current by bonding them "hard" to the negative bus, but instead a switch is placed in the circuit so that it will or can be opened when the direction of current flow changes.

These switches are sometimes automatic but more often are merely the ordinary hand-operated knife switch which is opened whenever the station is shut down or when the ammeter in the circuit shows that current is leaving the bus. Where such ammeters are used on the negative side as well as on the positive it is the custom to have them read at regular intervals and the readings recorded on the regular feeder sheets just as is done with the readings of the ammeters on the feeder panels.

The use of portable recording instruments of the smoked chart type, if occasionally put into the circuit, will show that often when the ammeters of the ordinary switchboard type are not sensitive enough to record any current, the voltage on the bond wire will be fluctuating, the readings showing that part of the time the potential of the negative bus is higher than that of the cable sheaths, and vice versa. The writer knows of one occasion when simultaneous readings on the bond wires leading to the negative bus from the high and low tension cables at one station showed that current was coming into the station on the sheaths of the d.c. cables, which ran out principally in one direction, and was leaving the station on the sheaths of the a.c. cables which ran to another station in a different direction.

Renewable Wearing Plates for Both Journal Boxes and Truck Frames

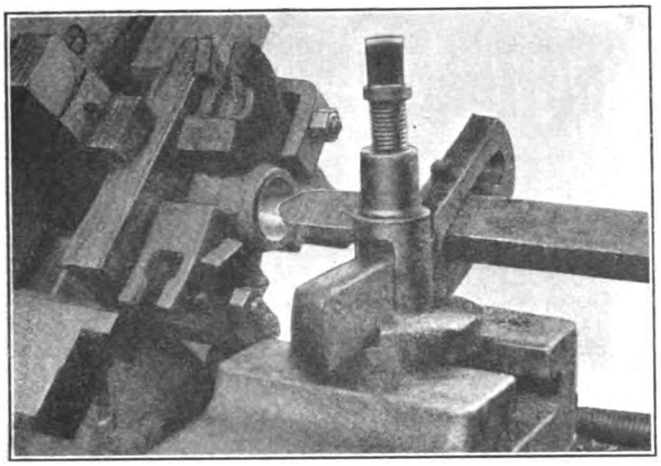
FOR a number of years the cars of the Cleveland Railway have been equipped with double wearing plates between the journal boxes and sides of the truck frame jaws. Both of these plates are continuous, being stamped from ⅛-in. sheet steel strips and bent to form U-shaped pieces. One pair of plates is slipped over the journal box and is held in place by the journal box guides. The outer pair of flanged plates is bolted to the truck frame jaws. The tops of these two renewable wear plates form the bearing surfaces for the coil spring over the journal box inserted between them. Thus these plates are held from rattling by the weight of the car, a scheme which has worked out with considerable success. Protecting the wearing surfaces of both the journal box and of the yoke means that the life of these parts has been materially increased at a small cost.



RENEWABLE WEARING PLATES FOR JOURNAL BOX AND TRUCK FRAME JAWS

One set of these plates before assembling and another set assembled on a journal box are shown in the accompanying illustration. The pair of plates on the left was formed by using a bulldozer, while the other pair was formed in a press with a set of dies.

Handy Jig for Boring Brakeshoe Heads



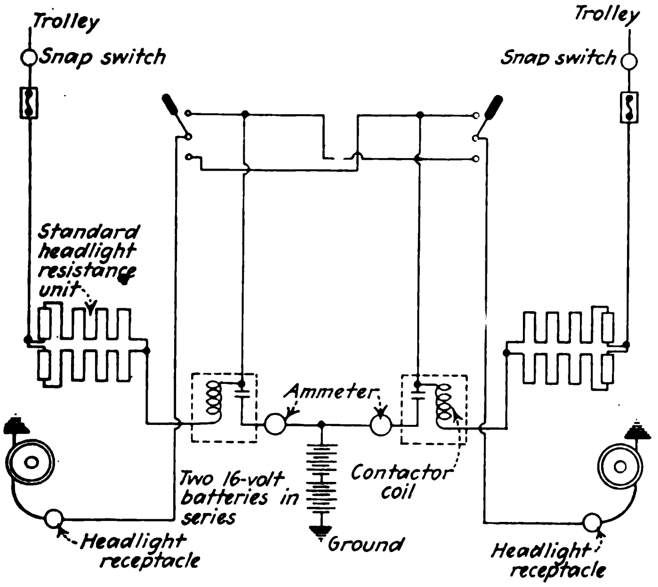
LATHE SET UP FOR BORING BRAKESHOE HEAD

THE accompanying illustration shows the set-up in a lathe of a brakeshoe head for boring as used in the shops of the Northern Ohio Traction & Light Company, Akron, Ohio. The brakeshoe head is clamped to an iron block by two clamps at either end. The block is then placed in the chuck of the lathe and adjusted to its proper position.

Headlight Circuits with Storage-Battery Booster

IN ORDER to overcome varying intensity of headlights, due to fluctuation of line voltage, the San Francisco & Sacramento Railroad has connected its headlights with a storage battery in circuit, as shown in the accompanying diagram.

With this arrangement, the battery is charged at about 1 amp. when trains are in front of substations and discharges about 2 amp. when the voltage is low between stations. Standard 32-cp., 250-volt locomotive-type lamps are used in "Golden Glow" 14-in. reflectors, which provide a light that illuminates an 80-ft. right-of-way clearly for 1,000 ft. and is not affected by voltage fluctuation either in starting or in running. This arrangement has been in operation about six months on trains operating altogether at night. Arrangement has been made in this circuit to use the headlight resistance as cab heaters for the motormen and to permit selection of either resistance from both ends of the car.



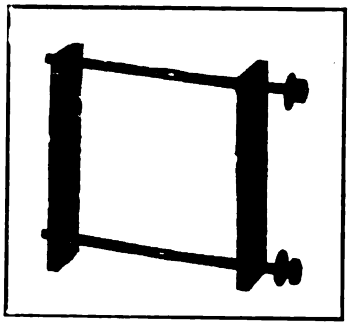
WIRING DIAGRAM FOR BATTERY HEADLIGHTS

Eliminating Controller Connection Boards

By W. B. UFFERT

Master Mechanic New York & Harlem Railroad, New York, N. Y.

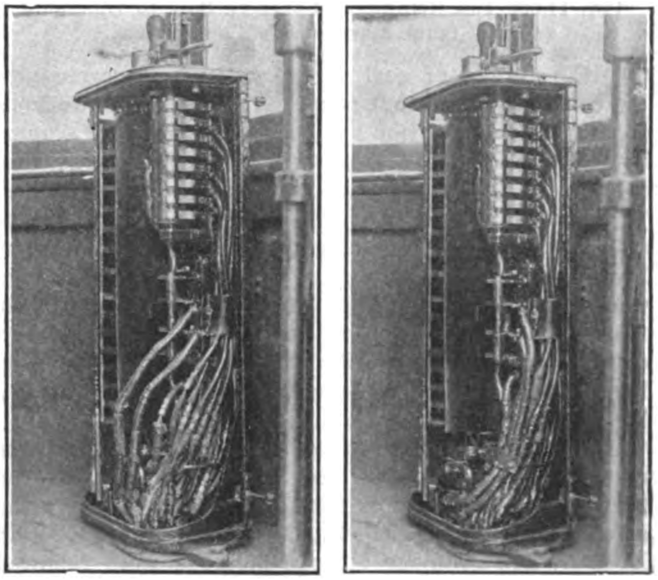
THE New York & Harlem Railroad has a number of old-style type "K" controllers in service. Considerable trouble was caused from open circuits and short circuits at the connection board. The terminals were of the screw type, and due to screws working loose, poor contact resulted which caused burning, short circuits and even controller explosions. Due to the cramped condition where the leads came in, it was almost impossible to keep these free from dirt, and the dampness and carbonized terminal conditions caused a creepage of current which ultimately resulted in short circuits. It was also very difficult to make a good soldered joint, due to the limited space available.



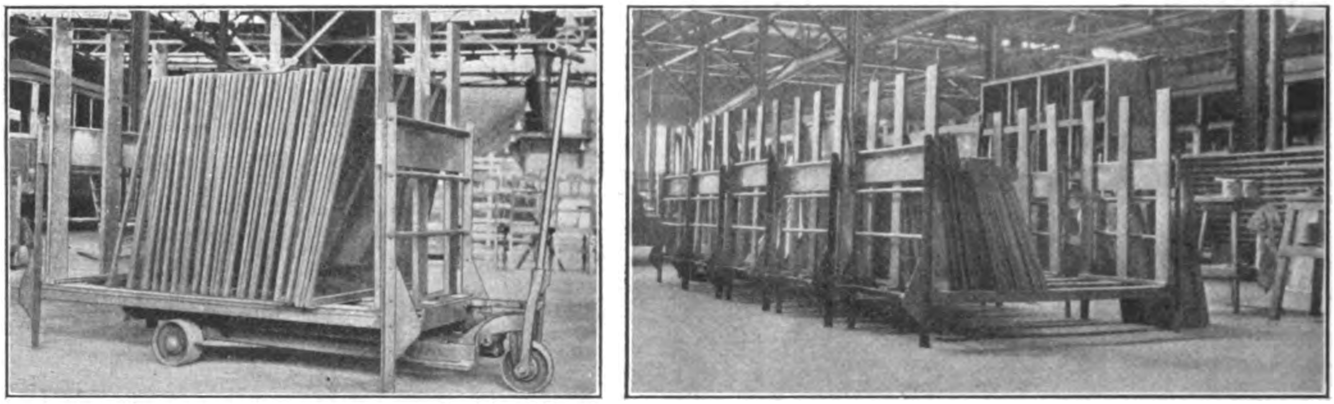
CLAMPING BLOCK USED TO SECURE LEADS

To remedy this condition, the connection board was cut off and the lower section which had the connecting terminals was removed. The upper section on which was mounted the motor cut-out switches was not disturbed. To connect the incoming leads from the motors and resistors to the controller leads, Frankel two-way soldered connectors were used. These permit the cables to run straight and their use provides a positive joint.

Accompanying illustrations show how these connectors are used for making the connections and also how the leads are taped and clamped in place. After the connectors have been installed, the joints are thoroughly taped up and grouped in proper position. Clamping screws with fiber blocks hold the leads.



AT LEFT, LEADS CONNECTED WITH CONNECTIONS. AT RIGHT, FINISHED INSTALLATION OF LEADS IN CONTROLLER



At Left, Car Windows Loaded on Special Frames Are Handled with a Lift Truck. At Right, the Sash Belonging to Each Car Is Kept on a Separate Rack

Sash Handled with Racks and Lift Truck

AN EFFICIENT system for handling car windows while the cars are undergoing repairs or are being painted has been in use for some time in the Harvard shops of the Cleveland Railway. As the windows are removed from the cars which are being stripped in preparation for washing and painting, they are loaded on a rack as shown in an accompanying illustration. A hydraulic lift truck is then run under the loaded rack and the two units are transported ensemble to the paint shop from the wash house. The car number chalked on the rack identifies the sash.

The loaded racks are lined up in a space provided for them in the paint shop as shown. They are then taken from these racks, cleaned, painted and stored in drying frames. When the paint has dried, the sash is replaced on the same rack, when the lift truck is again brought into play to transport the refinished sash to the car.

For this purpose about eighteen racks are employed with but one truck to move them about. Steel angle irons form the vertical and horizontal members of each frame, to which is bolted an inner wooden rack. They were built in the railway shops.

Underwater Coal Storage in the Twin Cities

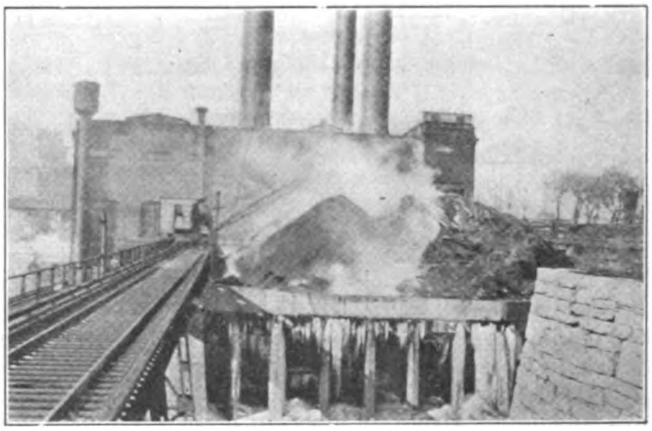
Reserve Supply for the Railway Power Plant Is Stored in Two 14,000-Ton Reinforced Concrete Bins to Eliminate Fires from Spontaneous Combustion

THE storage of coal under water in concrete pits constructed for that purpose to eliminate fires from spontaneous combustion has been resorted to by a number of public utility companies and other large coal users. Up to several years ago the Twin City Rapid Transit Company, Minneapolis, Minn., was caused considerable trouble and much expense because of fires that broke out from spontaneous combustion in its huge piles of stored coal. Although most of the coal never reached the actual ignition point, there was a marked deterioration in its calorific value because of the heating. These difficulties have been largely remedied by the construction of two concrete storage bins.

The power plant itself is so located on the lower river bank, only a few feet above the level of the Mississippi, that it is hemmed in on two sides by the steep embankments which rise to the upper ground level. When ordinary storage methods were followed space limitations meant that often the coal had to be piled higher than was known to be safe.

One of the 14,000-ton bins was constructed in a small space on the east side of the power plant. The reinforced-concrete structure, which is completely above the ground, is basin-shaped and is supported at the outer edge by vertical concrete columns. The bin is divided into four compartments, each of which can be flooded and filled separately. The loaded coal cars are shunted onto a trestle, level with the top of the bin, and by means of a locomotive crane the coal is unloaded and dumped into the bins, which are previously filled with water. The coal is removed with this same crane and dumped into a hopper at the junction of the four partition walls. From the bottom of the hopper a belt conveyor carries the fuel to bucket conveyors, which elevate it to the bunkers.

The construction of the storage bunker on the north side of the plant is quite different, for its shape and size were determined by the space available between the wall of the power station and the embankment. The far side of the bin, which has a 45-deg. slope, is built like a mat on the excavated earth of the embankment while the bottom rests on a strata of rock. Since the building wall, constructed of stone and mortar and designed to support only a compression load, had to be utilized as one side of the bin, further reinforcement against the lateral forces had to be provided. This was done by supporting the wall at eight points with buttresses which extended through the wall and onto the boiler room floor for a distance of 7 ft. at their base. The upper end of each buttress is secured to the wall of the bin with tie rods, while the actual weight of the wall is transferred to the building wall by means of concrete dowels. This bin has an average depth of about 30 ft. and is not subdivided.



Reinforced-Concrete Bin for Storing Coal under Water at East End of Twin City Power Plant

The loaded cars can be dumped directly in the north bin from a track which extends along the station wall. It is an extension of the spur which goes over the main receiving hopper and into which the coal to be conveyed directly to the bunkers is unloaded. The coal is reclaimed by the locomotive crane, which dumps it into the regular receiving hopper. Since the range of the crane is limited, sometimes it must make several operations to transfer the coal up to the hopper located at the northeast corner of the building.

The accompanying view, which shows considerable steaming, was taken during zero weather, when the evidence of such a condition is most pronounced. At that time there was probably as much coal stored above the water line as below owing to the large reserve that had been accumulated. This, of course, is an abnormal condition and has the same effect as though the coal were piled on the ground at a height equal to its depth above the water level.

Switch Easements and Frog Standardization

Some Observations Regarding the Difficulty of Specifying Special Trackwork Curves That Will Suit all Conditions

By S. Striezheff
Department of Way and Structures
Brooklyn Rapid Transit System

The fact that the committee on way matters of the American Electric Railway Engineering Association, at its May meeting, took no action with respect to standardization of branch-off frogs spurred the writer to set down a few pertinent observations on frog standardization in particular and of A. E. R. E. A. switch easements in general.

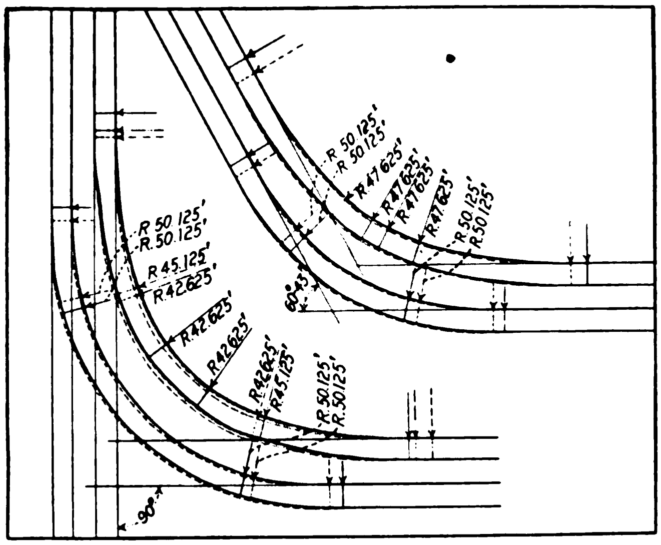
While the idea of possible standardization of frogs is in itself a very good one, the method suggested in Appendix A of the A. E. R. E. A. 1921 report, i.e., the insertion of a "closing" radius between easement and inner radius so as to take care of different gages and devilstrip widths, is inconsistent. It does away entirely with uniform curves, rendering meaningless Appendix C of the same report, as well as the 1920 report with regard to Type A easements. Study of Appendix A demonstrated to the writer the disadvantages of this method of frog standardization and rendered him skeptical as to the advantages stated on page 76 of the report mentioned.

That the alleged saving of 50 per cent in the total number of frogs cannot be realized is evident when we consider the relative amounts of special trackwork purchased during a given time by different street railway companies. For example, take on one hand a large system having a standard gage and practically uniform track centers, and on the other the small units of odd gage and varying track centers running through the boroughs of Squeedonk and Toonerville. In general, why should a large system such as the Brooklyn Rapid Transit, for instance, adapt itself to the physical and pecuniary limitations of the Gopher Prairie single-track transportation units?

The report itself contains the following statement: "In the matter of interchangeability of frogs on any one street railway system having only one distance between track centers, the proposed standardization scheme offers little advantage."

So much for standardization. As to the A. E. R. E. A. easements in general, they present no improvement on easements or spirals in use. The outline of a 200-ft.-radius A. E. R. E. A. Type A switch easement is practically the same as that of Lorain switch spiral No. 3. Even if there were some slight difference it would hardly be worth the effort to secure it. As a way engineer recently said to the writer: "What is the use of all this theorizing in surface road special work? Thirty days after installation all your theory is wiped out!" A prominent American engineer, after his return from service overseas, said that in France they were continually installing curves of plain radius and that the cars going over them would after a while work out a spiral for themselves at each end of curve.

As far as Brooklyn is concerned Appendix C of the 1921 report could just as well never have been included, as it simply does not and cannot suit local conditions. The main feature of this appendix is the insertion of an intervening long radius between the 200-ft. switch radius and the spiral easement (for greater car clearance), thus increasing the ex-secant and bringing the curve almost onto the sidewalk. This limitation was recognized by the proponents of the appendix and they suggested for Brooklyn the 200-ft. switch easements A, and furnished a set of possible double-track branch-off curves. Unfortunately this was a hybrid solution of the problem, following neither the 1921 Appendix C nor the 1920 A easements, on account of the insertion of the "closing" radius for that much coveted but as yet unrealized frog standardization. Further consideration has caused these suggested curves to be laid aside, at least for the present.



TRACK CURVES OF DIFFERENT DESIGN DRAWN FOR COMPARISON OF A. E. R. E. A. EASEMENT SPIRALS AND THOSE IN GENERAL USE

In both sets of curves A. E. R. E. A. easements at ends of curves are indicated by full lines (as well as the joining central radius curves). Dash lines represent curves of same central radius with Lorain spiral easements at ends.

Dotted line curve in 90-deg. intersection has central radius 2.5 ft. longer than full line curve in same location but approximately same ex-secant due to Lorain spiral easements at ends. Thus, dotted inner curve with dash-line outer curve presents same situation as full line inner and outer curves, both for car clearance and area occupier.

The accompanying diagram shows the lack of advantages in the A. E. R. E. A. easements and also brings out some of their disadvantages. For instance, in the 90-deg. branch-off, the Lorain spiral No. 3, with 150-ft. radius switch, allows for a longer central radius without practically any increase of ex-secant, thus assuring a longer life to the curve. The entire branch-off, shown in full lines, with 200-ft. radius A. E. R. E. A. switch easements A in the inner curve and 100-ft. radius easements in the outer curve required about 13 ft. of special trackwork more than the inner curve (shown by the dotted line) of longer central radius and the outer curve (shown by the dash line), with Lorain spirals Nos. 3 and 2 respectively. Yet these last two involve the same conditions as far as car clearance and area occupied are concerned.

In conclusion, while the writer sees no advantage in either the Type A switch easement of the 1920 report or in those of Appendix C of the 1921 report, he recognizes the difficulty of the subject of possible frog standardization and admits the great desirability of such standardization. He fails, however, to see how the method suggested in Appendix A can improve matters to any extent.

What's New from the Manufacturers

Transformer Load Indicator

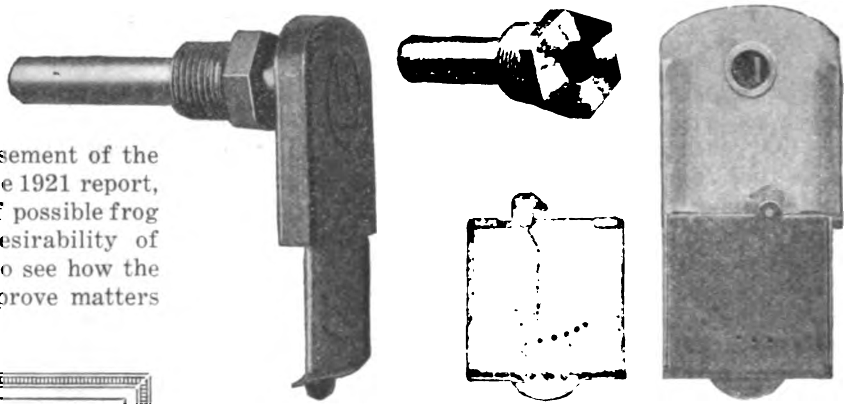
A TRANSFORMER load indicator is being manufactured by the Westinghouse Electric & Manufacturing Company. The indicator is made for mounting in place of the drain plug or, preferably, in the side of the tank wall a few inches below the oil level in a distribution transformer for the purpose of indicating whether any predetermined temperature of the transformer has been reached or exceeded. When the predetermined temperature has been reached, a yellow semaphore, or flag, drops into view to indicate the fact. Since the flag is of a distinctive color, and has an area of about 2½ sq.in., it can be readily seen from the street by a watchman.

The most important use for this device is to indicate when a transformer is overloaded, but it can also be utilized to determine whether transformers operating in a bank or in parallel are properly dividing the load. Underloading can also be detected by setting the indicator to trip at a low temperature, failure to trip at this low temperature being an indication that the transformer is underloaded.

The load indicator consists in general of two parts—the indicating mechanism and the plug. The plug portion replaces the regular transformer drain plug or the special plug now being provided in Westinghouse distribution transformers a few inches below the oil level, and it can be inserted in the transformer tank either in the storeroom or on the line. The pipe is a tube closed at the inner end and enlarged to a standard pipe thread with a hexagonal nut at the outer end. The tube, when in position, is surrounded by the transformer oil.

The indicating mechanism consists of a base plate, tube, bimetallic strip, flag, adjusting rig and cover. The tube fits the inside of the plug and has a threaded piece at the end which engages the nut in the end of the plug. By means of this threaded piece, the indicating mechanism can be inserted in the plug with a turn or two after the transformer is hung and can then assume a vertical position without danger of falling out.

The bimetallic strip is set in the end of the tube while the free end, projecting beyond the end of the base plate, latches the flag in position. The flag is held until, through an increase in temperature, the bimetallic strip bends enough to unlatch it; then it drops by gravity. The top of the flag is bent over and, after dropping, engages the bottom of the base plate, which is bent upward. The flag is reset by simply pushing it back in place.



At Left, Transformer Load Indicator. At Right, Dissembled View of Transformer Load Indicator Showing Yellow Flag in Tripped Position and Method of Obtaining Different Trip Settings

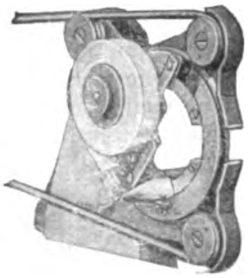
The indicator can be set to trip the semaphore at any predetermined temperature within the range of adjustment by setting the trigger.

The indicator responds to the temperature of the oil in which the plug is immersed, and since the object is to have the signal trip when the hottest part of the winding has reached a temperature of 105 deg. C., it is necessary, in setting the pointer, to allow for the difference between the temperature of the hottest part of the winding and the temperature of the oil at the top or bottom of the tank where the indicator is placed.

For average operating conditions, it will generally be found satisfactory to set the indicator to trip when the oil at the top of the tank reaches a temperature of 80 deg. C. or when that at the bottom of the tank reaches a temperature of 70 deg. C. In setting the indicator, however, consideration should be given to the individual temperature characteristics of the transformer on which the indicator is mounted.

New Armature Coil Taping Machine

THE P. E. Chapman Electrical Works, St. Louis, Mo., has brought out a kickless self-feed armature coil taping machine. It is claimed that this machine takes the "kick" or pull of the tape off the operator, so as to make operation easy. The operator, however, guides the coil and operates the machine in a similar manner to a plain taping machine. The machine has no gears, cams, belts and requires no setting up for a job. The self-feed allows the operator to increase or decrease the lap at will and while running. The machine is claimed to be economical in the quantity of tape used and will make a smooth and neat coil of uniform size.



Armature Coil Taping Machine

Securing the Maximum Benefit from Energy-Saving Devices*

The Author Has Brought Together the Experiences of Twenty Railways Using the Three Types of Devices for Measuring Energy and Power-on and Coasting Times—A Summary of Follow-Up Methods and Figures on Instrument Maintenance Are Presented

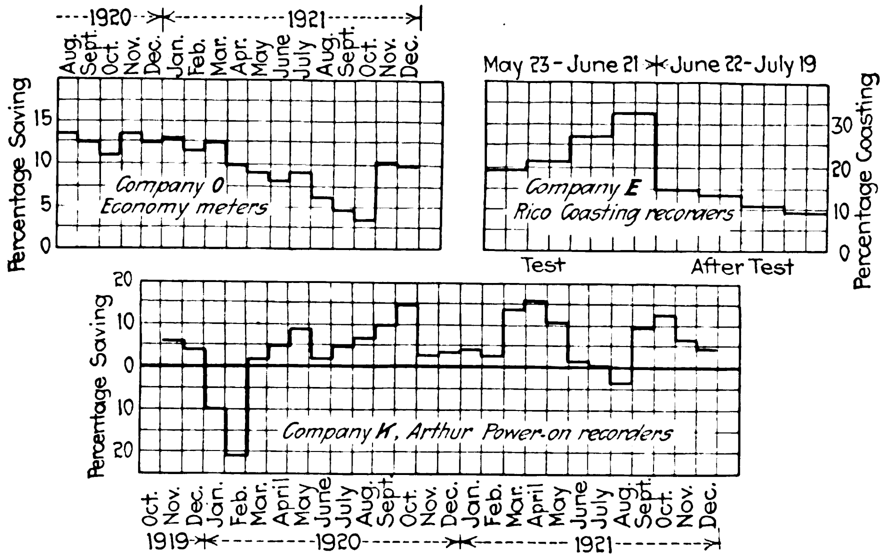
By Frank H. Miller
Vice-President Louisville (Ky.) Railway

THERE are now on the market three power-saving devices that have reached a successful and acceptable state of perfection. These are the Rico coasting recorder, the Arthur power-time recorder and the Economy kilowatt-hour meter. The basic principle and method of operation of each of these devices are well known to all electric railway operators. The number of properties using energy-checking devices of one form or another is sufficient so that considerable data are available on the savings their use has made possible. It is the magnitude and nature of these savings in which we are particularly interested.

This paper is based on information obtained from twenty railways using energy-saving devices. Six of these have installed the Rico coasting recorder, seven the Arthur power-on recorder and seven the Economy meter. All these companies report uniformly that these devices are effective in saving energy, and generally agree that the saving up to a certain point is almost proportional to the amount of time devoted to the instruction and follow-up of the operators of cars equipped with such devices.

A résumé of the outstanding advantages as received in answer to the twenty questionnaires is tabulated in Table I. This table shows the number of meters installed on each property, the date the instruments were placed in service, the advantages of the devices according to the experience of each operating manager, the number of clerical employees required per one hundred devices, the methods used to arouse and stimulate the interest of the platform men and the annual maintenance cost. The great interest of operating men in the subject of power saving is indicated by the complete and valuable information furnished. Many interesting practices were described in the replies and almost every one mentioned other advantages that had accrued from the use of power checking devices besides the main one of energy saving.

For instance Company "A" states that men with a high coasting percentage seldom have an accident. The report of Company "C" shows that both preliminary tests and later experience indicate that a 1 per cent increase in coasting is equivalent to a saving of 1 per cent in energy. Prior to the installation of coasting clocks secret checks of motormen's performance revealed an approximate coasting average of 20 per cent, and following the use of clocks as high as 30 per cent was secured. In regard to the interest taken by the men in energy saving, Company "D" estimates that 15 to 20 per cent of the motormen, especially the "high coasters," actually check their own coasting time daily. The operator of Company "E" made the statement that any device which the motorman knows is accurately checking the energy consumption will be the means of reducing it until a reasonably low value has been reached.



GRAPHS FROM THREE PROPERTIES EACH USING A DIFFERENT ENERGY SAVING DEVICE

The decreased saving of Company "O" during the last half of 1921 was probably due to the increase in passengers per car-mile. Company "K" stated that the variation in the amount of saving was undoubtedly caused by the difference in supervision.

A feature of the coasting recorder is brought out in the statement of Company "F":

> The principal advantage of the coasting recorder as a power saver is that it emphasizes that phase of operation, i.e., coasting, which is one means of saving power. It is, however, subject to the objection that the results have no absolute relation to the kilowatt-hour saving. In one way this is an advantage because it is unnecessary to take into account the characteristics of the motor equipment or of the loading in order to obtain a measure of what has been done by the motormen to save power.

A user of the power-on type of device, Company "G," emphasizes the simplicity of the record keeping system as a distinct advantage:

> We regard any type of power saving device as merely a method of educating motormen. No device, in our opinion, is of any use unless it is carefully followed up. The Arthur power-on recorder permits this follow-up and educational work to be done in a simple and effective manner. Perhaps its most marked advantage is that it permits a simple system of record keeping, since it is not necessary to classify different types of car equipment to any appreciable degree.

In regard to offering prizes this company adds:

> We are strong believers in the need of keeping up the interest of the employees by some sort of prize or bonus system. In the beginning we worked out a scheme which experience has shown to be quite satisfactory. We set a standard on each line for the motormen to work toward. All men who do better than the standard receive a small prize. The man who heads the list on each line receives $5 at the end of each three-month period. The man who takes second place receives $3, and a $2 bonus is given to all others who have done better than the standard. We find it much better to offer a large number of small prizes rather than a few relatively large ones, as more men are kept interested.

Company "H" was pleasantly surprised with the effect of power saving on the life of equipment:

> When we first considered putting on power-time recorders our mechanical department was under the impression that in the efforts to save power the car equipment would suffer. It was gratifying to receive recently a report from our superintendent of rolling-stock and shops entirely justifying our installing these recorders and in which was made the rather broad statement that the improved way in which our rolling-stock was being handled was prolonging the life of car equipment considerably.
>
> We have effected a saving of roughly between 12 and 14 per cent, principally during the last year and a half when working conditions have been improved and we have been able to carry on our power saving campaign more intelligently.

The prize system for encouraging the maximum power saving is employed quite extensively. Company "I" states that a standard "power-on period per hour" for each line is set and all operators coming within this limit are given a premium of $2 a month. Companies "J" and "K" keep up the interest of their platform men by a scheme similar to that of Company "G" except that the prizes are awarded on a six-day week instead of a three-month basis and are of one-half the amount. The motormen of Company "M" are grouped by lines and a weekly list posted in each depot showing their names arranged in the order of their "power-on minutes per month" record. The supervisor of power saving and his outside man are in constant touch with the supervisory force and the

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*Abstract of paper presented before the Central Electric Railway Association, June 25-30, on board *S.S. South American*.

TABLE I—INFORMATION FROM VARIOUS ELECTRIC RAILWAYS REGARDING CURRENT-SAVING DEVICES

Company	Type of Device	Number of Instruments	Time of Installation	Advantages of Device	Number of Clerical Employees per 100 Devices	Methods Used to Keep Up Interest	Annual Maintenance per Instrument
A	Rico	1,350	1915-1921	Makes a man "think." Reduces accidents. Checks schedule, equipment and men	1.5	Four instructors who devote all their time to this work	Not stated
B	Rico	369	1917	Unit (minute) used is familiar	1.286	Bulletins, six coasting instructors, individual motormen's records. "Follow up" by official interest	$1.80 first year, $1.76 second year, $6.30 third year, $7.60 fourth year
C	Rico	600	1916	Checks motorman on proper use of power and brakes	.5	Semi-monthly bulletins	$3.40
D	Rico	600	1917-1918	Checks individual operating efficiency of each motorman	1.25	Cash prizes	$6.66. Average of four years $1.50-$2 higher than normal due to strikes of trainmen
E	Rico	348	1913	Moral effect on motorman	2.0	Compliment motormen. Bulletins and published records issued	$10.40 in 1921
F	Rico	201	1911	Emphasizes coasting	1.3	Monthly bulletins giving percentages of various men	$25.00
G	Arthur	1,466	1917-1918	Mechanically and electrically simple. Costs less. Checks faulty brakes and equipment. Records simple	.204	Individual record in pay envelope. Bulletins posted. Number of small cash prizes	$1.80
H	Arthur	1,100	1919-1920	Reduces power consumption. Prolongs equipment life. Promotes more safe operation	.5	Monthly bulletins	$0.50
I	Arthur	34	1920	Records time in minutes for power on. Moral effect on car operator	.3	Monthly prize of $2 to all operators who come within a certain standard	$0.50
J	Arthur	388	1920	Simplicity, low maintenance cost, ease and economy of record keeping	.6	Power-saving inspector. Distribution of cash prizes every six weeks	$0.08 first year
K	Arthur	282	1919-1921	Low first cost. Low cost of maintenance and record keeping	1.0	Cash prizes, and constant supervision by inspectors and foremen	$0.15
L	Arthur	170	1915-1920	Power saving of 10 per cent	.85	Cash prizes and constant instruction	Not stated
M	Arthur	1,400	1920-1922	Permanently accurate, low first cost, reliable, rugged and simple. Units used familiar to trainmen	.57	Weekly bulletins. Close supervision, and fostering of competition and rivalry among men	$2.04
N	Economy Meters	330	1919	Provides means for comparing men, and different types of equipment on the same or different lines	...	Bulletins and instruction to less efficient	$1.02 in 1920. $2.68 in 1921
O	Economy Meters	450	1919-1922	Comparison of men. Checks up equipment	1.0	Semi-monthly bulletins, and "follow-up" instruction	Not stated
P	Economy Meters	106	1920	Operators can observe power consumption, meters are simple, sturdy and reliable. Inspection dials are valuable for car inspection	1.0	Bulletins. Short competitive efforts. Constant supervision and instruction	$1.20
Q	Economy Meters	109	1920	Positive measure of power consumption	1.0	Supervision by power-saving inspector	$2.70
R	Economy Meters	539	1919-1921	Measure saving in units desired. Measures power consumption at car. Inspection dials. Rugged and simple	1.0	Competitive spirit. Bulletins. Constant supervision and interest of officials	$1.44
S	Economy Meters	120	1915-1920	Measures energy consumed at the car	1.0	Weekly bulletins. Constant supervision	$2.90
T	Economy Meters	309	1922	Measures power consumed at the car. Meters simple, sturdy, and reliable. Inspection dials valuable for car inspection	1.0	Semi-monthly bulletins. Supervision by inspector	Installed in 1922

motormen, and keep the matter of power saving a live issue by fostering a desire among the motormen to head the list. The matter of some form of bonus for a high standing is under consideration.

When we come to the reports of railways using Economy meters we find that there is almost no end to the constructive interpretations that can be placed on the actual kilowatt-hour consumption of a car as measured by this type of instrument. Company "N" remarks that the meters are of considerable value in providing comparisons of power consumption of different types of cars or of the same car on different lines. In regard to conducting the power saving phase of car operation this company adds:

> Occasional bulletins are posted and the interest of the men is further kept up by sending out lists showing comparative standings. These lists do not show the names of the men but simply the records with a check mark opposite the record of the man receiving it. Those using excessive power are instructed further in the proper method of handling equipment, and those who constantly remain near the top of the list are sent letters of commendation by the general superintendent.

Company "O" finds the principal advantages of Economy meters as follows:

> They make it possible to publish a fair relative ranking of motormen for each class of run on each route. The relative ranking, together with the follow-up instruction after the novelty wears off, stimulates the motormen to maintain a standard of economical operation.
>
> The meter detects at once any mechanical defects which increase power consumption, such as tight brakes and defective motor wiring.

TABLE II—PER CENT POWER SAVING OF COMPANY "T" COMPARED WITH BLIND PERIOD

			Divisions					
			I	II	III	IV	V	VI
1922		Number of Meters Installed	17	27	23	21	32	69
Week Ending		Blind Period—Weeks	2	1	1	1	1	2
January	30		7.44					
February	6		11.98					
	13		12.40					
	20		12.80					
	27		11.57					
March	6		11.98					
	13		11.98					
	20		13.22					
	27		12.80					
April	3		11.57					
	10		10.33					
	17		7.02					
	24		9.90	12.90				
May	1		9.10	7.60	10.10			
	8		10.70	9.12	6.36	11.55		
	15		11.60	9.87	8.60	10.13	5.75	
	22		10.70	11.40	10.50	14.40	5.14	
	29		11.57	9.50	10.80	15.60	5.43	
June	5		9.90	9.50	13.85	15.90	8.75	8.34
	12		8.68	9.12	12.35	15.60	9.37	8.04
	19		9.50	8.75	11.20	15.3	6.35	8.34

Several additional points are brought out by the statement of Company "P":

> The meters are simple, sturdy and reliable. Operators have faith in their accuracy. They require but little attention and that from an ordinary electrician. Much valuable data can be compiled from the meter readings. By the use of the inspection dials the shop men can see at a glance whether or not the car is due for inspection.

This company keeps up the interest of the men by comparative reports displayed in the train rooms and with inspirational, informative and educational matter printed in the employees' magazine. Occasional special competitive efforts of short duration help maintain discipline. It is their idea to make power saving an incidental but steady part of each man's work.

Among other advantages, the operator of Company "R" mentions that of getting a measurement of energy at a point not otherwise obtainable so that it is possible to segregate definitely the distribution losses. This company also encourages the motormen to report promptly those faults of the car equipment which would increase energy consumption. The manager of the property takes an active personal interest in the correction of these defects and also rides frequently with the motormen to discuss the ways and means of saving power.

The experience of Company "T" with Economy meters is shown in Table II. The meters were first placed on one division for a trial period of two months. After the initial test meters were ordered for the other divisions of the company and were installed at intervals of one or two weeks as indicated in the tabulation. A rather marked difference in the saving from week to week will be noticed. In analyzing these variations it was found that fluctuations in the number of passengers carried materially affected the percentage of energy saving.

Relation of Car Ventilation to Passenger Comfort*

Volume of Air Required for Desired Refreshing Effect Greatly Exceeds That Necessary to Supply Chemical Needs—Exhaust Ventilators with Arch-Type Roof Entirely Practical, Utilizing Leakage as Fresh Air Supply

By W. McK. White

President White Manufacturing Company, Goshen, Ind.

PROPER car ventilation is a vital necessity to every electric railway as one of the factors for securing public good will and increased traffic. To be sure, it is a sanitary problem affecting public health. The era of considering the pleasure and comfort of passengers is at hand. An electric railway cannot sell its service to the best advantage by subjecting its customers to unpleasant surroundings. Executive and transportation officials are constantly reminded of ventilation by popular sentiment, and those in charge of equipment have accorded the subject some investigation. I think, however, that far too many cars are ventilated in a haphazard manner due to many conflicting theories causing car designers and operators as a last resource to take a chance on some simple means, which may produce ventilation, though actually it may be inadequate.

Scientific study has given some data on the proper content of air in steam railroad coaches, on the frequency with which the air must be changed and on the relation between heating and fresh air supply. I am quoting frequently herein from bulletins published by Dr. Thomas R. Crowder, who conducted a number of extensive tests for the Pullman Company. The further these investigations progressed, the more pronounced became his opinion that the question is one of psychology and physics rather than one of chemistry.

The first recorded attempts to study air in railroad cars were made in 1875 by Wolfhugel and Lang. The next inquiries were instituted in 1878 by the Prussian Minister of War to learn the best methods for ventilating hospital cars. In about 1893 the Massachusetts Board of Railway Commissioners had tests made in passenger coaches and at the same time the Pennsylvania Railroad opened the subject. In 1894 the Master Car Builders' Association made an extended report and published analyses of air from sleeping cars, chair cars and suburban coaches. In 1904, Dudley of the Pennsylvania System issued a report on a number of experiments in analyzing air from coaches ventilated by the excellent plan which he devised.

A Problem of Circulation, Not of Air Purity

The results of all these studies show that steam railroad cars with standard exhaust ventilators average a lower carbon-dioxide content than restaurants, offices and stores, and that the main problem is one of circulation, not of air purity. It is not my purpose to include the mathematical data recorded in these tests because they all prove that the necessity for ventilation does not arise from a poisoning of the air by products of respiration. It is rare for the carbon dioxide so produced to contaminate the air of any room, even with the poorest ventilation, to the extent of more than fifty parts in ten thousand, or one-half of one per cent. That amount is entirely harmless. The limit of allowable carbon-dioxide content is variously placed at from ten to fourteen parts in ten thousand and is that degree at which the sense of smell gives indication of closeness to one entering the room. The averages of steam railroad cars with adequate exhaust ventilators were shown to be within this limit, but the average of electric railway cars examined exceeded this ratio.

An interesting series of tests conducted by Dr. Crowder showed the following contents of carbon-dioxide in parts per 10,000:

Sleeping car, lower berths	6.96
Stores	8.80
Steam railroad day coaches	9.38
Elevated railway coaches	13.90
Offices	13.91
Suburban railway cars	14.30
City street cars	15.10
Restaurants	16.10

It is a comparatively simple matter to supply enough sufficiently oxygenated air to any railway car. In fact, the more usual difficulty is encountered in letting too much in. The really important problem is to govern and regulate the air movement within the car. Relatively small amounts of fresh air will supply the chemical needs of the body whereas large amounts may be required to satisfy the physical demands.

To the average person fresh air is that which cools the body. Its so-called freshness depends upon its ability to remove body heat and is not affected by richness in oxygen or absence of poisonous gases. Partially vitiated or devitalized air will not be criticised by passengers if it is stirred up. Of course this statement is not to be construed as an excuse for poor ventilation but is in explanation of the fact that surface absorption is most important in its effect on bodily comfort. Moreover, the simple stirring up of air on a line patronized by "unwashed" passengers is not sufficient to eliminate objectionable odors.

An average adult produces enough heat in about an hour to raise the temperature of 1,000 cu.ft. of air 15 to 20 deg. F. and this heat must be absorbed to keep the person cool and comfortable. If the air is still the effect is depressing. When people crowd together in restricted space they soon overheat the air. Either fresh air must be supplied or the air must be put into motion. It is evident that air movement in a car is more important than its purity and its temperature is more significant than its carbon-dioxide content. Proper renewal assures healthfulness, but this renewal of the interior air must not cause chilling drafts nor "short circuits" in certain parts and the methods for securing this circulation must prevent entrance of dirt, side drafts, rain or snow.

Use of Monitor Roof Proves Need for Ventilation

The use of the monitor roof is an admission of the need for ventilation. It was the first attempt and yet many railways, both steam and electric, retain this primitive means for obtaining good air by the use of deck sash. The deck sash should rapidly be discarded as a car ventilator. Sometimes the open sash permits large volumes of air to enter, often very little. Sometimes it acts as an outlet but offers no as-

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*Abstract of paper presented before the Central Electric Railway Association, June 25-30, on board *S.S. South American*.

sistance toward removing warmed air from below. When acting as an intake the large opening permits undesirable downward drafts and in stormy weather, when ventilation is most needed, the deck sash must be closed. Thus no dependence can be placed on such ventilation and no railway with such a handicap can sell satisfaction to passengers.

On the other hand, the monitor roof can be readily adapted to give highly efficient ventilation by the installation of a number of exhaust ventilators. This can be done at a moderate expense because standard size ventilators can be obtained and mounted on wood or metal panels to fit in the deck opening. They may be applied to the outside and the sash used to open or close the ventilator aperture. Several well-known electric railways have thus modernized their equipment in this respect. One of these is the Indiana Public Service Corporation. Arthur W. Redderson, superintendent of equipment of that company, states that it was done at a cost of only $10 per car in addition to the cost of the ten ventilators. The satisfactory result is best shown by the popularity of these cars.

There are many railway men who prefer monitor roof cars either because of personal preference or to harmonize with railway standard design. On new equipment the exhaust ventilators can be used advantageously and there are several successful ventilators for such application. No superintendent of equipment need consider the selection of any one of them a life and death matter.

ARCH-ROOF CONSTRUCTION DEPENDENT ON EXHAUST VENTILATORS

Effective ventilators have made the arch-roof car possible. In other words, arch-roof cars would be exceedingly unsatisfactory were it not for successful car ventilators. It takes no argument to prove this because a short ride in an arch-roof car with ventilators closed soon gives adequate demonstration. The importance of ventilating an arch-roof car requires that an efficient eductive car ventilator should be applied. But let me caution you that a hole in the roof, with protection against rain and no assurance of exhaust action, is not sufficient.

Prior to the perfection of storm proof ventilators it was always thought necessary to install regulators and this is still a general custom. I believe, however, that a regulator or register is not always necessary or advisable. Careful scrutiny shows that usually these registers are closed and thus the good provisions for ventilation are made useless. Control of ventilation is thus transferred to whims of conductors and passengers.

If a car is equipped with sufficient ventilators for average or nearly maximum traffic and heating apparatus of properly related capacity is installed, it is far better to omit controlling mechanism. There are several exhaust ventilators which will not admit rain or aid winds and consequently do not have to be closed in stormy weather. Even in cold climates this plan is followed. The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was one of the first properties to omit registers and that city has exceedingly cold winters. The Chicago Surface Lines was one of the early users of exhaust ventilators without control.

I have frequently used the term "exhaust ventilators" and may explain this in approaching the matter of intakes, by stating my conviction that exhaust ventilators are the most satisfactory. Due to car construction and the physical action of warmed air in rising, it is necessary to withdraw this air in proximity to the roof. I further believe that you cannot take air into and out of a car at the same place without causing short circuits of air currents and with no assurance that the incoming air will have time to drop into the breathing zone before being withdrawn. That such short circuiting does take place was shown in tests, where by actual measure some 80,000 cu.ft. of air per hour was leaving a car through the exhaust, although carbon dioxide computations showed only 40,000 cu.ft. being supplied to the breathing zone.

Undoubtedly the ideal plan for car ventilation embodies a properly arranged system of intakes, preferably with distributing ducts. Frequently car construction complicates such a layout. For many years those seeking adequate ventilation depended upon leakage for supply of outside air. We now have metal sash, weather strips, storm windows and tight construction to decrease leakage, but steam railroad tests indicate that in the tightest cars the crevices still provide adequate intake.

Dr. Crowder measured 30,000 cu.ft. per hour passing out through the ventilator duct of a small stateroom with door and windows tightly closed so that the air must have found its entrance through crevices. Pettenkofer showed that when all visible chinks in a room were closed, the rate of ventilation was decreased only 28 per cent as compared with the rate when doors were closed in an ordinary way. There is no difficulty with an open fireplace draft when a room is closed, though each pound of fuel consumed causes some 2,600 cu.ft. of air to pass up the flue. Few inclosures are so fully provided with crevices as a railway car and subjected to such high wind velocities and pressure. With an average of some 500 lineal feet of crevices only 0.01 in. wide, over 20,000 cu.ft. of air could enter in an hour.

If this leakage is not too great it is a satisfactory intake as the air quickly mixes with warm currents from the heaters. The doors of cars in city service are opened frequently but on interurban cars either leakage or designed intakes must balance the action of the ventilators. Those heating systems which circulate warmed air meet this requirement but are usually installed on city cars only, perhaps because they supply heated fresh air on one side only.

I do not know of any instance of air intakes with distributing ducts of both sides of an interurban car using hot water heat. The Pennsylvania Railroad has used a system similar to this for several years on all-steel coaches, but these coaches can be supplied with large quantities of steam, whereas on an interurban car the water has to circulate in limited pipeage. It must not be cooled near the entrance to the passenger compartment so much as to withdraw its heat and leave only cold water in the pipes on one side of the car.

AIR LEAKAGE SUFFICIENT ON INTERURBANS

Consequently the air intake problem on interurban cars is still awaiting solution. My feeling is that leakage must take care of these cars, if not overdone, and will be adequate because there is less crowding on them and they require a higher degree of maintained temperature. It would be inadvisable to establish the practice followed on steam coaches and sleeping cars of dropping the end-door windows, because the draft would be unheated and too direct on those sitting in the rear. Furthermore, whenever the car is stopped the area of low pressure in the rear of the moving car, which tends to withdraw air from the body, is equalized and causes a strong inrush of air from the rear toward the front.

The requirements of a good ventilator are efficiency, protection against storm and side winds and ease of application. There are a number of accepted types, usually either round, box, honeycomb or ejector, and their producers have been diligent in experimentation in the laboratory and in service to increase their efficiency. They have given deep study and have spent large sums in endeavoring to solve the question of proper ventilation. In their behalf I must say that this work has sometimes been rendered difficult due to deep-seated opinions held by operating men who would defend their individual ideas rather than accept the experience of ventilating engineers delving into this problem.

I feel that little hesitancy need be had in accepting many of the well-known car ventilators on the market. They are designed so that the movement of the car produces a partial vacuum in the passage to the car body and considerable volumes of air can be withdrawn. One series of tests showed the following capacities in cubic feet per hour per ventilator:

At 5 miles per hour	5,700 cu.ft.
10 miles per hour	10,900 cu.ft.
20 miles per hour	20,200 cu.ft.
30 miles per hour	31,700 cu.ft.
40 miles per hour	41,300 cu.ft.
50 miles per hour	52,700 cu.ft.
60 miles per hour	64,200 cu.ft.

Another type showed 4,600 cu.ft. per hour at 5 m.p.h.; 16,900 at 10 m.p.h.;

34,300 at 20 m.p.h. and 54,300 at 35 m.p.h. Another type suitable for steam or interurban coaches registered as high as 99,000 cu.ft. per hour at 60 m.p.h. Velocity tests showed that air was withdrawn at a speed very nearly half that of the car. These figures were laboratory tests and in service experiments it was found that a reduction of 30 per cent would accurately represent their capacities. Much computing has been done on the amount of air which should be moved through a car and the simplest figure mentioned is 2,000 cu.ft. of air per person per hour. This happens to coincide with the amount necessary to carry off the hourly production of heat generated by the average adult and will maintain the requisite chemical purity.

The necessity for protection against the elements is apparent and the approved types of ventilators are arranged to prevent ingress of water. This is accomplished by baffle plates which hardly interfere with the air movement.

Admitting that car ventilation is desirable and required, it is evident from results obtained that present exhaust ventilators are entirely able to meet the demands of hygiene. But the success of car ventilation depends far more on supplying conditions suited to the outside of the body than to the inside of the lungs.

Gear Economies Through New Tooth Shapes*

Advantages of Long Addendum Pinions Possible Without Gear Changes with New "Wisdom Tooth"—Oversize Pinion Developed for Mating with Partially Worn Gears

By E. S. SAWTELLE
Assistant General Manager Tool Steel Gear & Pinion Company, Cincinnati, Ohio

FOR a long time stress has been laid almost exclusively on the development of quality of the steel used in railway gears, but in recent years more emphasis has been laid on tooth shape and the possibility of better gearing through design. Any proper design in tooth shape will give satisfactory service when new, but we must concern ourselves mostly with what happens when a partially worn condition is encountered. Until recently practically all railway gears had the Brown & Sharpe 14½ deg. standard tooth, excellent for smooth operation, with a full depth and therefore more wearing surface than the stub tooth, comparatively straight sided and therefore with minimum tendency for the gear and pinion to push apart. This tooth is a general standard easily interchangeable and almost universally used for industrial machinery. The chief objection to it was the fact that pinions with a small number of teeth were undercut in the flank, that is, the tooth was thin and liable to break near its root; also there was a tendency for this undercut condition to accentuate as the pinions wore. The first improvement used in the railway field was the 20 deg. stub, a tooth shorter in depth, therefore giving less breakage leverage, and having more slanting sides, therefore giving a broader base. This tooth has much strength and because of its lesser depth the pinion is strengthened somewhat against bursting, particularly where the bore is large and the pinion small. It was adopted as standard some years ago on the lines of the Interborough Rapid Transit Company, and numerous other lines with similar service.

The next development was the long and short addendum tooth, a type of gearing that for years has been used extensively in European countries, particularly Germany and Switzerland, and has been used for many years in bevel and automotive gear in America. Its application to the railway field was delayed primarily because it lacked interchangeability with old standards. This type of tooth is usually made with a 20 deg. angle which broadens the base and increases the strength. Further than this, by shifting the addendum, the pinion tooth, usually the weaker member of the train, is very decidedly strengthened and this is done without weakening the gear. By making the pinion oversize in diameter there is a gain in the amount of metal between the root of the tooth and the bore, which helps against bursting on thin pinions. This type of tooth when cut full depth shows rather thin at the top of the pinion tooth and as a remedy for this the tooth is sometimes stubbed. The stubbing process removes metal that would otherwise be worn away in service, hence has a tendency to decrease the life of the pinion, but it makes a more pleasing appearance.

To understand the signficance of the long and short addendum tooth, we will need to go slightly into theory. The involute curve is the base of practically all of our modern gearing as it represents the ideal curve of tooth contact when two gears are in mesh. Fig. 1 shows three left hand involutes generated from the same base. The section between the right and the left hand involute is a gear tooth, needing only the top trimmed off and the bottom shaped up to continue into adjacent teeth. The farther apart the involutes, the coarser the pitch and the less number of teeth in a gear of any fixed diameter. The full involute, however, is too long for practical use so a section is taken out of it for the individual gear tooth. If this section is close to the base line (Fig. 9), we have practically the straight sided tooth of very low pressure angle, used where there must be no thrust away between the gear and pinion. Coming up higher on the curve (B) we have the 1½ deg. pressure angle heretofore standard. Higher up (C) we have the 20 deg. tooth and to illustrate by an extreme case (D) we could build a gear with about a 30 deg. tooth and yet one that would have perfectly smooth action though of course with very heavy thrust and giving no service at all when considerably worn or used with bad bearings. High pressure angles therefore mean forming a tooth on the upper part of the involute curve, farther removed from the base circle. In a gear with many teeth slight changes in pressure angle are hardly measurable, but in a pinion with few teeth they are decidely noticeable.

Standard depth of tooth is purely an arbitary dimension. In Fig. 3 we have the full involute which runs to a point at the top. We first decide the pres-

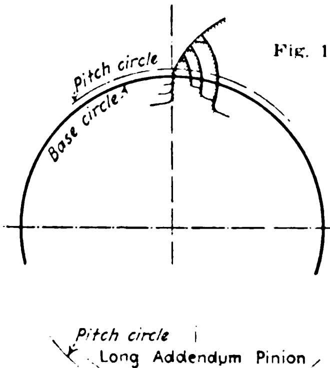


Fig. 1

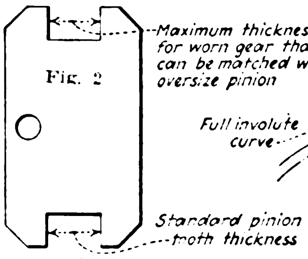

Maximum thickness for worn gear that can be matched with oversize pinion
Standard pinion tooth thickness

Fig. 2

Gage for Oversized Pinion

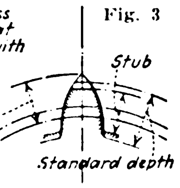


Fig. 3

Standard and Stub Tooth

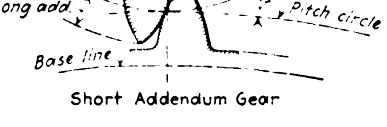
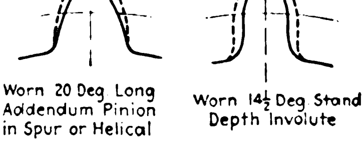


Fig. 4

Short Addendum Gear

Fig. 5



Worn 20 Deg. Long Addendum Pinion in Spur or Helical

Worn 14½ Deg. Stand. Depth Involute

FIG. 1—AN ILLUSTRATION OF HOW HEAVY AND LIGHT PITCHES CAN BE DEVELOPED ON THE SAME BASE CIRCLE. FIG. 2—GAGE USED WITH OVERSIZED PINIONS. FIG. 3—THE PRESSURE ANGLE DESIRED DETERMINES THE LOCATION OF THE PITCH CIRCLE. FIG. 4—LONG ADDENDUM PINION AND SHORT ADDENDUM GEAR. FIG. 5—EVEN WHEN WORN OUT THE LONG ADDENDUM PINION (LEFT) IS STRONG AT THE BASE

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*Abstract of paper presented before the Central Electric Railway Association, June 25-30, on board the S.S. *South American*.

sure angle we will use, this determining how high up we shall go on the involute curve to locate our pitch line. If we take a comparatively long section above and below this line, we have the full depth standard tooth. If we take a lesser section above and below, we have the stub tooth. If we take a greater section above the pitch line than we take below the pitch line, we have a long addendum pinion and when we build the gear to match it we must make it with a correspondingly short addendum.

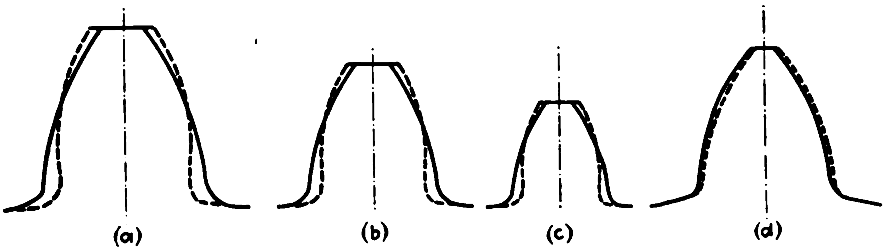

FIG. 6—CONTRAST OF WISDOM (HEAVY LINE) AND STANDARD TOOTH CONTOURS. ALL WISDOM TOOTH PINIONS HAVING ONE MORE TOOTH THAN THE STANDARD FOR THE SAME PITCH

(a) Interurban railway type; (b) city railway type; (c) safety car type; (d) identical shapes of 20-deg. long and short addendum and wisdom tooth.

In standard gearing the relative size of the tooth and slot is the same on each member. In long addendum gearing (Fig. 4) the teeth are made much longer on the pinion and project further beyond the pitch diameter On the gear the slot is deepened proportionately. Likewise on the gear mating with this pinion, the tooth projection is shortened and the slot in the pinion is correspondingly shallow. The amount of diversion in extra length and depth is optional with the manufacturer and he can build around any formula he desires. The longer the addendum on the pinion the more pointed it will be at the top of the tooth. The illustration in Fig. 4 takes an extreme lengthening of the pinion addendum to make the contrast between long addendum and standard gearing the more noticeable.

The long addendum pinion is preferable to the standard for the reason that it is a stronger pinion at the base, a thicker or "fatter" pinion at the pitch line and will in actual service permit twice as much steel being worn off the side of the tooth before rejection as is permissible with the standard 14½ deg. shape. This is illustrated in Fig. 5. When worn out, it is still a strong tooth at the base, whereas the old shape tends to wear to a weak tooth. This means that if a long addendum pinion and a standard pinion of equal quality are operating under identical service, the long addendum pinion, because of its tooth shape, will give approximately twice as much life. The gears running with these pinions will have about equal durability, in fact, only by accurate measurement can you distinguish between the short addendum and standard gear teeth form. There is no question whatever as to the desirability of the long addendum pinion for any service where gears and pinions are to be completely worn out before discarding. The only drawback is the seriousness of changing over from the old standard to the new.

The "wisdom tooth" pinion was recently brought out to overcome this difficulty* and to present to the operating man a practical opportunity for realizing all the advantages of long and short addendum gearing without going to any radical change or heavy expenditures. The "wisdom tooth" pinion (Fig. 6) is in every way a long addendum pinion and partakes of all the advantages of a long addendum pinion. It is, however, so designed and generated that it can be operated with the standard Brown & Sharpe 14½ deg. gear. Hence it can be installed without any gear change and the operator can go over to the true form of long and short addendum gearing with all its advantages by merely renewing pinions with those of the "wisdom tooth" shape. There is no dark secret about this shape; it is a pure involute generation of a standard tooth on an oversized diameter blank. Its use, however, involves one slight change, that is a slight reduction in the ratio as one tooth is dropped out of the pinion in forming the "wisdom tooth" shape. The changes in speed and acceleration caused by the different ratio are so little noticed that cars equipped with "wisdom teeth" are running on the same schedule as cars with standard pinions and even in one case are running in multiple-unit trains interchangeably. In another instance "wisdom tooth" pinions have been put on motors on one end of the car and standard pinions on the other with reports from the mechanical department that this gives thoroughly satisfactory service. Especially on pinions with a small number of teeth, such as the 13-tooth pinion standard for the safety car, the "wisdom tooth" idea gives a tremendously increased tooth strength. This has proved of great value to many users of safety cars who have been experiencing excessive breakage from the standard 13-tooth pinion. To illustrate the close similarity between the "wisdom tooth" shape and the standard long addendum pinion shape, Fig. 6 (a) shows the one superimposed on the other.

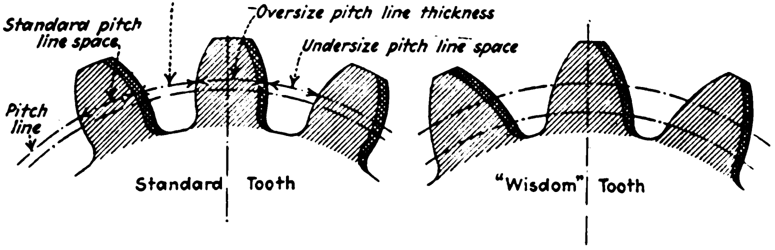
Standard pitch line thickness
Oversize pitch line thickness
Standard pitch line space
Undersize pitch line space
Pitch line
Standard Tooth
"Wisdom" Tooth

FIG. 7—CONTOURS OF OVERSIZE PINIONS HAVING A TOOTH WIDTH AT THE PITCH LINE LARGER THAN THE SPACE

"Wisdom tooth" pinions have now been sold to 44 different operating companies and their use has run to a total of 1,886 pinions. Thus far there has not been an adverse criticism. The oldest pinions have been in service longer than the life averaged from the standard pinions and still are only one-third worn out. In several cases they have completely stopped what was otherwise serious breakage trouble.

OVERSIZE PINION FOR MATING WITH WORM GEARS

A still further innovation being successfully used is the application of the "oversize" pinion of either standard, wisdom tooth, or long addendum design. This again is purely a practical problem. When your automobile cylinder and piston rings become slightly worn, you replace them with new oversize piston rings. Likewise, when a gear is badly worn, it can be mated with a pinion having thicker teeth than the normal standard. This takes out the major part of the backlash and uses up the old gear under much better operating conditions than normal. At the same time the oversize pinion, having thicker teeth at the start, has more material than can be worn off the teeth before they are reduced to the scrapping point. The teeth being thicker are stronger at the root, both when

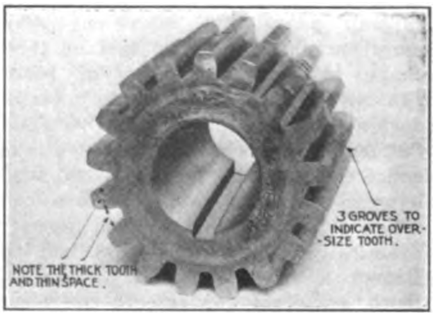
3 GROVES TO INDICATE OVER-SIZE TOOTH.
NOTE THE THICK TOOTH AND THIN SPACE.

FIG. 8—OVERSIZE PINION FOR MATING WITH A WORN GEAR

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*See *Electric Railway Journal*, June 17, page 972.

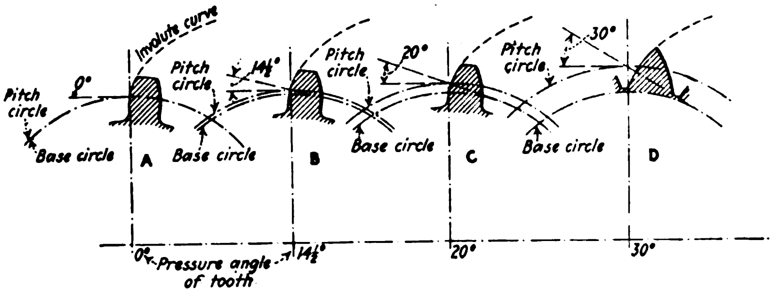


FIG. 9—TOOTH SHAPES OF THE SAME PITCH, SHOWING THE INCREASE IN THE PRESSURE ANGLE BY WORKING HIGHER ON THE INVOLUTE CURVE

new and when worn out. The advantages therefore are longer pinion wear, stronger pinions, and less backlash. The only disadvantage is the necessity of care not to mesh oversize pinions with unworn gears. This is guarded against by special markings of three grooves around the periphery of the pinion, illustrated in Fig. 9, and by using a wear gage which must go down over the gear tooth before it is worn sufficiently to take the oversize pinion. We believe the advantages more than overcome the disadvantages and where the shop organization can accommodate itself to the use of the oversize pinion, it will be found a decided saving in cost per thousand miles and its wear will greatly improve the operating conditions as regards noise, vibration, etc.

John Fritz Medal Awarded

THE board of award of the John Fritz Medal made the nineteenth award of this medal on July 8 at the United Engineering Societies' Building in New York City. The recipient was Senator Guglielmo Marconi, to whom the medal was given for his invention of wireless telegraphy. This medal was established to recognize achievements in applied sciences, and the board awarding it consists of representatives of the "founder societies," i. e., the A.S.C.E., A.I.M. & M.E., A.S.M.E. and A.I.E.E. Among previous recipients of the medal are John Fritz, Lord Kelvin, George Westinghouse, Thomas A. Edison, Elihu Thomson, Gen. George W. Goethals, Sir Robert A. Hadfield and others equally distinguished.

Technical Societies of Boston Affiliate

THE mechanical, electrical, mining and metallurgical, civil, ventilating and other engineering organizations of Boston have formed "The Affiliated Technical Societies of Boston," with headquarters at 715 Tremont Temple. In the first issue of the bulletin of the organization a list of objects and functions is given. The fundamental purpose, of course, is to co-ordinate the technical society activities, prevent duplication and promote the welfare of all engineers in the community. The various functions are to be carried out through the office of an executive secretary, under the direction of a council and the executive committee. There are at present nine member societies. One of the most useful functions promises to be a comprehensive employment service.

Well-Known Railway Men to Address Safety Council

A STRONG program has been arranged for the session of the electric railway section of the National Safety Council, which will hold its annual meeting in Detroit from Aug. 28 to Sept. 1. During the five-day session several joint meetings of the electric railway and public utilities sections will be held. A partial list of speakers before the electric railway section was given in the issue of this paper for July 8. The complete list of topics and speakers, given below, shows that all except one of the speakers are executives in the electric railway field:

A paper on "Safety as an Operating Factor," by F. R. Coates, president Community Traction Company, Toledo, Ohio; a paper on "The Human Side of Our Business," by Britton I. Budd, president Chicago Elevated Railroads and Chicago, North Shore & Milwaukee Railroad, Chicago; a paper on "The Most Efficient Manner of Conducting Safety Work," by Charles B. Scott, general manager Bureau of Safety, Chicago; a paper on "The Financial Side of Accident Prevention," by Garrett T. Seely, vice-president and general manager Pennsylvania-Ohio Electric Company, Youngstown, Ohio; and a paper by Arthur W. Brady, president Union Traction Company of Indiana, Anderson, Ind.

Safety Code Approved by A. E. S. C.

THE American Engineering Standards Committee, by letter ballot, has approved the National Electrical Safety Code of the Bureau of Standards which covers the generation, distribution and utilization of electricity for power, light and communication. The Standards Committee announces that there is now in process of formation a thoroughly representative sectional committee to consider any revisions of Part 2 of this Code, "Rules for the Installation and Maintenance of Overhead and Underground Electrical Supply and Signal Lines," which may be deemed necessary by any of the interested parties. There are also being organized three sub-committees to take up the unification of crossing specifications under the three following heads: Signal lines crossing railways; power lines crossing railways; and power lines crossing signal lines.

These committees are being organized in conformity with the action of the March 2 conference on the standardization of crossing specifications at which there were present the representatives of fourteen national, engineering, utility and industrial associations, four departments of the federal government, various state commissions of Connecticut, Iowa, Minnesota, New York, and of the telephone, telegraph and cable companies.

American Association News

Trackless Transportation

A MEETING of the American Association committee on trackless transportation was held at association headquarters on July 7. Those present were: H. B. Flowers, Baltimore, chairman; H. B. Potter, Boston, vice-chairman; W. J. Flickinger and R. E. Danforth.

The committee drew up its report in final form, which was made in three parts. The first is to cover the policies that the committee recommends as to bus operation. Then follows the report of the Transportation & Traffic Association's committee on the places where buses can be operated to advantage. Next come the vehicle designs suggested by the Engineering Association committee.

In conclusion the committee is to urge further study of the subject of trackless transportation during the ensuing year.

Revisions of the Engineering Manual Distributed

J. W. WELSH, of the American Association, has sent out, to all persons and companies entitled to receive them, sets of revised or added sections of the Engineering Manual.

To facilitate the rehabilitation of existing copies of the Manual, a set of instructions for inserting these sections has been distributed. It is hoped by this means to overcome one of the greatest difficulties in keeping the Manuals up to date, namely, the substitution of new material for old, and the addition of new sections at the proper points to permit them to be readily found by means of the index.

Inclosed with the Manual sections was a revised copper wire table, and sent out at the same time, a poster to cover an incorrect table appearing on page 452 of the 1921 Engineering Association Proceedings.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Chicago Votes to Strike

Trainmen of Surface Lines Insist that Present Contract Be Renewed for a Year

Complete tieup of local transportation facilities faces the city of Chicago. This was indicated on July 10 when the trainmen's union of the Chicago Surface Lines voted 12,149 to 37 in favor of a strike if their demand is not met for a renewal of the present contract for one year. At the same time employees of the elevated lines announced, after rejection of a similar demand by President Budd, that they would vote on July 13 to decide whether they would stand with the trainmen of the surface lines in the event of a walkout.

It was expected that International President Mahon would be called to Chicago before making the strike effective. This suggested the probability of further conferences with the officials of both companies with a view to getting together on a compromise wage cut or arbitration.

President Blair's proposal was for a wage reduction of 25 per cent for trainmen and changes in working conditions which would provide that the percentage of straight runs be reduced from 60 to 40, and the "spread" on swing runs be extended from 14 to 14½ hours and that the time-and-one-half penalty for overtime should not begin till after the ninth hour.

Conductors and motormen have been getting a maximum wage of 80 cents an hour since June 1, 1920, and when the fare was reduced from 8 to 7 cents on June 15 the management announced that expenses would have to be cut accordingly. President Blair said the revenue might be decreased as much as $9,000,000 a year, depending on what percentage of tickets would be used at the rate of three for 20 cents. The number has already reached 42 per cent and it is thought it may go as high as 80 per cent.

Union men at the meeting scorned the suggestion of a 20 per cent cut and adopted a resolution authorizing their officers to call for an immediate strike vote unless the company would agree to a renewal of the present contract for another year. President Blair in making his proposal stipulated that the new rates would be retroactive to July 2 and should continue for one year "unless there be a change by competent authority during said one year period in the fare rates authorized to be charged." Other help are to be cut.

Two days later when the union officials called on Mr. Blair they were told that it would be impossible to keep up the present rate of pay as demanded by the men. Mr. Blair said:

> If the men you represent are of the opinion that our proposition of June 30, 1922, asks the men to assume more than their fair share of the reduction in our rates of fare, we will give careful consideration to any counter proposal which may be made on behalf of the men; and if, unfortunately, we cannot come to amicable adjustment we stand ready to refer our differences to arbitration.

Union officials said they had no authority to consider anything but a promise to renew the existing scale and they would have to proceed with the strike vote which was set for July 10. They were quoted by the newspapers as blaming Mayor Thompson and his lawyers for playing politics with the Surface Lines and letting other utilities alone. It was pointed out that the Illinois Commerce Commission, which is said to be friendly to the city administration, had suggested that a fair rate of pay for the men would be about 60 cents and the city lawyers had urged changes in working conditions.

On July 8 Mayor Thompson made public copies of a letter which he had addressed to the state board of arbitration suggesting that they take the situation in hand so as to prevent a tieup of transportation. It was stated that neither the company nor the men would look with favor on this board to prevent trouble. Rumors were abroad that in the event of trouble the city would endeavor to take over the lines and that if necessary the Governor would use State troops to move the cars.

ELEVATED EMPLOYEES THREATEN RAILWAY

Decision of the elevated employees to take a strike vote was announced on July 10 after President Budd had informed a committee that he would be unable to meet the demands. He said:

> Changes in rates of fare and wages on the elevated are inevitable in the near future. A reasonable revision of wages is necessary, and it should be brought about without inconvenience to the public, which has generously and without protest paid higher fares during the period of high prices. Wage readjustments in the electric railway industry began more than a year ago and in practically every large city in the United States, except Chicago, wages have been lowered, in many instances more than once. I strongly advise our employees against pursuing a course inimical to the public interest.
>
> Suspension of local transportation service in Chicago can have only one result. It will turn public sentiment against the employees, and we are servants of the public dependent upon its continued good will. With the good will of the public behind you there is, in my opinion, no probability of your being called upon to work for wages not commensurate with the character of the service rendered and the living conditions which obtain. Our companies have not profited by the higher fare. On the contrary the net earnings have been less, due to the increased cost of operation.

Mr. Budd also indicated that he would be pleased to continue negotiations.

The local city administration is attacked in a statement addressed to the public by officers of the local Amalgamated. Ridicule is rained on the traction experts for the city, not one of whom, say the union officers, lays claim to any street railway experience on the witness stand. Of the Mayor this is said:

> Now the Mayor wants arbitration by another state commission. His commerce commission hasn't succeeded in splitting the electric railway employees' organization in Chicago, as the motive to isolate the street car men in a wage cut contemplated. Now he wants another state commission to finish the job.
>
> How can any plan of arbitration settle the matter while the administration and its commerce commission are steadily moving for more wage cuts?
>
> If the plan of the city hall to establish 5-cent fares were carried out, and wage cuts followed on the basis of the present one, the train men would receive 20 cents an hour and other employees would have their wages wiped out entirely.
>
> If the car men and their families are to carry the load of the unreasonable political propaganda fare movement of the city administration, then the issue may as well be fought out now as at any other time.

Wage Scale Agreed On—Strike Ends

The strike which became effective on June 1 on the lines of the Mauch Chunk & Lehighton Transit Company, Mauch Chunk, Pa., was terminated on June 24, when a wage scale was agreed on amounting to 41 cents an hour for motormen and conductors. The old rate was 43¾ cents an hour. All other employees were reduced in the same ratio. With this reduction and other economies in operating expense the company which recently took over the railway hopes to put the road on a paying basis.

The line has not been a paying concern for a long time, and the directors decided for the best interests of all to sell the property. Negotiations were carried on for some time and it was sold to a New York syndicate, the members of which were to take over the road and operate it on June 1, 1922. The yearly wage and working agreement of the employees terminated on the same day. About May 16, the employees wanted a new agreement signed, but they were told that the old company could not act for the new company and that they would have to wait.

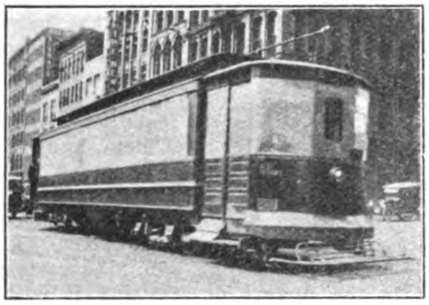
On May 11 the employees held a meeting and decided to quit work. At 3.30 on the morning of June 1, before the new owners had a chance to operate the road, the committee representing the employees called up the general manager on the telephone and notified him that the men would not work unless the new agreement was signed. The management and employees had a number of meetings, but could not agree. The new management then told the men it could not pay present wages as the receipts would not allow them, and suggested a lower rate. The men would not accept a reduction. Subsequent meetings resulted in an amicable agreement.

Service Being Restored in Buffalo

July 10 Marked Operation of First Car Since Strike There—This Was in Accordance with Promise of Mitten Management—Work of Rebuilding Entire Operating Force Well Under Way

WIRE-SCREENED cars guarded by motorcycle policemen and uniformed police in automobiles have been operated over several of the local lines of the International Railway, Buffalo, since 6 a.m., July 10, but no attempt has been made by the company to operate interurban cars on the Lockport, Niagara Falls or Lancaster divisions since the strike of platform men went into effect at midnight on July 1.

Very little disorder accompanied the running of cars. The police supplied the necessary protection. The company appealed for the state militia, but it was told that guardsmen would not be sent to Buffalo unless the situation grew so serious that the local police could not handle it. Practically no passengers were carried by the cars operated by the company.



CAR PROTECTED BY SCREENS BEING OPERATED IN BUFFALO

Each screened car is preceded by mounted policemen, motorcycle police and state troopers and is followed by an automobile carrying half a dozen members of the police riot squad equipped with sawed off shot guns. Two traffic supervisors of the International and four trainmen ride on each car. The new platform men have been brought to Buffalo as experienced crews from other cities.

Power house employees and practically all of the shop and track workers employed by the International are remaining loyal to the company.

CORRESPONDENCE PRODUCED IN EVIDENCE

Correspondence between Thomas E. Mitten, chairman of the board of directors of the railway, and W. D. Mahon, president of the Amalgamated Association, showing the existence of an understanding between the company and its employees covering working conditions for 1922 has been produced by the railway as a move to end the srtike.

Mayor Schwab had told Herbert G. Tulley, president of the International, that he would order the men back to work within twenty-four hours if the company would produce evidence of an understanding covering working conditions for the year. When confronted with the correspondence the Mayor insisted the evidence was insufficient and refused to intervene. The Mitten Management, Inc., then issued a statement which appeared in the newspapers as a strike bulletin, placing the blame for the continuance of the strike squarely upon the Mayor.

STRIKERS HAD UNTIL JULY 10 TO RETURN

Several times in the course of the past week the International has called upon the strikers to return to work under the terms of the understanding between Mr. Mitten and Mr. Mahon and it announced that those who did not report for work by phone or in person before midnight July 10 would lose their seniority rights as new employees will be engaged to operate the cars.

Efforts on the part of William Weatherwax, formerly superintendent of the traction lines in Chicago under Mr. Mitten, to bring about a settlement of the strike also failed.

Little was accomplished by the municipal authorities in their efforts to bring about resumption of service by appealing to the Public Service Commission in Albany for an order directing the International to resume adequate service and applying to the Supreme Court of Erie County for a temporary receivership for the International.

Only men with six months' experience in the operation of street cars will be allowed to run cars on the city lines of the International, Mayor Schwab informed the company. He also issued an order directing that all men brought from other cities by the company to operate cars or patrol its property should be finger printed and photographed by the police and their records thoroughly investigated so as to avoid all possibility of trouble.

HANDLING TRAFFIC IN BUFFALO BEFORE SERVICE WAS RESUMED

The Frontier Metal Trades Association, Buffalo, has issued a statement commending the attitude of the International on the open shop question and said that the closed shop is not a matter for arbitration. The association places at the disposal of the officers of the International its co-operation and assistance in maintaining the open shop principle.

While other Buffalo and Niagara Falls newspapers are for the most part remaining silent regarding the issues at stake in the strike, the Buffalo *Commercial* is loyally supporting the International in first page editorials featured daily. A few days ago the *Commercial* said:

> The *Commercial* confesses that it is at a total loss to understand what the striking employees of the International want. What are the men striking for anyway? Certainly it is not for more wages. We have it further upon the authority of Mr. Mahon and Mr. Conroy of the Amalgamated that the issue of the closed shop is not involved. They declare this is no fight against the open shop; that the International will be as free to employ men without the union as within.
>
> Now the men say they want recognition for the union. That is a new demand. But what does it amount to? The most perfect organization for bargaining over wages and conditions is to be found in the Mitten co-operative plan with the unit of labor represented in company employees.

Herbert G. Tulley, president of the International, in a statement to the men says:

> Those re-employed by the company after midnight July 10 will be rated as new men with a new seniority based on the time of re-employment. The bitterest aftermath of this strike will be experienced by the men who lose their seniority rights. You should carefully consider what your own best interest requires of you at this time. Regrets of tomorrow will not return to you this opportunity of today to sign up and keep your run.
>
> Experienced and trustworthy men have asked for this opportunity and will be given permanent places in filling these vacancies. Your choice is, therefore, now or never in so far as retaining your present seniority rights is concerned.
>
> The Mitten Co-operative Plan, which includes collective bargaining, will hereafter govern, and the maximum wage rate for permanent trainmen will be continued at 55 cents an hour for at least a year.

Highest Standards Upheld by Prospective Utility Advertising Association

Steps are now being taken which have for their object the formation of a Public Utility Advertising Association, which may eventually become a distinct department of the Associated Advertising Clubs of the World. An organization committee, headed by W. P. Strandborg, vice-president of the Associated Advertising Clubs of the World and publicity agent of the Portland Railway, Light & Power Company, Portland, Ore., was selected in June at the Milwaukee Conference of the Associated Advertising Clubs of the World.

The new organization will be open to the advertising sections of the American Electric Railway Association, National Electric Light Association, American Gas Association, American Telephone & Telegraph Company and the Independent Telephone Association, as well as to the various state committees on public utility information and individual companies engaged in serving the public with electric railway, gas, electric light and power and telephone service. Permanent organization is to be effected at the convention of the American Electric Railway Association in Chicago the first week in October.

Purposes and objects of the new organization as set forth in a tentative "Standards of Practice" to be submitted at the next meeting follow:

> Realizing our obligation and responsibility to the public, to the seller of advertising service, the advertising agent and our own organization, we, as general advertisers, pledge ourselves as follows:
>
> 1. To consider the interests of the public foremost, and particularly that portion thereof which we serve.
> 2. To claim no more, but if anything a little less, in our advertising than we can deliver.
> 3. To refrain from statements in our advertising which, through actual misrepresentation, through ambiguity or through incompleteness, are likely to be misleading to the public, or unjust to competitors.
> 4. To use every possible means not only in our own individual advertising, but by association and co-operation, to increase the public's confidence in advertised statements.
> 5. To refrain from attacking competitors in our advertising.
> 6. To refrain from imposing upon the seller of advertising service unjust; unreasonable and unnecessarily irksome requirements.
> 7. To furnish to publishers, when requested, technical information which will help them keep reading pages and advertising columns free from misstatements.
> 8. To refrain from and discourage deceptive or coercive methods in securing free advertising, and to do everything possible to aid the publisher to keep his columns free and independent.
> 9. To require standards for ourselves equal to those we set for others.

Meetings Continue on Reorganization Plan

W. Kesley Schoepf, president; Walter Draper, vice-president of the Cincinnati (Ohio) Traction Company, and Attorney Robert A. Taft, representing the Cincinnati (Ohio) Street Railway, attended the second meeting of the citizens' committee which has been named by Mayor George P. Carrel to solve the electric railway problem in Cincinnati. Mr. Schoepf went into detail on the history of the Cincinnati Street Railway and Cincinnati Traction Company and the effect of the double liability clause in the Ohio constitution on corporations. He stated that the Cincinnati Traction Company had been formed under the corporation laws of Ohio with a paid up capitalization of $2,000,000. At the same time the Union Traction Company of New Jersey was organized to finance the company. He recalled the repeal by a vote of the people of the double liability clause and the subsequent dissolution of the New Jersey corporation. Mr. Schoepf stated further that the Ohio Traction Company, successor to the Union Traction Company, controls only the Cincinnati Traction Company, the Traction Building, the Cincinnati Car Company and the Millcreek Valley lines.

Walter Draper, vice-president of the Cincinnati Traction Company, answering questions by members of the committee on the purchase of new cars explained that car trust certificates made it possible to pay off the cost of the new cars over a period of ten years.

At the conclusion of the meeting Mr. Schoepf declared that when the committee started going deeply into the traction investigation he would insist on the committee meetings being executive. The reorganization plan was referred to previously.

Favorable and Unfavorable Comment on New Franchise

The effort of the Louisville (Ky.) Railway for a new franchise agreement and compromise with the city in the fare rate is favored generally by business interests, the various clubs and civic organizations. The City Council, however, is objecting to the ordinance on the ground that the claimed valuation of $10,000,000 is too high. The matter has been placed in the hands of a committee. A digest of the franchise was given in the *Electric Railway Journal*, issue of July 1.

Charter for Kansas Interurban Line

The Arkansas City-Winfield Railway has been chartered with a capital of $300,000 to operate an electric interurban line between Arkansas City and Winfield, Kan. The line, now in operation is about 15 miles in length.

George Theiss, president of the Arkansas Valley Interurban, is working out plans for a connection between his line and the Arkansas City-Winfield line. The Arkansas Valley Interurban now operates a line from Wichita to Hutchinson and another to Newton. Electrification of lines leased from steam lines will connect Newton with McPherson and Salina. Negotiations on this electrification have been going on between Mr. Theiss and heads of the steam lines involved. If the connection is made between Wichita and Winfield there would be electric transportation connection between Salina at the most northern point and Arkansas City at the southmost point or a distance of approximately 125 miles.

Zoology for Railway Men

Zoology is intimately related to electric railway operation, so it turns out. It may be that a lot of operators are already in on the secret, but it is safe to say that most of them never stopped to consider the relation between the two. This was the case with H. R. Miller, efficiency engineer for the Keokuk (Ia.) Electric Company. He just went along from day to day, never for a moment associating the study of insects with his business until last June. And then the study of insects and their habits was forced upon him, for the district where the Mississippi flows between Illinois and Iowa and Illinois and Missouri was visited by an unusual plague of flitting things. The insects swarmed everywhere. And they stuck wherever they swarmed. The cities on the lower level suffered most, but cities on the bluffs also felt the inconvenience of the pest. In Fort Madison, Ia., the bugs were shoveled up and carted from the streets under the lights every morning.

As stated before, the insects swarmed everywhere. Of course, they ought to have respected the patrons of the street cars, but they didn't. In a number of instances they virtually took possession of the cars. Now you can kill an insect by catching it and squeezing it in the fingers or swatting it with a newspaper or a baseball bat, but none of these means appealed to Mr. Miller as he is of a scientific turn of mind and wanted to rid the cars of the insects without too much pain to the bugs. And then he remembered that the reaction of a ray of light upon the protoplasm of a bug, causing movement of the insect toward the light, depends upon the wave length of the light and is inversely proportional to the wave length. So Mr. Miller hadn't studied illumination or zoology for nothing, after all. He had a conference with A. C. Anderson, street railway superintendent of his company. They had lamp globes dipped red and installed them in a car. That car was free from bugs. The next night, all the cars of the Keokuk system were illuminated in red and have been bugless ever since.

The first lamps installed were too deep a red and caused some discomfort to sensitive passengers. The hue finally adopted is rose, which is not absorbed by palm beach suits or white dresses. This strikes the golden mean between the reactions on humans and on insects.

Passengers vote the idea a godsend. The ultimate origin of it is unknown. It is noticed that the bugs are not attracted by certain red lights in the dancing pavilion of the Keokuk Country Club, but enquiry fails to disclose whether they were placed for that purpose, or merely for decoration. It is believed that the Keokuk installation is the first time the lack of insect reaction to the red end of the spectrum was ever used by a public utility company for the purpose of increasing the comfort of the public it serves.

Edgar E. Clark to Head Transportation Institute

Edgar E. Clark, formerly chairman of the Interstate Commerce Commission, will, it is reported, head the National Transportation Institute, the organization of which is being considered in Washington. An account of the original plan of this Institute was published on page 947 of the issue of this paper for June 10. President Harding has indorsed the plan in a letter to Representative Sidney Anderson of the Joint Congressional Commission on Agricultural Inquiry. The president said:

> The broad and outstanding study of the entire transportation problem is unquestionably a serious national matter—indeed I think I may well say a serious world necessity at this time. Such an organization as you are proposing ought to become a power in connection with the nation-wide consideration of these problems and a useful directing force in connection with the dissemination of public policy.

Senator Cummings of Iowa, chairman of the Senate Interstate Commerce Commission, said nothing was more needed at this time than an organization to ascertain the truth respecting transportation and to disseminate the facts brought out. His remarks were of course presaged on the understanding that the institute would be wholly disinterested in conducting its work.

Letters favorable to the plan have been received from others prominent in national affairs.

Paper Praises Council's Act

The City Council of Toledo, Ohio, was recently made a subject for the praise of the Toledo *Times* because of its stand in the matter of paving charges. The City Council granted Commissioner Cann's request to relieve the Community Traction Company from paving expenses. The *Times* in commenting on this action says that the matter of paving between electric railway tracks is an item of public improvement which is properly chargeable to the taxpayers and should not be paid by the car riders because paving is no longer necessary to street railway operation. The editorial comment in part is as follows

> In granting Commissioner Cann's request, Council is merely assisting him to carry out the wishes of the people expressed when they selected the Milner ordinance over the alternative street car-bus plan. The guiding principle of this ordinance is that the car riders shall pay for precisely what they get, allowing the operators a fixed reasonable return on the capital actually invested.

Elec-trac News Makes Début

The Paducah *Elec-trac News* has made its début and will come out twice every month with some interesting information on Paducah's electric utilities—"What they are doing, what they hope to do, to give Paducah the best possible service." The pamphlet is presented by the officials and employees of the Paducah Electric Company and the Paducah Railway. As announced the paper is designed with a two-fold purpose. It aims to stimulate the spirit of co-operation, loyalty and efficiency in service and to disseminate real news concerning the men engaged in Paducah's municipal activities.

The aim of the pamphlet to stimulate loyalty is carried out in the first issue, which contains a picture and write-up of Elec-trac "Bill," formerly known as N. H. Bethel, who has been in the service of the Paducah Railway since 1883.

Working Agreement Renewed

Trainmen of the Ontario Hydro-Electric Commission operating in Windsor have accepted the commission's offer to renew the working agreement. Recently, the commission informed the men that a wage cut of 5 cents an hour was to be made. The men replied that a cut would mean a suspension of service or an application to the Dominion Government for a Board of Conciliation. The men's request for 10 cents additional for the operators of one-man cars and trackless trolleys has been rejected.

Action on Paving Petition Deferred

A public hearing was recently held on the petition of the Charleston (S. C.) Consolidated Railway & Lighting Company that its franchise be modified so as it would be relieved from unfair paving obligations. All who addressed the meeting were in favor of the petition. However, the committee of the whole adopted Alderman Sinkler's motion that final action be deferred until the August meeting of the City Council. The request of the railway was referred to in detail in the *Electric Railway Journal*, issue of June 3.

Milwaukee Purchase Proposal Making Progress

Martin Glaser, engineering and statistical expert for the street railway acquisition committee at Milwaukee, Wis., plans to confer in New York shortly with officials of the North American Company, holding company for the Milwaukee Electric Railway & Light Company.

Fred S. Hunt, chairman of the committee, is reported to have said:

> We have agreed on one thing—the basis for valuation. This will be the 1914 valuation of the Railroad Commission, plus additions. The company insisted on replacement value of its property and the committee held out for the historical value, or actual cost to the company. These figures were about the same, however, so far as the 1914 properties.
>
> One of the intricate problems before the committee is whether we shall agree on too high a value for the property and then insist on a small rate of return or hold the property down to a low value and permit a higher return.

More Buses for Baltimore.—The Baltimore (Md.) Transit Company, affiliated with the United Railways & Electric Company, planned to put into operation on July 15 a complete fleet of twenty-six Republic Knight-motored buses.

News Notes

Arbitrators Are Selected.—Attorney Frank F. Dinsmore has been selected as arbitrator for the Cincinnati (Ohio) Traction Company and Attorney J. H. Vahey of Boston, Mass., has been selected as arbitrator for the Street Car Men's Union to seek an adjustment of the wage question and working conditions proposed in the new contract between the two organizations. The two arbitrators have until July 20 to agree on an impartial chairman. If they fail to agree then the State Industrial Commission will make the selection.

Treasurer Stockwell Suffers Loss.—Mrs. Laura A. Stockwell, wife of Fred F. Stockwell, of the Barbour-Stockwell Company and treasurer of the New England Street Railway Club, died on June 29 after an illness of three days, at the Sylvester Hospital in Allerton. Mrs. Stockwell was almost as well known to the women of New England as is Mr. Stockwell among the men. She was a member of Ramona Rebekah Lodge and of the Eastern Star. She was born in Chelsea, Maine. She leaves her husband and four children.

Cut in Wages Announced.—A new contract has been made between the management of the Inter-City Terminal Railway, North Little Rock, Ark., and twenty-five of its employees. An announcement to this effect was recently made by P. C. Warren, manager of the company. Under the terms of the new agreement the men will receive 3 cents an hour less than they did under the terms of the old contract. The new wage scale is 38 to 40 cents an hour and the old scale was 41 to 43 cents an hour. Younger men in seniority in the service receive the lower pay. The contract is for a year and is dated from July 1.

Fights for Car Line Space.—The Toronto Transportation Commission failed in the attempt to induce the Board of Control of Toronto to interfere with the sub-dividing of the Nordheimer estate. The trustees of this estate have been forming plans to divide the huge estate in building lots and offering the lots for sale. The commission wanted to have a street 80 ft. wide cut through the property so that car lines could be built through the estate. The members of the Board of Control are of the opinion that the cost to the city would be excessive. Commissioner Harris, the spokesman of the commission, in the attempt to get the Board of Control to take over the strip in the Nordheimer estate, thinks the cost will be $1,000,000 to start with, and there will be about $700,000 necessary for improvements.

Financial and Corporate

New Company Ready

Springfield-Troy Railway Authorized to Issue Bonds—Chamber of Commerce Indorses Plan

Final details for the taking over by the newly-organized Springfield-Troy (Ohio) Railway of the properties of the Springfield Terminal Railway. & Power Company, including the Springfield, Troy & Piqua traction line, will be completed before the option on the property expires on July 16, according to an announcement made by officials of the new company. The new company expects to exercise its right of purchase under the option on July 15.

It is the aim of the new company to furnish passenger and freight service through use of gasoline-propelled cars, as well as to supply electricity to municipalities along its lines. The company will not produce the electric power itself, but will purchase it from the Springfield Light, Heat & Power Company with whom tentative details of a contract have already been arranged.

Officers of the new company are: C. G. Taylor, president and general manager, Norwalk, Ohio; Henry H. Durr, first vice-president; B. F. Kaufman, second vice-president; D. A. Glover, secretary and treasurer. Directors are: Henry H. Durr, Springfield; A. J. Bright, Christiansburg; B. F. Kaufman, Springfield; A. D. Bowen, Elyria; Henry Pauley, Troy; D. A. Glover, Elyria; C. G. Taylor, Norwalk, and L. F. Bowell, fiscal agent.

CO-OPERATION PLEDGED

The State Public Utilities Commission has authorized the company to issue first mortgage 7 per cent gold bonds in the sum of $250,000, of which $200,000 is to be outstanding, and common stock to the amount of $250,000. The bond issue will be secured by first mortgage on all of the property of the company which has an approximate valuation of $400,000. Representatives of the new company are meeting with marked success in securing subscriptions to the stock and bond issues, as well as pledges of co-operation on the part of manufacturers in Springfield and other points touched by the line.

The Springfield, Troy & Piqua Company went into the hands of a receiver about two years ago. For some time after the receivership was authorized, the receiver attempted to operate the line, but financial results were such that service was abandoned about fourteen months ago. Since then, only a shuttle car operating between the plant of the Victor Rubber Company at Maitland, and Springfield, for the benefit of the Victor employees has been in service.

Residents along the line expressed themselves as being willing to back a reorganization by buying bonds and such a move was attempted about four months ago, but the deal fell through. After an investigation of the possibilities of the section traversed by the traction line, the new company was formed. The proposal is being given the active support of the Chamber of Commerce.

Track Removal Ordered—City Wants to Pave

Removal of the tracks of the Saginaw-Bay City Railway, Saginaw, Mich., from the streets was ordered by the Council on July 11 in a formal resolution instructing the City Attorney to obtain permission from the United States District Court for permission to proceed with the work. The company has not operated cars since it went into bankruptcy on Aug. 10, 1921. The company's franchise was forfeited by the Council on Oct. 21, 1921, on the grounds that it had failed to fulfill its contract with the city and on March 25, 1922, an ouster ordinance was passed, calling upon the company to remove its tracks and overhead construction from the streets within ninety days. Now the City Council wants to do paving along certain streets and permission will be asked of the United States District Judge to remove the tracks or cover them over as the city deems best for its paving program.

American Water Works Company Expanding

Plans for the expansion of the system of the American Water Works & Electric Company, Inc., Pittsburgh, Pa., through the acquisition of the Monongahela Power & Railway Company and the Potomac Public Service Company have about been completed, it is announced, adding approximately $8,250,000 in annual gross earnings to the company.

Of this amount approximately $6,000,000 will be contributed by the Monongahela property and $2,250,000 by the Potomac Company. This will bring total gross earnings of the system up to approximately $28,000,000 annually. The acquisition of these two properties will extend the system of the American Water Works & Electric Company well into West Virginia and Maryland.

The statement of the American Water Works & Electric Company, Inc., and subsidiary companies, including the West Penn Company, for the month of May, shows gross operating earnings of $1,641,914, an increase of $19,053 over the corresponding month of 1921; net earnings of $544,904, an increase of $72,641; gross income $609,088, an increase of $73,782; net income, after all charges, $91,069, an increase of $15,185.

Conversion Plan Only Partially Successful

The plan of the United Railways & Electric Company, Baltimore, Md., to permit owners of first mortage 4 per cent bonds maturing in 1949 to increase the interest thereon to 6 per cent upon the payment of $250 for each $1,000 bond, proved only partially successful. It is estimated that about $3,000,000 of bonds were so deposited.

For reasons which are more or less difficult to discuss, say Nelson, Cook & Company, local bankers, there seemed to exist an antipathy in the public mind against the acceptance of this proposition. One of the objections was the opinion frequently expressed that the proposal should have come directly from the company itself instead of through a bankers' committee.

The bankers contend that this certainly did not constitute a valid objection to a plain business proposition. The future alone, they say, will prove whether or not the holder of the 4 per cent bond who paid $250 and converted it into a bond bearing 6 per cent interest, bettered his position. They are of the opinion that the future will show that he did. In commenting on the position of the company the bankers said:

> The payments received from bondholders who deposited their bonds, together with funds already in hand and available for these purposes, will probably place in the company's hands the funds really required to retire all the notes due on Aug. 15.
>
> It has been reported in the press that the United Railways will indulge in further financing. This may or may not prove correct, although we understand the matter has the consideration of the board of directors.
>
> As stated above, the company is in possession of all the funds needed to meet the maturities of the 5 per cent and 6 per cent notes due on Aug. 15. At the same time, considerable sums have been expended in improvement, equipment, etc., which are actually capital expenditures. Therefore, it may not be amiss, in view of these maturing securities and the release of such a large sum of money for reinvestment at this time, for the company to come into the market and definitely finance these capital expenditures, thereby, through the issue of a long time security, placing itself in an unusually strong cash position for some time to come.
>
> Such financing, however, is by no means an assured fact as we understand the matter is simply under advisement.

The plan for conversion was the subject of editorial comment in the issue of the *Electric Railway Journal* for July 1, page 2.

Public Auction Sale of Spartanburg Property

George B. Tripp, receiver for the South Carolina Light, Power & Railways Company, Spartanburg, S. C., has announced that all properties of the company are to be sold at public auction at Spartanburg, on July 31, under order of the federal court.

It was announced some time ago that the bondholders of the company were working out a plan whereby a successor company would begin functioning in July of this year. Counsel for the bondholders had appeared before the Federal Court and had submitted details of the proposed reorganization. The details were given in the *Electric Railway Journal*, issue of May 6.

Binghamton Road Organizes Permanently

The permanent organization of the board of directors of the Scranton, Montrose & Binghamton Railroad, Binghamton, N. Y., was effected at a meeting on June 26. The directors named are as follows: H. S. Fleming, New York; Frank L. Fuller, Binghamton, N. Y.; R. W. Day, C. C. Ferber, F. W. Wollerton, W. L. Connell and A. Widdowfield.

H. S. Fleming was elected president; R. W. Day, vice-president and general manager; A. Widdowfield, secretary; F. W. Wollerton, treasurer; J. J. Moffat, assistant treasurer.

The Scranton, Montrose & Binghamton Railroad controls the Binghamton Railway, by stock ownership. Application has been made to the United States Court to take the Binghamton Railway out of receivership.

A high-tension transmission line to Binghamton, N. Y., was recently completed and has been furnishing electric current since Jan. 1 to operate the Binghamton Railway and for commercial lighting in Endicott, New York.

Benton Harbor Property Sold

Control of the Benton Harbor-St. Joseph Railway & Lighting Company has been purchased by the Indiana & Michigan Electric Company, South Bend, Ind., for $1,200,000. This gives the South Bend company control of the electric power distribution to practically all important towns in St. Joseph and Elkhart Counties in Indiana, and Berrien, Cass and St. Joseph Counties in Michigan. The deal also gives the South Bend company control of the interurban lines connecting St. Joseph with Dowagiac and Watervliet, Mich. The company will now further expand by erecting a dam costing $1,000,000 in the St. Joseph River.

Hoboken Line Discontinued

A recent decision of the Board of Public Utility Commissioners of New Jersey has approved the discontinuance of the Washington Street line of the Public Service Railway in Hoboken. The abandonment was authorized, however, with the condition that the West New York line take care of certain traffic. The Public Service Railway agreed to this provision. It was shown that there were only five passengers per car, that jitneys paralleled the line and that the West New York cars covered the same territory. At first Hoboken opposed the abandonment.

Utility Maturities Large for Balance of 1922

The total of public utility issues maturing in the last six months of 1922 amounts to $261,921,600. This figure compares with $211,623,240 in the same period a year ago and $60,729,000 in 1920. Among the large issues is the Union Traction Company of Indiana $4,623,000 first 5 per cent bonds due July 1. The Interborough Rapid Transit Company has $39,199,000 of 8 per cent extended notes due on Sept. 1. Under the agreement between the security holders of the Interborough Rapid Transit and the Manhattan Elevated Railroad these notes will be extended ten years.

Financial News Notes

Service to Be Stopped.—The Sacramento Northern Railroad, Sacramento, Cal., has received permission from the State Railroad Commission to discontinue service to West Sacramento.

Wants to Issue Bonds—Application has been made to the Georgia Railroad Commission by the Valdosta Street Railway for permission to issue $100,000 of 6 per cent bonds, the money to be used to extend the company's lines and to establish recreation parks.

Property in New Hands.—A New York syndicate took over the operation of the Mauch Chunk & Lehighton Transit Company, Mauch Chunk, Pa., on June 1. The new president is Rolland A. Davidson, with offices at 15 Park Row, New York City, and the Secretary is V. M. Wolff.

Railway Issues Approved. — The Board of Public Utility Commissioners of New Jersey recently authorized the Morris County Traction Company, Morristown, N. J., to float an issue of $1,600,000 mortgage bonds, $1,500,000 of preferred stock and $1,179,000 of common stock.

Receivership Ended.—The Northampton Traction Company, Easton, Pa., has passed from the hands of receivers and has been reorganized as The Northampton Transit Company. Chester Snyder, who served as receiver for the company, has been elected president. No other personnel changes were made at the time of the reorganization. The terms of the reorganization were published previously.

Officers Chosen.—Following the purchase of a majority of the stock of the Stark Electric Railroad, Alliance, Ohio, by a syndicate in that community, officers have been elected to head the organization. M. S. Milbourne, has been chosen president, C. Y. Kay, vice-president, William E. Davis, secretary, and S. L. Sturgeon, treasurer. All are residents of Alliance. No changes were made in the other offices.

System on Sound Basis.—In his report of the year Finance Commissioner Ross of the City of Toronto says that the transportation system of the city is on a sound financial basis; that fares charged are sufficient to meet all expenses of operation so citizens need have no fear that they will ever be called upon to shoulder any deficits. In his opinion hydro has saved the citizens of Toronto twice the original investment.

Asks for Receiver.—According to a recent finding of Judge Swartz a receiver will probably be appointed to work out the financial difficulties of the Montgomery Transit Company, Norristown, Pa. The matter came before the attention of the court through the action of J. Rich Grier, Otho Newland and C. S. Newall brought against the railway company, the Norristown Trust Company and the Liberty Title & Trust Company as trustees.

Must Pay State Franchise Tax—In the case of the State of Alabama versus Lee C. Bradley the receiver for the Birmingham Railway, Light & Power Company, a decision of considerable importance to all service corporations in Alabama has been returned by the Supreme Court, to the effect that a corporation, even though it may be operating in the hands of a receiver, must continue to pay the state a franchise tax as levied by the constitution of 1901.

Preferred Stock of Bangor Company Offered.—About $470,000 of 7 per cent cumulative preferred stock Class B, of the Bangor Railway & Electric Company, Bangor, Me., is being offered for subscription at 101 and dividend by Beyer & Small, Portland, Me. The stock is not subject to redemption. The new stock ranks equally with the old issue except that it has no voting power. The proceeds from the sale will be used to purchase new properties and for capital requirements.

Manhattan Deposit Time Extended.—More than 60 per cent of the stock of Manhattan Railway, New York, N. Y., has been deposited or pledged for deposit under Judge Mayer's plan of readjustment of the company's relations with the Interborough Rapid Transit Company according to Alvin W. Krech, chairman of the Manhattan Railway stockholders' protective committee. In giving notice that the committee has extended the time in which further deposits may be made up to and including July 25, 1922, Mr. Krech states that unanimity of action is necessary to effect the plan and that failing this receivership will be inevitable.

Surface Line Valuation Case Closed.—The New York Transit Commission on July 10 closed its hearings on the valuation of the properties of the New York Railways. John H. Madden, valuation expert for the commission, was recalled and re-examined by Judge Shearn as to the methods by which he arrived at his calculations and the various items in the report he had submitted. The commission gave leave to Counsel Reynolds for the railway to file a memorandum. In the case of the hearing of the Third Avenue Railway, set for July 10, an adjournment was ordered for two weeks owing to the illness of counsel for that company.

Traffic and Transportation

329 per Cent Overload

Municipally Operated Line on Staten Island Has Frightful Service Record

Case No. 2656. Hearing of June 20. General Lincoln C. Andrews, chief executive officer of the New York Transit Commission, presiding. Solemnly announced: In the matter of the hearing on the motion of the commission upon the regulations, practices, equipment, appliances and service of the Staten Island Midland Railway and of Mortimer Brenner and Grover Whalen, as receiver and operator.

The appearances are noted. The newspaper men present yawn a yawn of despair and prepare for their daily snooze. It is a warm day. Moreover, it has been a long while since the sessions of the commission have provoked any real copy. Enthusiasm is at the zero hour.

Edward A. Roberts is duly sworn. After considerable questioning the fact is brought out that Mr. Roberts is chief of the transit bureau of the commission. Yes, Mr. Roberts is fairly familiar with the lines of the Staten Island Midland Railway. It is established that the road is being run by the city of New York under the direction of the head of the Department of Plant and Structures. Mr. Roberts knows that one of the lines runs from Port Richmond to a point near Eckstein's brewery. Just how near to the brewery is not brought out. Evidently it doesn't matter now, although it might have been different a few years ago.

Captain Cooke, if the commission please, would incorporate into the record the commission's standard of street railway operation. Of course the commission is pleased. As if this were not enough Mr. Roberts specifies the four principal elements of service: (1) cars must run at regular intervals; (2) the cars must be comfortable; (3) the speed should be the maximum consistent with safety; (4) the cars should operate at intervals sufficiently frequent to serve the best interests of passengers. Mr. Roberts is dismissed.

F. G. Daniel is called. He confesses to holding the position of assistant electrical engineer with the commission. There doesn't appear to be any direct reference in what Mr. Daniel said of any knowledge on his part of Eckstein's brewery, but he did know a lot about the physical condition of the line. According to Mr. Daniel there is nothing to prevent the company from giving good service except the physical condition of the road, and that was terrible. Mr. Daniel said this just casual like. The reader should note it carefully. It is going to loom up later in large letters.

William H. Freeman called. He has been with the commission fourteen years as a railway engineer. "Have you," asked Mr. Cooke, assistant counsel for the commission, in addressing Mr. Freeman, "at the request of the commission made or had made under your supervision an inspection of the rolling stock of the Staten Island Midland Railway?" He had. And this is what he found: A total of eighty-one cars, thirty-three of which were out of service. Of twenty-six of the single-truck safety cars examined on May 31 the percentage of those that needed repairs was:

	Per Cent.
Painting	65
Destination signs dirty	100
Cars with broken glass	50
Curtains missing	34
Hand brakes stiff	23
Air gage glass or hand missing	23
Sand box pipe missing	23
Air gage out of adjustment	15
Doors and steps out of adjustment	23
Seats broken	12

Fifteen of the double-truck closed cars were examined and a list of needed repairs and percentages of cars on the same basis as the safety cars is given below:

	Per Cent.
Line switch inoperative	100
Curtains missing	27
Journal boxes worn	47
Glass broken	53
Platforms sagging	60
Destination signs dirty	60
Doors and steps out of adjustment	20
Brake rigging worn	20

June 22. Hearing continued. W. O. Smith the witness. Mr. Smith, it appears, is supervising inspector in the transit bureau of the commission. Charts, tabulations and other figures presented in evidence. What do they show? Well, for one thing, that operation of this municipal line is always irregular, but particularly so during the non-rush hours. It appears also to be a chronic case of excess of passengers over seats. "Compared with standards of proper operation," asks Counsel Cooke of Mr. Smith, "what would you say as to the showing made by these counts?" "They show," said Mr. Smith, "the service is inadequate in both morning and evening rush hours and during twenty-nine non-rush hour periods."

At another point Mr. Smith said that the overload on the Richmond line varied from a trifling one to as high as 329 per cent. This was in the morning rush. In the evening rush the overload at one period was 234 per cent.

July 6. Hearing continued. Harry S. Fischer, statistician for the commission, the principal witness. Basing his testimony on the company's reports, Mr. Fischer said that from Dec. 1, 1920, to March 21, 1922, the company showed a deficit of $400.72. While the general balance sheet showed a surplus of $4,806.37 as of June 30, 1921, he said, a net debit adjustment charged after that date left the deficit mentioned on March 21, 1922.

For the ten months' period ending April 30, 1922, said Mr. Fisher, the total operating revenue was $334,640 and the total operating expenses $311,228, which, with deduction for taxes of $14,445, left a total income for street railway operation of $8,966. There was a non-operating income of $824, making a gross income of $9,790, from which $9,745 for interest was deducted, leaving a net corporate income of $45 for these ten months.

Such in brief is the record made by the city of New York in running its little road down on Staten Island and as brought out by the New York Transit Commission in its general inquiry into the traction situation under direction from the Governor and the Legislature.

One-Man Car Not to Blame for Accident

J. P. Wadhams, assistant engineer of the Connecticut Public Utilities Commission, has submitted his report on the accident in Meriden on June 18, when a one-man car of the Connecticut Company injured a passenger and two occupants of an automobile and damaged five other automobiles. He believed that the failure of human agencies to perform prescribed duties and not the type of car in use was the cause of the accident. His investigation convinced him that the presence of an additional man would not have prevented the accident. He suggested as a remedy that the company's attention he called to a previous recommendation on instructing motormen in such measures as are necessary to prevent a car getting beyond control. He further suggested the installation of air buttons in all cars, inside a small cabinet plainly marked "air button."

Rerouting Ordinances Passed

After a delay of nearly two years the City Council of Cincinnati recently passed ordinances rerouting twenty-five routes of the Cincinnati (Ohio) Traction Company in the business section of the city. The rerouting plan does not call for the construction of any new track except the installation of a few low curves. The report of the Council committee states that it is apparent that the benefits accruing from the installation of the rerouting plant will be: (1) the speeding up of cars and the rendering of better service and (2) the cutting down of expenses of operation which ultimately will be reflected in lower fares.

The various ordinances passed will become effective within thirty days, unless they are subjected to a referendum. W. Jerome Kuertz, Street Railroad Director, said that the entire rerouting plan will not be put into effect, however, for aproximately three months. It is understood, however, that the routes that will not require special construction will be changed as soon as the thirty days referendum period has expired.

Terre Haute's Toonerville Trolley

Whimsical Description of Special Station Service Written for Local Paper

Terre Haute has a Toonerville trolley. At least that is the way the *Saturday Spectator* of Terre Haute refers whimsically to the line which is run between Union Station and Wabash Avenue by General Manager E. M. Walker of the local company as a special service.

As the *Spectator* sees it, running the car is the least of the duties of the conductor, G. W. Ellis. As the door swings open and you alight from the car at Union Station did you ever notice, says that paper, the little old man who takes your bag and helps you down the steps? If you are heavily laden, old, or have several children with you, he carries your packages into the station and perhaps even helps you check your baggage.

This man, the conductor of the emergency car at Union Station, meets every train that comes in. With a rosebud or a ragged robin in his coat lapel, his cap tilted at a jaunty angle on his white head, and a smile on his face, he welcomes all travelers entering and leaving Union Station.

His car, the emergency car, is switched on a side track, and if a train happens to draw into the station when the regular street cars are not there, Mr. Ellis invites prospective passengers into his car and takes them to town. Before the emergency car was put on travelers often had to wait ten or fifteen minutes for a street car. Now there is always one at the station.

STRANGERS APPRECIATE COURTESY

"Some days I never leave the station," said Mr. Ellis. "Others I make as many as five or six trips to town and back. But I'm always busy directing people and helping them with their baggage. If I see a stranger, I go up to him, ask him where he wants to go, and tell him how to get there.

"I pride myself on the fact that no one has yet asked me a question I couldn't answer. I've studied up on Terre Haute and Terre Hauteans and I think I could answer any question that could be asked of me about them.

"I direct people to the hotels, to the stamping mills, the hospitals, the river; tell them who the most influential men are, Terre Haute's chief industry, and a hundred and one other things. But if they talk to me for any length of time, I convince them that Terre Haute is the garden spot of the world. I tell all the good points but fail to mention any drawbacks.

"The park in front of the station gives strangers a good impression of the city right at the start. The women especially always comment on it and admire it.

"If a blind person happens to get off the street car, I always lead him into the station, help him to get his ticket and check his baggage. Or if a mother with several children happens along, I help her get settled. I never let old people carry their baggage. I always take it into the station for them.

"Many of the people take my help as a matter of course. But others comment on it and ask how I happen to do it. Then I tell them about the emergency car and how the traction company wishes to welcome strangers to Terre Haute, not by making them wait for a car to take them to town, but by always having some one there to greet them when they arrive and to help them in every way possible.

"They say that Terre Haute is a friendly city—that they know of no other place in the United States having such a system of welcoming strangers.

"There comes a woman now who looks as if she didn't know exactly where to go. I guess I had better go help her," he said, as he pushed his cap over one ear and started off.

A relieved look spread over the face of the bewildered looking stranger as Mr. Ellis, his own face aglow, stepped up to her, took her bag, and ushered her to the car with as much ceremony as a knight of old would have attended a queen.

Newspapers Indorse Jitney Regulation

Favorable reflection is found in the press of Connecticut just across the border from Rhode Island of the regulation of jitneys in the latter State which went into effect on July 1. All the roads in Connecticut suffered frightfully from the jitney before the recent regulation there, but none of them more so than the lines included in the system of the Shore Line Electric Railway operating to the beaches in both Connecticut and Rhode Island.

A considerable measure of protection came to the company under the Connecticut regulatory act of a year ago. Now similar protection is to be afforded in Rhode Island. The extent to which this is so in Rhode Island was indicated in the *Electric Railway Journal* for July 8, page 63.

The Westerly *Sun* said recently:

> The State Public Utilities Commission did a good thing not only for the trolley cars of this State but the public as well when it abolished practically every jitney and bus route in the State of Rhode Island July 1. Perhaps the sweeping decision to wipe out the jitney cars which run on regular routes will not be final. But the public utilities are going to find out if the trolley business cannot be made a paying one and so conducted that better service may be given, perhaps at reduced costs. The board believes then that the public will see the uselessness of a foolish competition, which in the end will give no one service.

The Norwich *Bulletin and Courier* said:

> What appears to be a determination to give the needed co-operation that will permit the trolley lines to meet the expense of operation, get a reasonable return for the service rendered and to meet the requirements of the public in the way of service is disclosed by the action of the utilities commission in Rhode Island, where the jitneys have been eliminated.
>
> This does away with that unfair competition, and means that the electric lines are to be given a fair chance to meet the transportation requirements of the public. It is of course an attitude which is no more than ought to be expected.
>
> Rhode Island has come to the same conclusion that other states have. It is not a time to drive existing companies to the wall. Improved service is to come from just such methods as are being employed in this state and which are now adopted in Rhode Island and with the unfair competitors eliminated there will be reason in the insistence upon the improvement of the service just as fast as the trolley lines are able through the patronage provided to accomplish it.

Transportation News Notes

Token Passengers Increasing—The number of token passengers on the lines of the Public Service Railway, Newark, N. J., is increasing each month. A little more than half of the people who travel on the cars use tokens.

Reduces Fares Within Albany.—The Schenectady (N. Y.) Railway has made a reduction in fares from 8 cents to 7 cents on its lines which operate over the United Traction Company's tracks in Albany. A recent decision of the Public Service Commission reduced the fares of the United Traction Company.

Lower Fare Ordered.—Following a session of the City Commissioners of St. Augustine, City Manager Masters was instructed to notify the St. Johns Electric Company to reduce its fare from 6 cents to 5 cents. The 6-cent charge was authorized during the war to continue for six months after the declaration of peace.

Emergency Increase Denied.—The Alabama Public Service Commission has refused the application of the Mobile Light & Railroad Company for permission to increase fares from 7 cents to 8 cents. This increase was sought as an emergency measure pending the valuation of the company's property. The valuation matter is now before the commission.

New Line Started.—The Springfield (Mass.) Street Railway on June 5 instituted service on its new line from Carew Street through East Springfield to Berkshire Avenue, on the route to Indian Orchard and Palmer. This line was built last year. It accommodates industrial workers of East Springfield, Indian Orchard and Chicopee Falls. Hourly service is maintained.

Fares Cut in Boulder.—The Boulder (Col.) Street Railway recently announced a reduction in fares averaging 20 per cent. The price of books of twenty rides has been reduced from $1.50 to $1.25. Strips of seven tickets are being sold for 50 cents. The single cash fare remains at 10 cents. C. A. Semrad, general manager of the Western Light & Power Company, operating the local lines, explained that the reductions were made in the hope that they would induce the public to patronize the lines more freely.

Personal Mention

J. A. Greenland Appointed Transportation Superintendent

J. Allan Greenland, who has been general passenger and freight agent of the Indiana Service Corporation, Fort Wayne, Ind., has been appointed superintendent of transportation and traffic. In this capacity his jurisdiction in transportation and traffic matters will extend over the Fort Wayne & Decatur Traction Company and the Fort Wayne, Van Wert & Lima Traction Company, as well as over the Indiana Service Corporation. By his advancement Mr. Greenland fills the vacancy caused by the resignation of R. N. Hemming, who recently became associated with the Railway Audit & Inspection Company as the manager of that company's Detroit office.

Mr. Greenland has been engaged principally in steam and electric railway work since his graduation from Roanoke College, Salem, Va., in 1904. After the completion of a three-year course there, he served for eighteen months in the engineering department of the Lake Shore & Michigan Southern Railway in the development of its lines in eastern Pennsylvania. Temporarily leaving the railroad industry, he was engaged in the general builders and supply business for three years at Roanoke, Va. For the following three years he was connected with the Cleveland & Erie Railway at Girard, Pa., in the traffic and transportation department. Mr. Greenland received his appointment as general passenger and freight agent of the Fort Wayne & Northern Indiana Traction Company in 1911. He has held this position until his new assignment, which became effective on May 15.

Mr. Greenland was born in Clarion, Pa., on Sept. 18, 1881.

Samuel W. McCall an Eastern Massachusetts Trustee

Homer Loring has resigned as chairman of the public board of trustees of the Eastern Massachusetts Street Railway and former Governor Samuel W. McCall has been appointed by Governor Cox of Massachusetts to fill the vacancy. The salary is $5,000 a year.

Arthur G. Wadleigh, who was a member of the board, has been designated as chairman of it. Mr. Wadleigh is a lawyer, formerly city solicitor of Lynn, and a former member of the Massachusetts Legislature, and by the consent of all the attorneys in the case he took the leading part for the communities at the time the fares and districts of the Eastern Massachusetts were investigated by the Public Utilities Department.

The appointment of former Governor McCall was confirmed by the Governor's Council on July 12, the same date that the nomination was made, under a suspension of the rules. He has been a prominent figure in Republican politics for many years, as a member of the Massachusetts Legislature and a member of Congress. Mr. McCall was Governor from 1916 to 1919, when he was succeeded in that office by Calvin Coolidge.

S. L. Vaughn a Modern Manager at Grand Rapids

With the remark that "old-time railroading was not much like the present," S. L. Vaughn, vice-president and recently appointed general manager of the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., shows that he is a modern of the moderns. He knows present-day methods and has definite ideas concerning future development. He is well qualified to compare the past and the present, for his background is that of "the old days." He combines the past experiences and the advanced ideas into an able solution of present-day problems. Thus works Mr. Vaughn.

S. L. VAUGHN

Of the various means of approach to the mahogany chair which every dramatist attributes to every executive, Mr. Vaughn chose telegraphy. He learned it while working as baggage man and tie inspector for the Chicago & West Michigan Railroad, and learned it, he says, during his leisure hours. Not only this knowledge of telegraphy but his tenacity and ability put him in the successive positions of telegraph operator at Fremont, agent at Holton, agent at Fremont and commercial agent of the Barryline Steamers at Grand Rapids. All this happened between 1884 and 1902. After opening a city office for the company, he was promoted in 1903 to general freight and passenger agent of the company with offices in Chicago. There he remained until 1906, when he joined the Grand Rapids, Grand Haven & Muskegon Railway, as general accountant. In the following year he was appointed traffic manager to look after the increasing passenger and freight business. In February of this year he was elected vice-president, and in June were heaped upon him the added responsibilities attached to the post of general manager.

More Honors and Work for W. P. Strandborg

W. P. Strandborg, Portland, Ore., is again in the public eye. The publicity and advertising man for the Portland Railway, Light & Power Company has just been chosen to head a committee of the Associated Advertising Clubs of the World, which has under consideration plans for organizing a national association of public utility advertising men. Bill, as he is known to the fraternity, was chosen for this post at the recent annual convention of the Advertising Clubs at Milwaukee. The new body, when organized, will become a new department of that association, of which Bill is a vice-president.

Bill Strandborg has a regular job with the Portland Company under President Franklin T. Griffith, but nobody ever seems to have caught Bill working at it. *Watt's Watt* and the other very successful advertising of the Portland Railway, Light & Power Company appear regularly, but Bill, who writes all of it, never seems to have a hand in it, for like as not he will be in Atlantic City today, in Boston tomorrow and in Cleveland a few days later on. He is one of the greatest globe trotters in the world. When he isn't traveling for his own company, he is being sent somewhere as a delegate by the Portland ad men or the Elks or some other body which signifies goodfellowship. Bill just radiates good fellowship. Even his visiting card is in the form of a folder that advertises the Pacific Northwest and invites you out there among the murmuring pines and the hemlocks.

Bill was born in Ohio and usually worms a ticket home out of Mr. Griffith every year. He took Greeley's advice when a young man and went West, serving on many papers on the coast in all the capacities from reporter to editorial writer and managing editor. When Mr. Griffith assumed the reins at Portland he found himself confronted with the problem of bettering the public relations of the company as one of the first things to be done, and to help him in this work he sought out the writer of the kindly, shrewd and whimsical editorials of the Portland *Telegram* as best qualified for the job and found, as one might expect, that they were being written by a jovial little fat man. As the reader must already have guessed, the formal name of this gentleman on the payroll of the *Evening Telegram* was William P. Strandborg.

Friends, Says P. S. Arkwright of Railways and Automobiles

Automobiles and street railways are not enemies—not even friendly enemies—explains Preston S. Arkwright, president of the Georgia Railway & Power Company, Atlanta, Ga., but the mistaken idea that the two are opponents arises because the service of the two is misunderstood. Mr. Arkwright delivered his opinions on the competition between the two means of transportation in an address, called "Friendly Enemies," before the Atlanta Automobile Association in April. The address has more than a momentary interest.

It would be impossible, he points out, for everybody to operate a private machine, even if he were able, for the streets would be so congested that all private vehicles would have to be ordered from the streets. The legitimate uses for the automobile in the transportation field will be in territory where business would not justify the building of rail lines. Mass transportation, however, states Mr. Arkwright is incapable of being furnished by automobiles. Jitneys pay little property tax and nothing to the cost of pavement, operate at will, and are without obligations of any sort. The street railway, on the other hand, is backed by a responsible operating party, provides a safe means of travel, and bears property taxes and paving taxes, though the original reason for this paving tax has long since passed. The expenses of service have increased in greater ratio than gross receipts. Operation of private automobiles, said Mr. Arkwright, cuts receipts of the street railway, and in Atlanta makes the rate of fare at least one cent higher than it would be were there no automobiles. Such operation, he said also, restricts the ability of the railway company to furnish the quantity and quality of service desired. Mr. Arkwright closed with the repeated admonition: "Don't ever let anybody persuade you that the street railroad is the enemy of the automobile, and I hope you never feel that the automobile is the enemy of the street railroad." His remarks have been reprinted in a pamphlet of seventeen pages.

Mr. Ludwig Auditor at York

Samuel Ludwig, who recently succeeded the late J. J. Landers as auditor of the York Railways, York, Pa., has been continuously connected with this company for twenty years. He began as a clerk in the auditing department and worked his way up to the position of chief clerk. His promotion to assistant auditor under Mr. Landers came as a natural result of his careful study of the principles as well as the practice of accounting. So well did he familiarize himself with the duties of the work of the auditing department that his selection to succeed Mr. Landers, and thus head his department, was the natural termination of two decades of endeavor.

C. E. Fahrney has been made vice-president of the Ottumwa Railway & Light Company, Ottumwa, Iowa. He is also general manager of the company.

C. H. Wales is now electrical engineer of the Olean, Bradford & Salamanca Railway, Olean, N. Y. W. J. Woodcock has been appointed superintendent of power station and S. W. Hardin superintendent of overhead construction.

James E. Lamb has resigned as assistant chief of the bureau of accounts and statistics of the Public Service Commission of Pennsylvania and is now practicing as a certified public accountant as a member of the firm Busher, Lamb & Company, Harrisburg, Pa.

H. R. Roudebush, who has been auditor for the Toledo & Western Railroad, Toledo, Ohio, has been appointed secretary and treasurer of the Community Traction Company, Toledo. David A. Moore was formerly secretary and treasurer. He resigned to engage in private business.

J. I. Mange has been elected president of the Southern New York Power & Railway Corporation, Cooperstown, N. Y. He is president also of the St. Johns Electric Company, St. Augustine, Fla., and a vice-president of the J. G. White Management Corporation and the Eastern Pennsylvania Railways.

F. D. Shoemaker, who for the last three and a half years has been in the service of the Illinois Traction System at the general shops of the company at Decatur, Ill., has resigned, effective July 15, to assume the position of staff engineer of the Texas Company, Railway Division, with headquarters at Chicago, Ill. Before going to I. T. S. Mr. Shoemaker was connected with the old Fort Wayne & Wabash Valley Traction Company and the Fort Wayne & Northern Indiana Traction Company, at Fort Wayne and La Fayette, Ind., respectively.

Charles H. Hubbell, Cleveland Ohio, has announced himself as a candidate for Lieutenant Governor of Ohio at the Democratic primaries on Aug. 8. Mr. Hubbell, now at the head of Charles H. Hubbell & Company, certified public accountants, is well known among utility men, particularly in the Central West. He was formerly secretary of the Texas Power & Light Company and auditor of the Illinois Traction Company. He is against trading stamps, cigar coupons, etc., and says they should be legislated out of existence. Instead of being "liberalized" the provisions of the Volstead act and other prohibition laws, says Mr. Hubbell, should be made more stringent. It is his idea that the State Utilities Commission should not be permitted to allow any utility company a value for rate-making purposes in excess of the amount for which its property appears on the tax duplicate. Moreover, he says that municipal bonds issued for the construction or acquisition of public utilities should be a lien only on such utilities.

Obituary

Lefferts S. Hoffman, general attorney for the Public Service Railway, Newark, N. J., died in May. He was attorney for the Rhode Island Company for some time, and was connected with the United States Rubber Company also, in a legal capacity.

John W. Williamson, assistant superintendent of transportation for the Ohio Valley Electric Railway, Huntington, W. Va., died at his home in Huntington. Mr. Williamson joined the Baltimore & Ohio Railroad in 1893, and later became general freight agent of the Ohio Valley Electric Railway. He was appointed assistant superintendent of transportation in 1918. He was fifty years old.

William Reiser, treasurer of the Electric Bond & Share Company, died recently near Port Jervis, N. Y., while on an automobile trip with his family. He was born in New York City, March 9, 1881. He joined the Electric Bond & Share Company in 1909 and was elected treasurer in 1919. In addition, he was treasurer or assistant treasurer of the companies associated with the Electric Bond & Share Company.

Harvey D. Loveland, member of the California State Railroad Commission, died on June 11 in San Francisco after several weeks illness. Col. Loveland was credited in railroad commission circles with being the dean of public utility commissioners in the United States in point of service. He was first appointed to the California commission in 1907 by Governor Gillett and at once established himself as an authority on transportation problems. He was elected to the commission in November, 1910, and upon the reorganization of that body in 1911 became, under the public utilities act, one of its five members. He was again appointed at the expiration of his term and was reappointed on two occasions thereafter. His present term of six years began Jan. 1, 1921.

M. F. Flatley, master mechanic of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., died a short time ago. He previously had been master mechanic of the Dayton & Troy Electric Railway and from 1915 to 1917 of the Lebanon shops of the Terre Haute, Indianapolis & Eastern Traction Company. He was associated with the Westinghouse Electric & Manufacturing Company early in his career, and later with the Interborough Rapid Transit Company, New York, as foreman of car equipment of the elevated division. He was foreman of the elevated division of the Brooklyn Rapid Transit Company for four and one-half years. In 1909 he became master mechanic of the Rochester, Syracuse & Eastern Railway, Syracuse, N. Y., joining the Indianapolis Traction Company in 1915.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Early Electrification of Bombay Railways

Information from the Vice-Consul at Bombay, India, states that the proposed electrification of the Bombay steam railroads will be started immediately and will involve the eventual expenditure of 40,000,000 rupees, all the work to be completed by 1927.

The first step in the project will be the electrification of the Harbor branch of the Great Indian Peninsula Railway. Messrs. Merz and McLellan of London are the consulting engineers in this work. The local chief engineer left a short time ago for England with the complete plans. The requests for bids, it is understood, will be made as soon after his arrival in England as they can be prepared.

The Harbor branch, recently completed, connects Victoria Terminus with the Port Trust Railroad and rejoins the main line of the Great Indian Peninsula Railroad at Kurla, which is located on the southern end of the Island of Salsette, about a mile from the extreme northern end of the Island of Bombay. The branch is about 7 miles long. It is double-tracked as far as Sewri (about half way) and single-tracked from there to Kurla. No equipment has yet been bought for this branch; but it is understood that electric equipment will now be purchased.

The Tata Hydro-electric Power Company will furnish all the power. The total hourly maximum demand on the Harbor branch will be 2,500 kw. No new transmission lines will be necessary, the power being supplied from existing substations.

It is planned to start work on the electrification of the first part within six months. It is to be completed in 1924. The acting consulting engineer has estimated that the Harbor branch is about one-thirteenth the size of the whole project.

The second step will be the electrification of the main line of the G. I. P. Railroad from Victoria Terminus to Kurla. This line now has two tracks and two more are in process of construction as far as Kurla.

This second step will take a total hourly maximum demand of 6,650 kw., which will be provided by two substations of 3,500 kw. each. Bids will be advertised for in about six months.

A third stage will be Kurla to Thana, 14 miles; this will require an additional 3,500 kw. The final stage is from Thana to Kalyan, the extreme limit to which steam suburban lines run now. Kaylan is 34 miles from Bombay. This extension will require 2,000 kw. additional power.

Meanwhile, the Bombay, Baroda & Central India—a two-track line—is to electrify its suburban lines from Colaba Station to Virar, a distance of 38½ miles. This will complete the electrification of the steam railroad lines for suburban traffic. No decision has been reached on the Port Trust Railroad electrification.

It is understood that the government of India will provide the necessary funds, the Viceroy having guaranteed them at a conference with the railroad agents, the consulting engineer, the governor of Bombay, and the financial secretary. It is known that two offers to supply the capital were made by English banks, but it is believed that an effort will be made to raise all of it in India.

$100,000 to Be Spent in Rehabilitation Work

Approximately $100,000 will be spent in the rehabilitation of the Cincinnati, Georgetown & Portsmouth Railroad and its branch the Felicity & Bethel Railway, when the road is taken over by an organized syndicate. L. G. Van Ness, who is the general manager of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, has announced that new equipment will be purchased, including cars, rails and overhead wires. Several new substations will also be added at various points along the line to provide the necessary power supply.

Thirty-four Locomotives for Japan

The Imperial Government Railways of Japan has just placed with the English Electric Company for its Dick Kerr Works at Preston an order for thirty-four complete electric locomotives of the total value of upward of £500,000. This represents the whole requirement of locomotives up to the end of 1923 for those sections of the main line railways which the Japanese Government has decided to electrify at once.

Eight of the locomotives now ordered are for heavy express passenger service. They are of the 2-C-C-2 type. Their weight is approximately 96 tons and they are designed to haul a 415-ton train at a balancing speed of about 60 m.p.h. Each locomotive is equipped with six D. K. 86A motors rated at 306 hp. at 500 volts, the motors being connected in two groups of three in permanent series on a trolley voltage of 1,500 volts. The control equipment is of the standard "English electric" cam-shaft muliple-unit type.

Of the remaining locomotives, nine are for local passenger service and seventeen are for heavy freight service. These twenty-six are all of the B-B type and will weigh approximately 56 tons each. They are equipped with four D. K. 86A motors similar to those on the express passenger locomotives, but in this case the motors will be connected in two pairs in permanent series. Here too the control is the standard "English electric" multiple-unit type. The locomotives for local passenger service are designed to haul a 315-ton train and the freight locomotive a 600-ton train, the balancing speeds being about 55 and 40 m.p.h. respectively.

Short Delivery for Interborough Cars

As announced in these columns in the issue of May 6 the Transit Commission of New York directed the Interborough to order 350 new cars, 100 of them immediately. The company obtained bids at once and has now placed an order with the Pullman Company for 100 new trailer cars, which will provide 5,000 additional seats and help relieve existing congestion.

The bid of the Pullman Company covers car bodies and trucks. The wiring and other installation will be made at the company's shops at 148th Street and Lenox Avenue, to which the commission recently authorized additions of a temporary character to facilitate the equipment work. It is expected that the delivery of car bodies and trucks will begin in November at the rate of five a day and that delivery will be completed in December. If this schedule can be adhered to, the cars, which will be in the shops about three weeks, will all be in service by Christmas.

It is estimated that the new cars will cost the Interborough between $1,875,000 and $2,000,000. A part of the expense will be met out of existing funds of the company and the rest will be met by the issuance of $1,400,000 of car trust certificates, designated as "Interborough Equipment Trust Series A," and bearing interest at the rate of 6 per cent, a plan that has received the approval of the commission. The cost of each car when fully equipped is estimated at between $18,000 and $20,000.

Metal, Coal and Material Prices

Metals—New York	July 11, 1922
Copper, electrolytic, cents per lb	13.937
Copper wire base, cents per lb	15.75
Lead, cents per lb	5.75
Zinc, cents per lb	5.72
Tin, Straits, cents per lb	31.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.32
Somerset mine run, Boston, net tons	3.62
Pittsburgh, mine run, Pittsburgh, net tons	....
Franklin, Ill., screenings, Chicago, net tons	....
Central, Ill., screenings, Chicago, net tons	....
Kansas screenings, Kansas City, net tons	3.30
Materials	
Rubber-covered wire, N. Y., cents per lb	6.25
Weatherproof wire base, N. Y., cents per lb.	15.50
Cement, Chicago net prices, without bags	$2.05
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	91.50
White lead, (100-lb. keg), N. Y., cents per lb.	12.50
Turpentine (bbl. lots), N.Y., per gal	$1.22

Chicago Testing Fare Boxes

The Chicago Surface Lines is contemplating the installation of Johnson fare boxes on all cars. A trial installation of fifteen motor-driven boxes has been made and a study of their operation and the results obtained is going on. The change in fare to 7 cents with a lower ticket rate has precipitated a more prompt consideration of the purchase of boxes. Hand-operated boxes may be installed to begin with and later be replaced with motor-driven boxes. The company will also substitute metal tokens for the paper tickets now in use.

Development Work Involves Millions of Dollars

Cities Service Company recently announced its approval of plans involving the expenditure of several millions of dollars on the properties of the Ohio Public Service Company, a subsidiary serving the northeastern section of Ohio. The plans approved call for the construction of a 60-mile 130,000-volt steel tower transmission line from Lorain to Mansfield, Ohio, a similar line 55 miles long between Warren, Alliance and Canton, where it will tie in with the system of the American Gas & Electric Company, which now operates a large power plant on the Ohio River.

In addition, the plans provided call for the installation of a 20,000-kw. turbine at the Edgewater plant at Lorain, Ohio, and a new 30,000-kw. turbine in the Toledo Edison Company plant in Toledo. This development work when completed on the Ohio properties at Mansfield, Massillon, Elyria, Lorain and Alliance will make available for service generating capacity now held in reserve in the individual plants. A new 10,000-kw. turbo-generator has been authorized for the Empire District Electric Company in Joplin, Mo., together with other equipment for subsidiary utility properties of Cities Service Company which involves an expenditure of an additional $1,000,000.

$32,500 to Be Spent in Railway Department

The 1922 construction program of the Columbus Electric & Power Company, Columbus, Ga., announced several weeks ago by R. M. Harding, manager, includes the sum of $32,500 to be expended in the electric railway department. Carhouse improvements total $1,500; purchase of three new street cars $20,000 and miscellaneous track work amounts to $11,000.

Great Northern to Electrify

The Great Northern Railway is planning to electrify its system in the Rocky Mountain States, according to reports in the financial district this week. The Spokane region is to be developed first. The work is expected to start about 1924.

Rolling Stock

Western Ohio Railway, Lima, Ohio, will have its new steel cars which were ordered recently delivered by July 20.

Chicago, Aurora & Elgin Railroad, Aurora, Ill., will shortly place an order for twenty new combination parlor and dining cars.

Department of Street Railways, Detroit, Mich., will open bids July 24 for 100 new cars of the Peter Witt type, 100 pairs of trucks and the necessary electrical equipment for their operation.

Kansas City (Mo.) Railways has been authorized through its receivers to purchase the twenty large type cars under an order filed in Federal Court signed by Judge Kimbrough Stone and Judge Arba S. Van Valkenburgh. The application was made several weeks ago.

Dallas (Tex.) Railway has purchased five one-man cars with two express cars for installation on the Dallas-Terrell interurban line. The cars were constructed by the American Car Company. These one-man interurbans will be the first to appear in the south or southwest.

Jacksonville (Fla.) Traction Company has announced through its manager, J. P. Ingle, that three of the one-man cars had arrived. These cars will take the place of the two-men cars on one of the lines serving the greatest number of people in the city. In all twelve cars have been ordered to be ready for operation the latter part of August.

The Reading Transit & Light Company, Reading, Pa., has secured equipment of sign frames for advertising use on the outside of the cars. The frames, attractive in appearance and made of metal, were finished in the shops of the company at Reading and are of uniform size and color to harmonize with the exterior finish of the cars. Posters are placed in the frames to inform the public along all city and suburban lines of attractions at various places reached by the cars. At present they are used especially for Carsonia Park, where the advertising of free band concerts, dancing, baseball and other diversions has been followed by a large volume of business since the opening of the outdoor amusement season.

Track and Roadway

Olean, Bradford and Salamanca Railway, Bradford, Pa., will start the repairing of pavements along its tracks in all parts of the city.

The Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio, will tear up its street car tracks the entire length of South Washington Street before next April.

The Winona Interurban Railway, Warsaw, Ind., expects to place a contract within the next two weeks for necessary tracks and switches for connecting with the Wabash Railroad at New Paris, Ind.

Chattanooga (Tenn.) Traction Company is planning the extension of its lines which will join the Red Bank and Signal Mountain lines. Making the connection will include the laying of about 2½ miles of track. The investment will amount to approximately $60,000.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is engaged in the rebuilding of the track intersection at West Water and Grand Avenues. An entire new intersection will be put in, including a double-track curve at the Caswell Block corner and the removal of the single-track curve at the Gimbel corner. This work will cost about $46,000 and will take one month to complete.

British Columbia Electric Railway, Vancouver, B. C., is relaying 1,000 ft. of track with the paving of a section of Wilson Road, Kerrisdale. This work will cost $16,000. Work has been started on the double-track Broadway west extension of 1 mile from Trafalgar Street to Alma Road. The track will cost $75,000, of which $50,000 will be spent on local labor and materials.

Indianapolis (Ind.) Street Railway has been ordered to extend city street car service to the city limits in College Avenue by the Board of Public Works. Officers of the company pointed out that the company did not own the tracks in College Avenue north of the terminal of present service. The works board in ordering the extension offered no suggestions on means to be employed by the company in acquiring the use of tracks north of that point, which now belong to the Union Traction Company.

San Diego (Cal.) Electric Railway started work on May 22 on the reconstruction of its Logan Avenue line. The reconstruction will include 3.9 single-track miles. The replacement is with 114-lb. girder rails with special track-work of the same type and weight. 100-lb. T-rails and 75-lb. A.S.C.E. rails will also be used. All will be laid on twin steel ties spaced 5 ft. 6 in. center to center. All joints are to be welded except on the special track-work. The estimated cost of the reconstruction is $268,000.

International Railway, Buffalo, N. Y., was to start on June 10 the construction of double trackage in Bailey Avenue for a distance of 8,000 ft. Bailey Avenue at this point at present has but a single track and the work, which is estimated to cost about $110,000 and to take two months to complete will include reconstruction of the present single track and the construction of an additional track, making a double trackage for this distance. H. E. Riexinger is the chief engineer in charge of the project. The work will be done by day labor.

The Connecticut Company, New Haven, Conn., is planning to double-track the line on Main Street, in Manchester, from the center, south to Locust Street, a distance of some 1,500 ft. The company is asked to provide ten-minute service on this line and is unable to do so with a single track. Business interests of the town feel that the entire street should be double-tracked. N. J. Scott, Manager, of the Hartford Division, has expressed himself in favor of such a plan, but states that it is a matter of expense with his company.

British Columbia Electric Railway, Vancouver, B. C., started work on June 5 on a one-mile double track extension of its Broadway West line. The cost will be about $75,000. Depending upon the consent of the city, permanent track will be laid, 87 lb. rail being used. The new line will provide transportation for a large district and afford a new route for two suburban lines to come into the city, relieving a parallel line. The line is to be in operation by Sept. 1. The construction of this line follows an agreement with the city of Vancouver extending the present 6-cent fare after June 30 when it would have expired. The company is also relaying 1,000 ft. of track on its Kerrisdale line with permanent construction at a cost of $16,000.

Power Houses Shops and Buildings

Tampa (Fla.) Electric Company has purchased a 600 hp. B. & W. boiler.

Trenton & Mercer County Traction Company, Trenton, N. J., will purchase soot blowers.

Shreveport (La.) Railways will build a new carhouse and repair pits to shelter twenty cars.

Texas Electric Railway, Dallas, Tex., has purchased a 400-ton hydraulic wheel press from the Chambersberg Engineering Company of Philadelphia, to supplement a Caldwell press which will be used for lighter work.

Olean, Bradford & Salamanca Railway, Olean, N. Y., expects to build in the near future a brick and steel sash general warehouse and storage building. The company will also purchase equipment for handling hard coal to and from bunker storage for car heaters.

Chicago, Aurora & Elgin Railroad, Aurora, Ill., has been authorized to construct a new freight house to be located on North Broadway. Extensions to the Wheaton carhouse and extensive improvements to the company's power plant are also included in the reorganization plan.

Cumberland County Power & Light Company, Augusta, Me., is planning to spend $1,000,000 for the construction of a new steam station at South Portland and has petitioned the Public Utilities Commission for permission to issue and sell $1,000,000 of its first and refunding mortgage 5 per cent gold bonds for that purpose. This will cover cost of the site, construction and cable connections with the company's existing lines.

Trade Notes

Westinghouse International Company announces that due to its increased business in Argentine it has been necessary to move into larger offices. The new address of the company is Cia. Westinghouse Electric Internacional, S. A., Avenida de Mayo, 1031, Buenos Aires, Argentina. Louis T. Peck is managing director of this branch.

Isidore Newman & Son have announced that the business heretofore conducted by them was incorporated July 1, 1922, and will be continued under the name of Newman, Saunders & Company, Inc. The offices are located at 212 Carondelet Street, New Orleans, La. The firm has long been associated with the financing of utility properties in the South.

Economy Fuse & Manufacturing Company, Chicago, Ill., announces the appointment of Charles H. Bluske as district sales manager of the Los Angeles office at 1304 Maltman Avenue. Mr. Bluske was formerly connected with the Pacific States Electric Company of Los Angeles and succeeds George L. Davis. The Pittsburgh Sales Office of the Economy Fuse & Manufacturing Company has been moved from 2223 Farmers Bank Building to 1006 People's Bank Building, at Fourth Avenue and Wood Street.

National Railway Appliance Company, New York, N. Y., announces that Joseph H. Towle, who joined the selling force of the company some time ago, is now located at Harrisburg, Pa. The company has established an office there to be the Pennsylvania headquarters. Mr. Towle is probably best known to many as master mechanic of the Dayton and Springfield, Ohio, properties of the American Railways. He was later connected with the Railway Improvement Company of New York as sales engineer.

The Barney & Smith Car Company's plant at Dayton, Ohio, which at one time was the largest concern of its kind in the country, will be offered for sale on July 12, according to a court ruling made recently. The plant will be put up at auction by Sheriff Cusick of Montgomery County in compliance with a court order issued in foreclosure of a mortgage held by the stockholders. Valentine Winters, receiver, has announced an organization of Dayton business men will bid on the property.

The Differential Steel Car Company, Findlay, Ohio, reports delivery of eight Differential cars to the Toronto Transportation Commission and a two-car Differential train to the Texas Construction Company. Recent orders for Differential cars include two for the United Electric Railways of Providence, R. I., four for the New Orleans Railway & Light Company, six for the Cleveland Railway Company, two for the Pittsburgh Railways Company. A train of three Differential cars consisting of a motor car and two trail cars has also been ordered by the Community Traction Company, Toledo, Ohio, and the Milwaukee Electric Railway & Light Company has ordered ten Differential cars of the trail type to supplement the equipment they already have in service.

New Advertising Literature

Lourie Manufacturing Company, Springfield, Ill., has issued a leaflet illustrating many of the types of special machines which the company has designed and manufactured for electric railway use.

Joseph Dixon Crucible Company, Jersey City, N. J., has issued a booklet dealing with automobile lubricants. The reasons for the success of Dixon's products are given, and arguments why they should be used in transmissions and differentials.

Martindale Electric Company, Cleveland, Ohio, has issued a folder relating to commutator grinding and undercutting. A card has also been issued giving a scale along the left-hand edge with data regarding commutator troubles, their cause, effect and remedy. Directions for ordering and use of the Imperial commutator stones are given.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued a leaflet entitled "Arc Welding in Electric Railway Shops." The publication describes advantages of arc welding and gives figures showing savings possible by reclaiming railway parts, such as worn and broken brake shoes, side bearings, truck frames, bolsters, door castings, gear cases, air reservoirs, etc.

Carnegie Steel Company, Pittsburgh, Pa., has just issued new editions of its booklets on "Wrought Steel Wheels" and "Industrial Wheels, Gear Blanks and Other Circular Forgings." These booklets give much information of value to electric railways. Dimensions of various types of steel wheels are given, together with tread and flange contours. Standard specifications are also included for solid rolled carbon steel wheels for electric railway service as adopted by the American Society for Testing Materials. The booklet on gear blanks and circular forgings gives dimensions for these parts.

The Conveyors Corporation of America, Chicago, Ill., has issued a new booklet describing its American cast-iron storage tank, which is designed for holding loose, bulky, dry materials for storage or transfer. The tank is sectional and may be secured in a number of sizes. The booklet is illustrated with engravings showing the tanks in use at a number of well-known plants. Diagrams give details of construction and a comprehensive table of weights and measures is included. Copies of the booklet may be secured by addressing the Conveyors Corporation at 326 West Madison Street, Chicago, or on application to the district representatives.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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The Child Is Father to the Man

THE greatest need in the safety crusade now being carried on over the country is the education of every one in the adoption of the safety habit. This lesson can best be learned in childhood, because impressions gained in tender years remain more vivid than those received later on in life.

One of the very encouraging results that the various safety campaigns are showing is the appreciation by many of our Educational Boards of the need for teaching safety in the schools. This is particularly satisfactory because the educational authorities are constantly being urged to include various fads and fancies in the school curricula to the detriment of the amount of time and energy that could otherwise be given to fundamental studies. The safety habit, however, is on a different basis. If it is good for an adult, as all admit, it is even more necessary for children.

The pioneer work done in St. Louis and other schools, through the efforts of Dr. E. George Paine, former principal of the Harris Teachers' College, St. Louis, Mo., and others, has been bearing fruit, and one of the things that is most hopeful in connection with the whole question of safety is this extending attention to safety in the schools. Here is a potential field of great opportunity for managers and operators of electric railway properties, i.e., so to develop their safety campaigns that this instruction will be continued and extended.

Now Is a Good Time to Start a Safety Organization

THE report of the committee on safety, presented last year at the convention of the Transportation & Traffic Association, showed that out of the 131 companies reporting, 50 per cent are spending nothing on safety work, and that the other 50 per cent average only $2,002 per company per year. Only thirty-nine companies reported that they had departmental safety committees, while eighty-six said they had none. In other ways the report of the committee showed that much more could be done to advantage in the way of safety by many companies.

To some extent this can be understood, in spite of the fact that organized safety was introduced on electric railway properties as far back as 1913 and 1914. During the years of the war the railways were handicapped in efforts to carry out campaigns of this kind because of the shortage of labor, the inexperience of many of the new men who were hired and the various war campaigns which were of paramount importance.

Conditions are ripe now, however, for active safety work. Experience gained during the war has taught the effectiveness of co-operative public campaigns to secure a definite community object. A great deal has been learned also as to the best way of organizing for such an object through departmental and other committees and the need for a permanent organization if continuous rather than spasmodic results are to be obtained. Finally, the train force has become a more permanent body than for a number of years past. This may be due to the increasing use of one-man cars, which call for the employment of men capable of earning higher pay. But if these higher grade men, by the exercise of more skill in operation, can cut down the accident cost, the companies can well afford to pay higher wages.

This issue should be of help to those companies planning safety organizations as it gives accounts of methods which have proved successful on many properties.

Organized Safety Work Is the Price of Accident Reduction

THERE is a maxim that self-preservation is the first law of nature, and the courts recognize "self-defense" as an excuse even for homicide. Theoretically, the idea of safety first should be so ingrained in human consciousness that it would not have to be taught in the schools and elsewhere. Actually it is about as hard to get the average man to take precautions against accidents to himself as it is to make him do a great many other things which he ought to do but which he omits because they take a little time or energy.

The electric railway has more interest in the general adoption of safety measures than any other corporation in the community. This is because of the very large accident hazard on the streets. In fact, the public hazard of the electric railway company is probably greater than that of any other interest in each community, though its legal hazard is not identical with its public hazard. But even if there were no legal hazard, the humanitarian doctrine would urge electric railway companies to take a lead in public safety activities.

The idea of general public safety campaigns is comparatively a modern one. It is hard to say who initiated it, but in electric railway circles undoubtedly the honor belongs to the claims department. This department also usually has accepted the responsibility of maintaining interest in the safety campaigns. Undoubtedly it has taken this leading part because the claims representatives are in a particularly good position to see both the expense and the suffering which follow casualties.

The assignment of the claims department primarily to this work on any electric railway is a logical course. Real success, however, must come from co-operative efforts not only from every department but from every one connected with each of the departments. On every employee there rests a certain degree of responsibility, and especially on the executive, because without his encouragement and approval interest will lag and die.

At one time the railways thought they had to do practically all the safety campaign work in a community. This need not be so and should not be so in any progressive city. For this condition the National Safety Council deserves most credit. Through it or one of its subdivisions the forces of the community can be co-ordinated in accident prevention. If the railway company should attempt to conduct a campaign by itself, it might be charged with a purely selfish motive. With the work under the general direction of a community board, the railway company can contribute as much as it is able to the safety movement, yet not be accused of raising humanitarian issues to save money.

The two most fruitful opportunities for the reduction of accidents on the streets are through the school children and the trainmen. Adults are supposed to have learned by experience how to take care of themselves, and if they have not, they have no one to blame but themselves. But without this experience and being naturally impetuous, children are liable to incur all sorts of danger, where there are risks to be run. If safety can be taught as second nature during the school days the lesson will last a lifetime. With the trainmen also safety should be acquired as a habit. After all, it is only taking thought and care, and adults can learn to do this as easily as any one else. That work along these lines is effective and has reduced accidents has now been so clearly proved on many properties as to admit of no doubt.

As in every worth-while result, however, success cannot be obtained simply by wishing for it. This means that careful planning, hard work and persistence are necessary. Fortunately, experience is accumulating in accident prevention work, so that less experimentation is necessary than was once the case. Hard work is a matter in which every one should share, from the executive down. Persistence is largely a matter of organization and individual responsibility. It can best be obtained when the maintenance of this interest is the duty and the principal duty of one or more individuals, called, possibly, safety engineer or engineers.

The qualifications of such a man are laid down in this issue by two of the contributors. According to these specifications, a first-class all-around man is required. But the rewards, certainly in service to his fellows, are great. This is one of the positions on an electric railway which has been created by modern times and should grow in importance.

It is worthy of note that safety engineering for electric railways came into being about the time that automobile traffic began to crowd our city streets. This may be a coincidence or it may be simply an illustration of cause and effect. At any rate, the hazards created by automobile traffic have greatly increased the difficulties of safe operation by electric cars. The danger from careless habits becomes multiplied many times when an individual changes from a pedestrian on the street to the driver of a car. He then not only imperils his own life and limbs by carelessness also but those of many others.

Much of this increased hazard responsibility falls on the street railway company, but it is also shared by every user of the street. This is an added reason for safety measures at this time. Nevertheless, statistics from a number of companies have shown that in spite of the increased automobile traffic of the present day, accidents with good safety organization are fewer than before the automobile era.

Recent Car Design Has Been Along Safety Lines

IT IS notable that the most conspicuous developments in car design within recent years have been in the direction of safety. The inventor and car designer have been working with the same objects in view as the operating manager. Unfortunately passengers will insist on taking chances if allowed to do so and many if not most of these recent inventions relate to ways of preventing passengers from injuring themselves.

These changes in design and practice have gone so far in some cases as to cause complete retirement of designs. For example, for many years the open type of car with side running board was very popular with the traveling public, but the number of boarding and alighting accidents was so great that railways could not afford to continue the use of this type of car in service. Hence, no new open cars with side running boards have been built for a number of years, and many of those formerly in existence have been converted to the type of open car with center aisle.

Boarding and alighting accidents have also been greatly reduced through the vestibuling of cars and the use of folding doors and steps, together with the addition of safety devices, which provide for more efficient braking and the interlocking of the door and step operation with that of the control and brakes. Comparative records made on the same system with the same class of average city service showed that in a period of nine months on 130 cars equipped with folding steps and air-operated doors there were less than forty accidents. During the same period on 700 city cars not equipped with folding doors and steps there were 687 boarding and alighting accidents while the cars were standing and 253 accidents while the cars were moving. The comparison in this case is one accident for every thirty-two cars equipped with folding steps and air-operated doors as against 1.3 accidents for every car not equipped with folding doors and steps.

A reduction in the number of accidents occurring while the cars are moving can be materially cut down through the interlocking of the door and step operation with that of the control so as to make it impossible to start the car until the doors are closed and the steps folded.

A few years ago only the heavier type of city cars were equipped with air brakes. Now we find comparatively light city cars with air brake equipment. There is no doubt that this has also been a considerable factor in reducing accidents. The use on cars of safety devices such as the dead man type of control with emergency features of braking received considerable impetus through its application and general use on safety cars. Many of the features which were brought out primarily for this type of car have now been extended to heavier types, with great success.

Great advances have been made in the development of door engines. In the first types which were installed about twenty years ago there was a source of danger through the building up of air pressure whenever the door would bind or meet an obstruction, which would then cause the door to close with such force as to be a menace to anything in its path. Late types of engines can now be adjusted to maintain an even pressure over the entire length of the door closing and the use of collapsible shoes and other interlocking devices makes it almost impossible to have a door accident through the use of automatically operated doors.

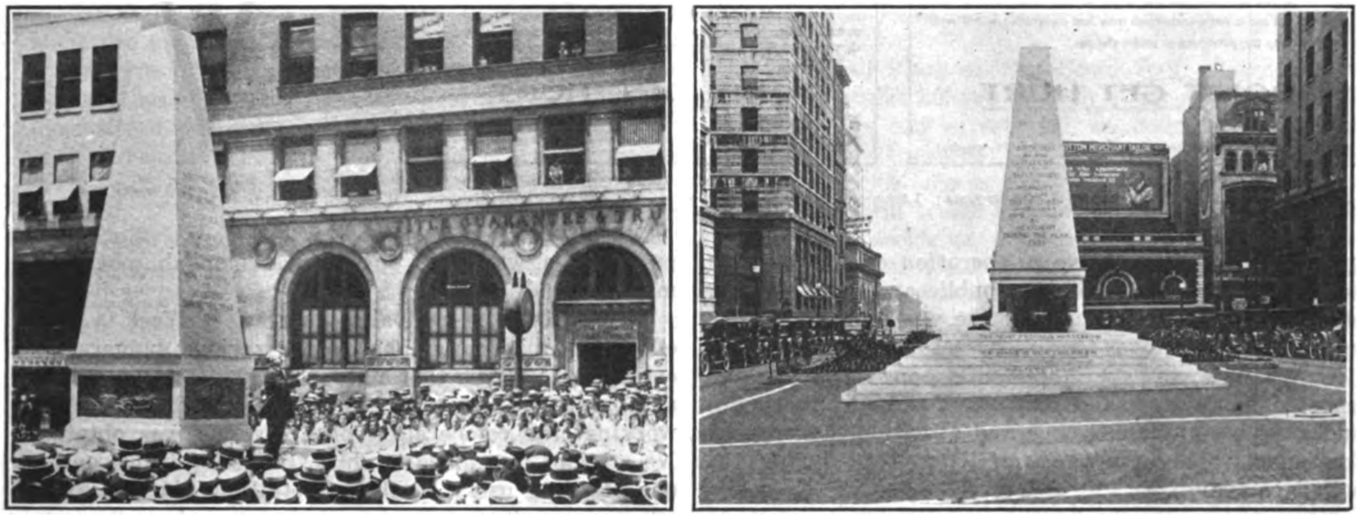
How Safety Week Was Conducted in Baltimore

Under the Direction of the Merchants' and Manufacturers' Association, All Interests in the City Participated in a No-Accident Week Last Month—The Street Railways Took an Active Part

By L. H. Palmer
President American Electric Railway Transportation & Traffic Association
Assistant to President United Railways & Electric Company of Baltimore

THE continued increase in the use of the streets in Baltimore, Md., with consequent piling up of congestion, particularly in the business district, has resulted, as in other cities, in an increased number of public accidents; that is, those occurring on the streets and sidewalks of the city. These accidents come under the general category covered by public accidents as distinguished from those occurring in industrial plants, individual homes and places not specifically under the supervision of the public authorities.

In 1921 the press of Baltimore agitated the question of increased safety in the streets, and as a result of its efforts, particularly those of the *Evening Sun*, a "No-Accident Week" campaign was planned and put under way to cover the entire State. After considerable preparation this was carried out during the month of July and resulted in an appreciable decrease in the number of accidents, and as well aroused the citizens to the need for use of greater precautions.



A Monument Was Erected on a Prominent Square and Dedicated by the Mayor During No-Accident Week

During the spring of this year the subject was again brought to the front by the increasing number of accidents on the streets, and a representative committee was appointed by the Merchants' and Manufacturers' Association (which corresponds to the Chamber of Commerce in many cities), with the result that a "No-Accident Week" was planned to begin June 11. One of the compelling reasons for choosing this June week was to get the movement under way while the schools were still in session. It was decided to lay great stress upon the need of educating the children, particularly the younger ones, in accident prevention.

Representatives of the various organizations and industries of the city were included on this committee, and every one approached was glad to take part in the work, because all realized the need for spreading the doctrine of safety.

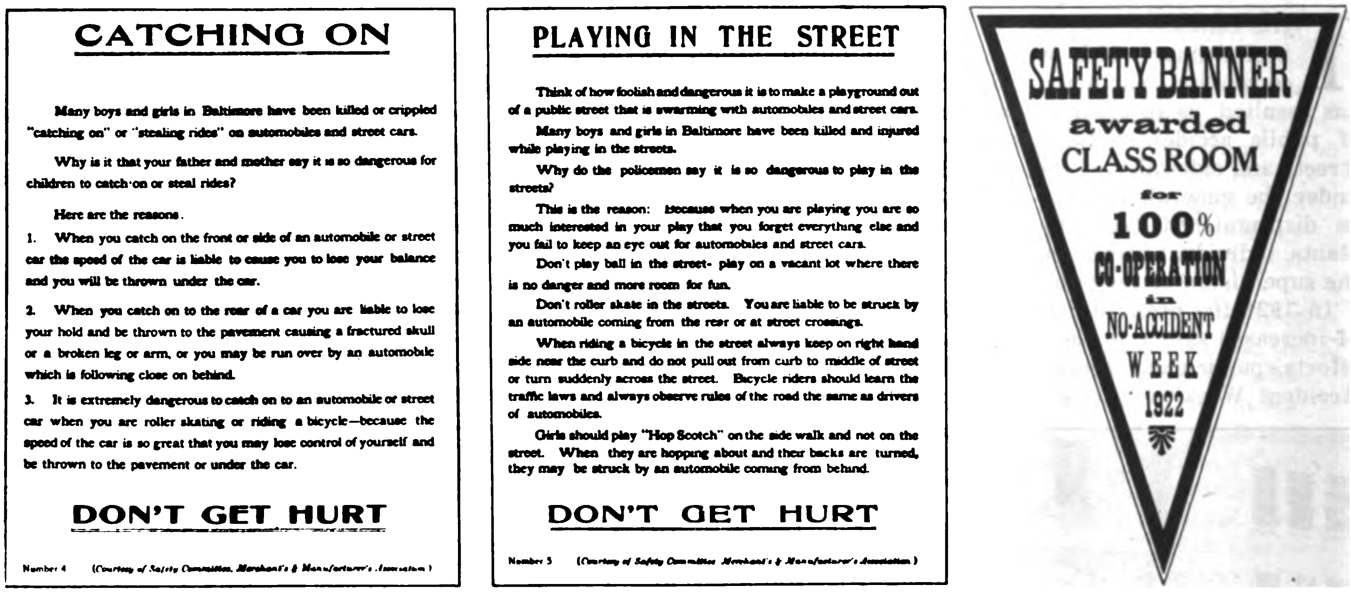
The whole movement was practically assured of success in advance because of the active support which it received from the Mayor and the various other officials of the city and their subordinates, and from the Commissioner of Police and all of the officers and uniformed men of his department, who threw themselves heart and soul into the movement.

The Automobile Club, Association of Automobile Dealers, the steam railroads, the street railway company and other large corporate and business interests of the city joined hands in the movement and lent their moral support as well as their active interest in forwarding the campaign.

It was the spirit of whole-hearted, unselfish co-operation on the part of the people, the Mayor, the Commissioner of Police and the Automobile Club that assured the success of the whole effort.

Particular attention was given to the efforts made to get the attention and rivet the interest of the school children. This was made possible by the co-operation of the Board of Education, which distributed a series of safety lessons prepared by the committee. Subjects of these lessons were: Crossing the Street, The Street Car, The Automobile, Catching on or Stealing Rides on Automobiles and Street Cars, and Playing in the Streets. These lessons carried a direct safety message in a way that school children could understand them. Two of them are reproduced on page 110. Teachers were told that the safety of children would be made the outstanding feature of the campaign, and in addition to using the lessons they were asked to appoint a committee of three children in each classroom to act as safety patrols and watch streets when schools were dismissed and warn children observed playing in a dangerous way. Arrangement was made with the school board to have school children write a letter to their parents on what they were doing to prevent accidents during the week and asking them to co-operate. This called for a reply from parents and classrooms receiving 100 per cent replies received a banner, reproduced on this page. To stimulate further interest, the Merchants' and Manufacturers' Association offered several prizes for posters designed by school children on "The Right and Wrong Way to Cross a Street." Prizes were offered for the best essay written by children.

Continuing all during the campaign, too, was the great influence and active co-operation of the press in keeping the matter before the public and in publishing stories and articles which kept the whole question alive and in the public eye.



CATCHING ON

Many boys and girls in Baltimore have been killed or crippled "catching on" or "stealing rides" on automobiles and street cars.

Why is it that your father and mother say it is so dangerous for children to catch-on or steal rides?

Here are the reasons.

1. When you catch on the front or side of an automobile or street car the speed of the car is liable to cause you to lose your balance and you will be thrown under the car.

2. When you catch on to the rear of a car you are liable to lose your hold and be thrown to the pavement causing a fractured skull or a broken leg or arm, or you may be run over by an automobile which is following close on behind.

3. It is extremely dangerous to catch on to an automobile or street car when you are roller skating or riding a bicycle—because the speed of the car is so great that you may lose control of yourself and be thrown to the pavement or under the car.

DON'T GET HURT

Number 4 (Courtesy of Safety Committee, Merchant's & Manufacturer's Association)

PLAYING IN THE STREET

Think of how foolish and dangerous it is to make a playground out of a public street that is swarming with automobiles and street cars.

Many boys and girls in Baltimore have been killed and injured while playing in the streets.

Why do the policemen say it is so dangerous to play in the streets?

This is the reason: Because when you are playing you are so much interested in your play that you forget everything else and you fail to keep an eye out for automobiles and street cars.

Don't play ball in the street- play on a vacant lot where there is no danger and more room for fun.

Don't roller skate in the streets. You are liable to be struck by an automobile coming from the rear or at street crossings.

When riding a bicycle in the street always keep on right hand side near the curb and do not pull out from curb to middle of street or turn suddenly across the street. Bicycle riders should learn the traffic laws and always observe rules of the road the same as drivers of automobiles.

Girls should play "Hop Scotch" on the side walk and not on the street. When they are hopping about and their backs are turned, they may be struck by an automobile coming from behind.

DON'T GET HURT

Number 5 (Courtesy of Safety Committee, Merchant's & Manufacturer's Association)

TWO OF THE FIVE SPECIAL LESSONS SENT TO THE SCHOOLS BY THE COMMITTEE—BANNER AWARDED TO CLASSES FOR 100 PER CENT CO-OPERATION

C. W. Price, an experienced safety engineer, who had assisted in the campaign last year, came to Baltimore and gave his undivided time and attention to the work for some weeks in advance of as well as during the actual campaign.

Each day in the week was especially designated, as shown in the official program, a part of which is reproduced on the opposite page.

The United Railways & Electric Company gave freely of the time and energies of its staff to the campaign. It provided and operated flat cars, made into floats, carrying object lessons as to the results of carelessness. These cars were operated all around the system preceded by a car with a band, to call the attention of the people on the streets and in neighboring buildings to the float and its object lesson. A picture of one of the floats showing a hospital scene is given. Another float depicted the results of an automobile collision and still another the effect of the right and the wrong way to play. A B. & O. engine modeled in wood, showing a demolished auto and gates at grade crossing, was made by B. & O. employees and was paraded around on Railroad Crossing Day.

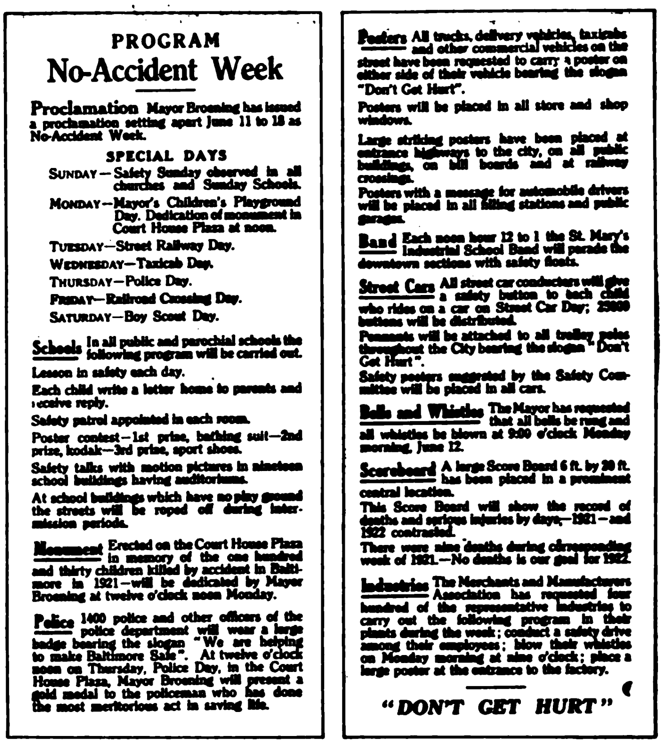
Every car on the system had stenciled on the bumper, front and rear, the slogan of the campaign, "Don't Get Hurt." Each trolley pole of every car carried a banner on which appeared these same words.

On Street Railway Day 25,000 buttons were distributed to children by conductors on the street cars. Every child who got on a car that day, as fare was paid, received a red and white button with the phrase on it, "We are helping make Baltimore safe." Special instructions were given to all of the employees of the electric railway company urging them to observe the particular instructions of Safety Week and to use their best efforts in all directions to forward the movement. Emphasis was placed on the point that the company is constantly striving to forward the safety movement and that this was an opportunity to drive the thought home to the public in a way that ought to accomplish much permanent good.

Throughout the campaign and Safety Week, a great effort was made to emphasize the various dangers that exist on the public thoroughfares but not to antagonize any particular section of the public. By this method of working, the co-operation of every one was obtained. No attempt was made to shift the major blame on any one class of users of the streets, and thus the most effective results were obtained, in our judgment.

No attempt was made to emphasize the fact that it was expected to go through the week without an accident of any sort. This would obviously be impossible in a city of over 700,000 people and it tends to discredit the movement when such a campaign is begun with the statement that every effort would be made to have no accident whatever, and then an accident occurs. As a matter of fact, a car derailment causing injuries to several happened the first day on a small independent suburban line, and in the pictures in the papers the banner with the phrase "Don't Get Hurt" was prominent. Here the lesson was emphasized in a way not desired, yet showing the wisdom of not trying for a 100 per cent score and leaving an opening for ridicule and sarcasm. The slogan adopted was "Don't Get Hurt," and we believe better results were accomplished in this way than would have been accomplished had the committee set out to obtain the impossible, i.e., no accident of any sort during the week.

A unique and most effective bit of advertising and publicity was a monument erected on the Court House Plaza and dedicated by the Mayor, himself, on the Monday of "No-Accident Week." Two pictures are



PROGRAM

No-Accident Week

Proclamation Mayor Broening has issued a proclamation setting apart June 11 to 18 as No-Accident Week.

SPECIAL DAYS

SUNDAY—Safety Sunday observed in all churches and Sunday Schools.

MONDAY—Mayor's Children's Playground Day. Dedication of monument in Court House Plaza at noon.

TUESDAY—Street Railway Day.

WEDNESDAY—Taxicab Day.

THURSDAY—Police Day.

FRIDAY—Railroad Crossing Day.

SATURDAY—Boy Scout Day.

Schools In all public and parochial schools the following program will be carried out.

Lesson in safety each day.

Each child write a letter home to parents and receive reply.

Safety patrol appointed in each room.

Poster contest—1st prize, bathing suit—2nd prize, kodak—3rd prize, sport shoes.

Safety talks with motion pictures in nineteen school buildings having auditoriums.

At school buildings which have no play ground the streets will be roped off during intermission periods.

Monument Erected on the Court House Plaza in memory of the one hundred and thirty children killed by accident in Baltimore in 1921—will be dedicated by Mayor Broening at twelve o'clock noon Monday.

Police 1400 police and other officers of the police department will wear a large badge bearing the slogan "We are helping to make Baltimore Safe". At twelve o'clock noon on Thursday, Police Day, in the Court House Plaza, Mayor Broening will present a gold medal to the policeman who has done the most meritorious act in saving life.

Posters All trucks, delivery vehicles, taxicabs and other commercial vehicles on the street have been requested to carry a poster on either side of their vehicle bearing the slogan "Don't Get Hurt".

Posters will be placed in all store and shop windows.

Large striking posters have been placed at entrance highways to the city, on all public buildings, on bill boards and at railway crossings.

Posters with a message for automobile drivers will be placed in all filling stations and public garages.

Band Each noon hour 12 to 1 the St. Mary's Industrial School Band will parade the downtown sections with safety floats.

Street Cars All street car conductors will give a safety button to each child who rides on a car on Street Car Day; 25000 buttons will be distributed.

Pennants will be attached to all trolley poles throughout the City bearing the slogan "Don't Get Hurt".

Safety posters suggested by the Safety Committee will be placed in all cars.

Bells and Whistles The Mayor has requested that all bells be rung and all whistles be blown at 9:00 o'clock Monday morning, June 12.

Scoreboard A large Score Board 6 ft. by 20 ft. has been placed in a prominent central location.

This Score Board will show the record of deaths and serious injuries by days,—1921—and 1922 contrasted.

There were nine deaths during corresponding week of 1921.—No deaths is our goal for 1922.

Industries The Merchants and Manufacturers Association has requested four hundred of the representative industries to carry out the following program in their plants during the week; conduct a safety drive among their employees; blow their whistles on Monday morning at nine o'clock; place a large poster at the entrance to the factory.

"DON'T GET HURT"

TWO PAGES FROM THE FOUR-PAGE PROGRAM

given of the monument; one, with the Mayor delivering an address to school children and other citizens. This monument was suggested by Chairman John N. Mackall of the State Roads Commission, and every one felt that nothing could have focused attention on the seriousness of our accident situation in Baltimore more than this monument. It was unique in the history of such campaigns in this country, as far as we have any knowledge.

Two posters were carried on the windows of all street cars, one representing a child playing ball on the street, running out in front of a car, and the other emphasizing the anguish that comes to any one who has struck and killed a child. These posters were also displayed all over the city, together with a larger poster with the slogan printed on it. Twenty-seven thousand posters in all were displayed in stores, business houses, lunchrooms, banks and in all fire and police stations and public buildings and on trucks and taxicabs, as well as on the street cars.

To indicate the possibilities of providing playgrounds for children, eighty streets were roped off for play spaces during the week. There is some question as to the desirability of doing this, unless it is to be made a permanent arrangement, because children afterward played in the streets without any protection, where for a week they had been taught to use these blocks without having to give heed to passing traffic.

One very interesting incident was the presentation of a medal to a policeman for a heroic act in saving the lives of some children. A delegation of policemen from each station and a band, in addition to the Mayor and prominent citizens, participated and good publicity resulted.

On Railroad Crossing Day checkers were placed at all railroad grade crossings to observe traffic. Out of a total of 61,301 automobiles observed, 275 failures to operate safely were noted, or 0.4 of 1 per cent, while past records at such locations showed an average of 10 per cent failures to operate with safety. The fact was published broadcast that such a check would be made, and this undoubtedly had some effect on the safe operation. Nevertheless, the fact was borne home to drivers of automobiles. There was not an accident of any kind at the grade crossings on that day.

The boy scouts gave a life-saving demonstration at the City Hall Plaza on Boy Scout Day. They also relieved the traffic officers at their posts and handled the traffic on the city streets for an hour, which was an excellent object lesson.

NO ACCIDENT WEEK JULY 17-24TH DONT GET HURT
THINK ... ACT SAFELY
LOOK BEFORE LEAVING SIDEWALK — CROSS STREET AT CROSSINGS
WALK RIGHT

THIS IS ONE OF SEVERAL FLOATS OPERATED ABOUT THE CITY BY THE RAILWAY COMPANY

All the police officers wore safety buttons, and there was not a fatal traffic accident during the week. The total public accidents reported by the Police Department during the week were eighty-six, compared with 105 during the Safety Week of the preceding year. There were two deaths, one a baby who fell from a porch and the other a man who was drowned in the harbor. There were no deaths among school children and only two serious injuries in which they were concerned. There were no deaths from traffic accidents. Last year in the corresponding week there were nine accidental deaths.

Ten thousand "Don't Get Hurt" triangular signs were distributed through the Automobile Dealers' Association to owners of motor vehicles and garages. Fifty thousand pledge cards, carrying an agreement to obey the traffic laws and safety rules of the highway and be especially cautious at street railroad crossings, in school zones and wherever traffic conditions make driving hazardous were distributed by the police to automobile drivers, all over the city. They were asked to sign and carry them in their machines. The back of this pledge card carried the following safety rules:

SPECIAL INSTRUCTION FROM POLICE DEPARTMENT

Due to the vast number of traffic accidents over the country the Baltimore Authorities are conducting an intensive Safety Campaign with the view of reducing them.

Will you, as a Motorist, DO YOUR PART by complying with the following:

Don't exceed speed limits of 15 miles an hour in congested sections, 20 miles per hour in outlying sections, and 35 miles per hour in open country.

Don't forget to Stop, Look and Listen at Railway crossings.

Don't disregard the child on the curb. He can start quicker than you can stop.

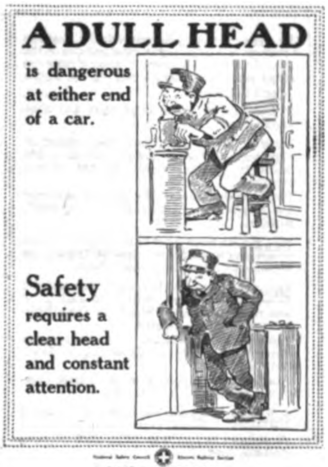
Don't neglect the rights of pedestrians. They have right of way at street intersections.

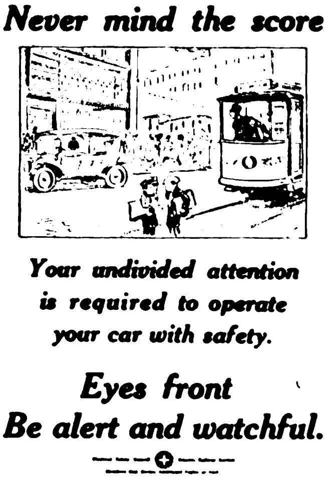
Don't neglect to approach intersecting streets at slow speed.

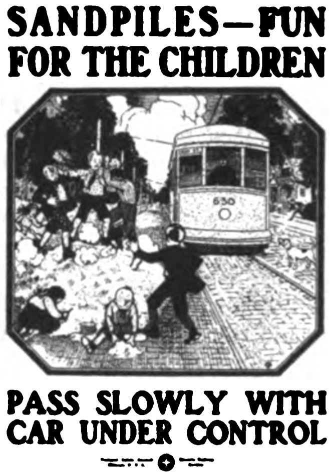
Don't neglect to give proper signal before pulling out from curb into stream of traffic, first seeing that the way is clear.

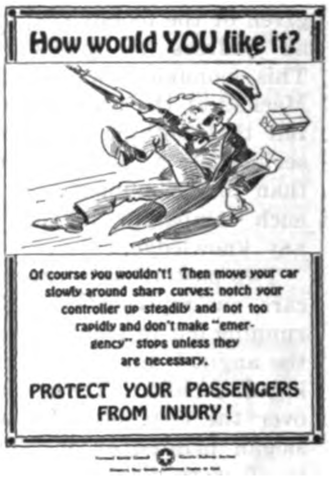
Don't operate to left of center of highway.

Don't pass on either side of a street car that has stopped for purpose of taking on or discharging passengers.


A DULL HEAD
is dangerous at either end of a car.
Safety requires a clear head and constant attention.


Never mind the score
Your undivided attention is required to operate your car with safety.
Eyes front
Be alert and watchful.


SANDPILES—FUN FOR THE CHILDREN
650
PASS SLOWLY WITH CAR UNDER CONTROL


How would YOU like it?
Of course you wouldn't! Then move your car slowly around sharp curves: notch your controller up steadily and not too rapidly and don't make "emergency" stops unless they are necessary.
PROTECT YOUR PASSENGERS FROM INJURY!

National Safety Council Issues Bulletins Especially for Trainmen

Don't fail to give right of way at street intersections to vehicles approaching from right. Don't "hog" your right of way privilege.

Don't drive fast on slippery streets.

Don't crowd another automobile off the road by driving abreast of it.

Don't ignore Danger and Safety signs erected on the highways for your Protection.

In making roadside repairs to tires or engines always stop on extreme right side and never at top of hill or on curve.

This card is handed you through the hearty co-operation and support of the Police Commissioner, Automobile Commissioner, Baltimore Automobile Trade Association and the Automobile Club of Maryland.

SAFETY COMMITTEE,
MERCHANTS' AND MANUFACTURERS' ASSOCIATION.

The street railway company got out a special issue of its four-page pamphlet "Trolley News" and circulated 100,000 for information of the traveling public. In each end of each of its cars it also had a placard with the slogan of the week, "Don't Get Hurt," in plain view of all passengers, with the words: "Of course you are interested."

Meetings were held at twenty schools during school hours, and addressed by the director of the drive, with the safety moving pictures. Safety pictures were also shown in the parks, through the courtesy of the park board, and in many of the churches and Sunday schools the safety subject was emphasized on the first day of the week.

Perhaps the most effective and important result accomplished was getting the safety work into the public schools. The school board has planned, beginning with the next school year, to devote a definite amount of time to teaching safety in all the schools. If any one tried to pick out the best result of Safety Week, I should say it would be this.

We are convinced that a permanent organization to carry out a continuous program of safety work is necessary to combat most effectively the increase in accidents, and one of the results which we hope to achieve as a result of the last Safety Week is to line up a permanent organization. The Mayor of the city now has under consideration the appointment of such a permanent committee to take up and carry forward safety work throughout the year, and this is the logical method to use in safety work, and one which should be of great benefit to the community.

Investment in Safety Profitable

What Britton I. Budd, first vice-president American Electric Railway Association, sends as his message with respect to the value of actively conducting safety work. Mr. Budd has been one of the outstanding figures in the industry in practicing accident prevention work on the Chicago Elevated Railroads, the Chicago, North Shore & Milwaukee Railroad and the Chicago & Interurban Traction Company, of which he is president.

NOT ONLY from a humanitarian, but also from a business standpoint, accident prevention is one of the most important phases of railroad operation. The monetary returns cannot be measured alone from the effect on damage claims. Of even greater value is the confidence of the traveling public in the safety of the railroad. It is difficult to estimate what that confidence brings in dollars and cents, but it is many times greater than the cost of maintaining a safety organization. The public will not willingly patronize a railroad having frequent accidents, the elimination of which requires continuous and systematic safety work.

Britton I. Budd

Prevent Accidents Rather than Pay Claims

An Interview on Safety Work with Cecil G. Rice, President American Electric Railway Claims Association—He Contends a Large Railway Can Afford to Pay Up to $25,000 If Necessary for a Good Safety Director, Whose Activities Should Extend Into General Community Safety Work—Claims Are the Only Expenditures that Bring No Returns—Some of the Byproducts of Safety Are Discussed

BY HARRY L. BROWN
Managing Editor *Electric Railway Journal*

BECAUSE Cecil G. Rice is president of the American Electric Railway Claims Association and has been active in fostering better safety in the Pittsburgh district the *Electric Railway Journal* editors thought he might have some constructive ideas on the subject of interest to pass on to the field through this safety number. So I called on him and imposed on his good nature further by asking his stenographer to take down in his own words whatever bits of wisdom he might choose to dispense. Now that the thing is all done it might be admitted that there was a little unworthy "safety first" in that selection of stenographers, for having had some experience with the mutilation of copy by public stenographers it seemed good forethought to follow a plan that relieved me of all responsibility as to results. But Mr. Rice is so alive to the great need for, and the immense possibilities of, earnest energetic accident prevention work that his stenographer has probably heard much along this line before and the transcript was admirable.

After telling Mr. Rice what my errand was, we settled down to the task in hand. There was no opportunity for him to prearrange a pretty speech, so that what follows is a good exhibit of the knowledge and ideas about safety which are at his immediate command. His responses were entirely spontaneous. Fortunately my questions were taken down too, and these serve to tie the story together, and it is presented here just as Mr. Rice talked it without any "dressing up."

But before starting on the worthwhile part of the matter on this page, perhaps I should qualify Mr. Rice for what he has to say on safety by recording that in addition to being manager of the Associated Bureaus, Pittsburgh Railway, the Philadelphia Company and affiliated corporations, he has found time to serve as president of the Western Pennsylvania Division of the National Safety Council, as a director of the National Safety Council, and as president of the American Electric Railway Claims Association.

RICE SAFETY AWARD

CECIL G. RICE
and the bronze tablet he presented to the company that made the best showing in accident prevention during the year he was president of the local division of the National Safety Council.

Mr. Rice Believes that Accident Prevention Is:

A worthy object
An Americanization lesson
A personal protection
A parental indispensability
An educational requirement
A business necessity
A profitable provision
A legal precaution
A criminal accountability
A civic obligation
A moral duty
A natural trust
A Biblical injunction
A religious service
A humanitarian demand
A community problem
A municipal function
A civilization debt
A national tendency
A universal urgency
A labor union opportunity
A paternalistic essential
A capitalistic virtue
A socialistic contradiction
A bolshevistic opposite
A syndicalistic antithesis

It Affects Every Human Being

With this background a statement by Mr. Rice in his recent booklet, "How a Claim Should Be Adjusted," that 5 per cent of the money now expended by the industry for claims, if applied toward prevention work, would accomplish more lasting results than any other expenditure, was most interesting. He was asked if he could "sell" a manager on this idea and how he would advocate the expenditure of that 5 per cent.

"I am not a salesman," said Mr. Rice, "but I believe managers are susceptible to reasoning based on facts. It has been proved that accidents can not only be reduced but in some instances they can be and have been eliminated. The same fundamentals which have been tested in general industry will apply to public utilities and the public in all activities. Accident prevention has long since passed the experimental stage. It is simply a matter of education. Experience has shown that 85 per cent of accident reduction is through education, 10 per cent by mechanical devices and 5 per cent through discipline."

"Suppose you were to start in with a safety campaign, or any safety work, with the authority to expend 5 per cent of your previous year's claims expenditure. In that work, how would you go about it?"

"First, I would analyze the fatal and other accidents that had occurred in the community where the company operated and chart the cost of fatal and non-fatal accidents. I would then determine the different industries and people who were affected directly by these accidents and form them into a community safety council, as has been done elsewhere. With this organization I would develop safety instruction courses for workmen, managers, superintendents and others, and sell them the idea of safety, which is that safety is a mental attitude. The objective is merely to get the individual to think of the safety of himself and those about him. Unless he is won over to this attitude he is not a safe man either at work or at home or in public. It is my belief that any human being has a point of contact where safety will appeal to him, if that contact can be determined. This plan takes into consideration that safety must not be attempted as a selfish proposition, but on broad general lines backed up by real heart interest. I mean, more specifically, that a traction company should not attempt to do all the safety work that should be done with the public under its own name and for the sole purpose of saving expenditures.

"A traction company has two lines of endeavor. One is that with its own employees and its own mechanical equipment; the other is with the public. Any work done along accident prevention lines in churches, clubs and schools and any association which brings about thought on the part of the individual reacts to the direct benefit of the traction company, because these same people become passengers upon the cars."

"In other words, you would promote traction safety by taking steps to interest people in other lines of safety work?"

"May I illustrate by citing one way in which the reaction redounds to the benefit of the traction company directly. The medical bureau of the Pittsburgh Railways examined 200 persons for employment recently. Out of these 200 men, eighty had received safety instruction in other companies. The company also got the benefit of their training before they became employees, for they were naturally thinking and disseminating safe conduct before they came into the company's employ."

"What would you do within the traction company itself to promote accident prevention in connection with the things the company only can control?"

HOW TO ORGANIZE THE RAILWAY FORCE

"The work within the organization itself is upon the same fundamental basis; that is, of developing thought. To be successful the work must be systematic and persistent. Brass-band methods are only of use in centering momentary attention. Every unit within the company organization must be organized on the idea of safety and the idea 'sold' to the men, not forced upon them. It must start from the highest executive officer and work down to the men on the job. Safety is a specialty just as much as accounting, for instance. It is not a matter which can be left to the operating department, because its immediate function is to keep the cars moving. On a property that operates over different divisions, I would first organize in each carhouse a safety committee with the local superintendent as chairman, with dispatchers and representatives of the men, either elected or appointed, and change the personnel frequently so as to bring in new thoughts and new men. This safety committee would report to another committee which included the entire division. The chairman of the carhouse committee would form the division committee with the division superintendent as chairman. The division superintendent would then report to a central safety committee including, in addition to the division superintendents, the general manager, superintendent of transportation and other department heads. This central safety committee would receive the suggestions sent from the other committees and report to an executive committee, which would include the highest executive officer of the company and be composed of possibly five or more executives who would have the authority to put into effect any recommendation they might approve."

"That organization would function primarily to act upon safety suggestions brought up from the bottom, but how would you take safety suggestions down from the top?"

"The same organization can be used to carry out executive orders. Anything desired by the executive committee would be put into effect by recommendation from this body to the central safety committee, and so on down through the safety organization."

"What would be your means of training employees?"

SAFETY SELLS ITSELF

"Safety is something that sells itself if a person with a heart and personality and the ability to express himself and having a knowledge of the accident hazard finds an opportunity to reach any group of any size. Each of the carhouses should hold meetings of their men when the crews are changing, or, if necessary, in the evening and the men paid for the time they spend. To start with, the accidents should not be discussed as a traction proposition, but as it touches the individual, as it affects the man himself, his family, his relatives and neighbors. This gets it away from the selfish motive. Accidents really have an appeal to every human being. For instance, it is possible to show that accidents, fire and sickness caused an unnecessary expenditure of $3,500,000,000 last year in the United States. This means a cost of $35 to each individual, or $175 for each family of five. This expenditure is unknown to most people, but it is reflected in all their purchases. Accident costs are included in the price of clothing. A painter charges in his overhead the cost of workman's compensation. It is included in the building of houses, in practically everything."

"Just how is that reflected in street car fares?"

"Every time money is spent by a traction company on account of accidents, or the claims which follow accidents, this takes away that amount that otherwise would be available for service and equipment. Claims are practically the only expense a traction company has for which there is no return. Even in taxation paid to the city or county or government there is a return in the form of protection and service. Claims not only return nothing, but they are the source of much antagonism."

"You make the statement that it is possible to avoid accidents on a street railway system. How far can that statement apply?"

"It applies just as far as a company is able to develop and maintain safe equipment and train its men to avoid accidents, and to educating the public to habits of safe thinking and acting."

"Then you think there is no irreducible minimum as regards accidents?"

"If the work is properly organized, each year's result should show a reduction over the previous year's number of accidents, except where extraordinary disasters might occur. There is, in addition to the reduction in the number of occurrences, what is equally important, and that is the reduction in severity of occurrences.

"The value and advantage of accident work, however, should not be confined simply to the saving of claims costs because it has been found to be very efficient in developing the morale of the employees and in building up improved public relations."

"Now that is expressing the value of safety work in general terms, but some general managers would want you to get down to brass tacks, as to the value of it. How could you show them that it is something they cannot afford to overlook?"

"A traction company is usually thought of as a cold, impersonal and heartless corporation. It is believed to be greedy. The opinion of the riding public is formed very largely by that which they see of the individual representative on the cars; that is, the motorman and conductor. You can readily see that if we who do our work in offices were forced to stand on blocks subject to the critical gaze of every one who passed, we probably would do things that might be offensive. That is what the conductor and motorman have to guard against. Now when people come to realize that the conductor and motorman operating the car upon which they are riding are individuals with a heart and family and are doing the best they know how to avoid an accident, and that the company itself earnestly desires to prevent accidents to passengers and to all persons who may approach the hazard in any way, there is a personal response that gives an entirely different opinion of the men, and therefore of the corporation.

"Some time ago," continued Mr. Rice, "I was a passenger on one of our cars when the motorman saw a little girl who evidently desired to cross the street. He stopped and the little girl started across the street but saw another car coming and turned back. The motorman locked his car and personally escorted her across the street safely. When I left the car, I said to him, 'Mac, that was mighty fine of you to help that child across the street.' He replied, 'Oh, I have children of my own and I wouldn't want them to get hurt.' In this, the motorman showed the angle of appeal in his case to be the thought of his own children."

HOW TO KEEP UP THE INTEREST

"Do you think it a good idea to try to stimulate unusual interest in safety work among employees by having large meetings and talks, or is that a form of interest that is too difficult to keep up?"

"Since the objective is to cause the individual to think, efforts with groups are the best means of attack. It is just as easy, or easier, to impress your thoughts upon a gathering of 1,000 or 2,500 people as it is on one person. I would think that group meetings are by far the most efficient way of reaching the men."

"Is it not true that in times past a good many electric railways have gone into safety work with great success for a while, but that the work has gone stale?"

"The reason for that is that much of the effort has been spectacular and not built along constructive lines. While the work was interesting for a while, it was probably not systematic and persistent and it was carried on under the name of the traction company, which gave those unfriendly to the traction company an opportunity to condemn and belittle the work. When the work is done through a locally organized safety committee or council and includes all lines of accident prevention and not simply traction accidents, there is no let-up in the result. The accomplishment should increase from year to year.

"It has been learned that accidents involving automobiles have reached the highest peak among causes of fatal accidents. There are 10,500,000 automobiles in the United States. That is one for each ten people, or one for every other family. They are increasing at the rate of 20 per cent or more than two million cars per year. Their development and general use has far outdistanced the means provided to control them. Nevertheless, it is possible to control them. First, the manufacturer of the car should sell the idea of safety with the car itself. When a person is learning to operate his car he is susceptible to advice and would then receive safety suggestions he would laugh at and ignore after he had become an expert driver.

"The second step, in which a traction company can assist, is in forming and securing enforcement for uniform traffic laws. When the automobile was used for short jaunts from the owner's home to the office, the traffic laws then in effect were sufficient, but now a week-end trip may take a car into several different states, each with different traffic conditions and rules. Support should be given to organized efforts being made for uniform traffic laws.

"Third, it should be brought about that before a person is permitted to drive a car he should demonstrate his mental fitness and physical ability. It is ridiculous that any individual, in most states, can secure a license upon mere application. Before a person can operate a steam engine he must pass an examination. It is criminal for a man to carry firearms, where he must develop an intent to do some harm before it becomes dangerous. An automobile has many times as many possible victims and the injury is without intent, but there is no reason why a careless automobile driver should not be as criminal as the carrier of a revolver.

"The next thing to bring about is the strict and impartial enforcement of traffic laws by city, county and state authorities. The next step is to secure the strict and impartial enforcement of traffic laws by the courts. Another means of reduction is to organize safe drivers' clubs, interesting the owners, the drivers and those who superintend the operation of large fleets of cars, and hold meetings which are attended by the drivers. The same appeal may be made to them as is made to any workman and thus bring about a public sentiment which is reflected in the enforcement of the laws."

CONTEST PUTS ZEST INTO SAFETY

"In planning safety work on a railway property is not a good deal to be accomplished by fostering competition in accident records among the various divisions?"

"No division superintendent can operate and control his division efficiently without a knowledge of what is occurring upon his division. Only by comparison with the results obtained upon other divisions can he determine what should be accomplished. Competition is one of many means, but always the objective should be kept in mind: to develop a mental attitude. My experience has been that division superintendents are so intensely human that there is temptation to excuse themselves. The most frequent excuse found is—'I report every accident occurrence on my division but some of the other fellows don't.'

"To overcome this overworked excuse, certain points of comparison should be developed. I would suggest something like this: First, the average number of witnesses per accident; second, the per cent of unreported accidents to the total number of accidents; third, the number of accidents per fatality; fourth, the number of accidents per million car-miles; fifth, the number of accidents per million passengers; sixth, the number of accidents per suit entered; seventh, the cost of accidents per million car-miles; eighth, the cost of accidents per million passengers; ninth, the average cost per accident; tenth, the percentage of gross revenue expended for claims.

"I have seen comparisons of this kind made which developed amazing differences among the various divisions of a company. Of course, there are some operating variables in different divisions, but in such cases this can be overcome by restricting comparisons as far as possible to those conditions that are standard in all.

SOME GENERAL ASPECTS OF THE WORK

"The statements I have made are based, for the most part, upon my actual experience. It was my privilege to serve as president of the Western Pennsylvania Division of the National Safety Council, including twelve counties in Pennsylvania, during the year 1921. Originally it was an industrial organization. A study of the statistics showing fatal accidents revealed the fact that industry was responsible for less than one-third of the fatal accidents and that automobiles, burns and scalds, and falls, entirely aside from industry, were the leading causes of accidents. One thing that impressed this on my mind was the case of a workman who was given the Carnegie Hero Fund Medal and money for having saved a fellow workman who was overcome by gas in a pit. This same man shortly afterward, on his way home from work, was struck by an automobile. His back was broken and for the remainder of his life he is a hopeless cripple, dependent upon the support of his wife and minor children. This led me to think how useless it was to keep a man safe while at work but allow him to be exposed to danger in public. Then it was that I recognized the necessity for combining industrial, home and public safety work, because the fundamental objective is the same in all three lines: To create a mental attitude that will cause the individual to think and *want* to prevent death, injury and loss from accidents, fire and sickness to you, yours and others, at work, at home or in public—a triplet expression phrased to help put over the idea.

"If a man is injured at work he at least is given medical attention and the workman's compensation benefit. Injured about his home, or on the streets, his family is cut off from that support by reason of his accident. It has been shown, based upon workman's compensation data, that it is twelve times more important to the individual to protect himself than to the company which employs him. We therefore turned the industrial organization into a council having as its object '*safety always and all ways*.'

"Safety instruction courses were arranged where speakers on various accident hazards appeared. One of these courses ran eighteen weeks, meeting every Monday evening. The attendance increased from 500 to 2,500. At one banquet, at $3 per plate, more than 1,000 people interested in all phases of safety work attended. The Superintendent of Public Instruction caused accident prevention to be taught in every school in the Commonwealth. The city schools took up and are teaching safety in connection with their regular studies. It has been made one of the major studies. Although the Coroner of this county operates his office on a fee basis he has been won over to the work of accident prevention and is using all personal and official power to that end."

Mr. Rice was then asked for the tangible results of the Western Pennsylvania Division of the National Safety Council. He said:

"The effect of reduced accidents under workman's compensation showed a net saving of $500,000 in the twelve counties where this work was carried on. A reflection of the effect of this work was shown in the number and severity of traction accidents, which were reduced from a year's peak of ninety-six fatalities to twenty-seven, which was the lowest in the history of Allegheny County. In three years traction accidents decreased 33⅓ per cent. In the same county taxicabs formerly had a considerable number of collisions with street cars. One of these companies reduced its total number of accidents 85 per cent and this reduced the insurance premium $12,000 per year—from $800 per car to $75 per car, which is the lowest rate in the United States."

"Your idea is that a traction company should have a man who would devote his entire time and energy to safety work. Do you think that his attention should not be confined to the traction company entirely, or should it be given over partly, also, to general safety work in the community?"

"Generally, yes. He should take an active part in the work as a community thing. There are but three ways to carry on safety work; that is, through organized community work, through an organized safety committee among employees, or by doing a few of the things that would be done by those organizations, although they do not exist. The job has to do with human nature. It requires an expert to be successful at that. While it should not be so, it is my belief that to start with, the greatest task of a safety director would be to sell the idea properly to the traction officers themselves, and to bring about an efficiently developed plan that would lead to the objective sought. Concrete detailed methods of organization will be a feature of the Claims Association convention at Chicago the week of October 2."

"How much do you think a traction company could afford to pay for a director of safety, based on results that might be expected?"

"A large property could afford to pay whatever is necessary up to $25,000 per year to get a man who could handle the work properly. For example, take the 5 per cent for prevention work mentioned earlier.

"A company with twenty millions gross receipts may have a claims cost of about 5 per cent or $1,000,000. Of that amount, 5 per cent would provide $50,000 for expenditure on claims prevention work as follows: One-half, or $25,000, for the director's salary, and $25,000 capital for the rest of the safety work. If this safety director could forestall ten claims verdicts in the course of a year he would more than pay for all the expenses of the safety work besides creating a condition that will continue and increase such savings.

"There is no other industry to which accidents and the resultant claims mean as much as to the traction company. A safety director must have highly developed executive ability. Such ability is worth as much in safety work as in any other line of endeavor.

"It is my belief that in ten years from now there will be no claims departments. Their title suggests and encourages claims. The need for having them is removed when accidents are prevented. All money expended for claims is wasted. Accidents can be prevented. Claims can be prevented. These are the possibilities. That they can be reduced is a proved fact. An efficient safety director could, I believe, take a property, and under reasonable conditions almost guarantee to bring about a fixed proportionate reduction with a fixed expenditure."

Safety—and the Safety Engineer on a Transportation Utility

The Many Duties of a Safety Engineer—What Such an Official Has Accomplished on the Lines of the Beaver Valley Traction Company —The Qualifications of a Safety Engineer

BY W. H. BOYCE
General Manager Beaver Valley Traction Company and Chairman
Safety Committee of the American Electric Railway
Transportation & Traffic Association

OUR safety department has reduced its claims cost from 9.42 per cent of the gross revenue to 1.96 per cent in 1920 and 2.07 per cent in 1921. Accidents, in point of number, eliminating special reports required but not classified as accidents, have been reduced 49 per cent.

Up to May 29 of this year we operated for eighteen months without a fatality accident. Then there was one, for which the company was not responsible, to a pedestrian on the street. There has been no passenger fatality in eight years. There has been but one employee fatality in eight years.

We have but three law suits pending, and the last five cases tried in court resulted in our favor either by non-suit or verdict for defendant.

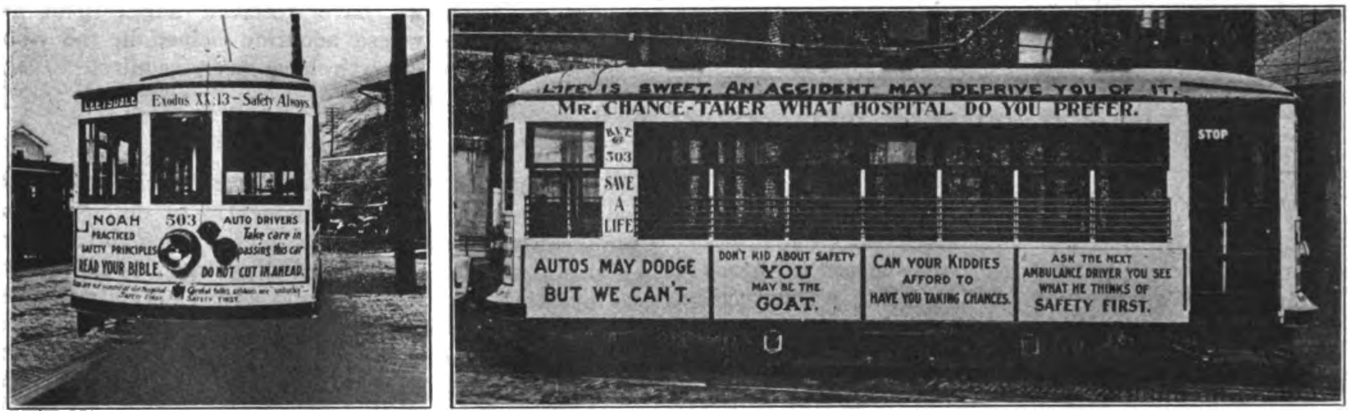
Our annual gross revenue is about $720,000. Last year we collected more than 13,500,000 fares, not including transfers.

The total number of classified accidents was 706, including 224 accidents in which automobiles were concerned, and of this number 111 were where automobiles had collided with the rear, side or front of our standing cars.

The first safety committee meeting held on our property was on Sept. 9, 1912. This was three years after I came to the property.

In 1909 this car line compared favorably with many others of the period. There was a great deal of prejudice against the property and those connected with it, most of it uncalled for. Undoubtedly those in charge had conducted the property in a way to compare favorably with the condition on other roads of that time. The usual opposition to a utility and the political baiting existed to a great degree.

As a new management we found some methods in force and some of the equipment inherited which did not entirely meet with our approval. It was seen that our first duty was to learn just what the public believed it wanted and then make an effort to give it or make a reasonable explanation why certain things could not be given. In this we met discouragement. The public was not ready nor always willing to believe what we gave as our reasons. We learned that what the traction company said was "taken with a grain of salt," even though it was the absolute truth. Organizations had arisen which had for their avowed purpose improvement of traction conditions, or what they considered improvements. Frankly the situation presented was a most trying one.


Exodus XX:13 – Safety Always
NOAH PRACTICED SAFETY PRINCIPLES READ YOUR BIBLE.
503
AUTO DRIVERS Take care in passing this car DO NOT CUT IN AHEAD.
LIFE IS SWEET. AN ACCIDENT MAY DEPRIVE YOU OF IT.
MR. CHANCE-TAKER WHAT HOSPITAL DO YOU PREFER.
SAVE A LIFE
STOP
AUTOS MAY DODGE BUT WE CAN'T.
DON'T KID ABOUT SAFETY YOU MAY BE THE GOAT.
CAN YOUR KIDDIES AFFORD TO HAVE YOU TAKING CHANCES.
ASK THE NEXT AMBULANCE DRIVER YOU SEE WHAT HE THINKS OF SAFETY FIRST.

FRONT AND END VIEWS OF THE SAFETY CARS IN REGULAR SERVICE ON THE LINES OF THE BEAVER VALLEY TRACTION COMPANY

This car has created a great deal of attention and has been the subject for much newspaper mention in various parts of the country. It has a safety appeal suitable to all who can see

H. O. Allison, now our safety engineer and employment supervisor, was then general manager of the *Daily Times*, the most influential newspaper in our territory. He had been in conference with the officers of the company on several different occasions in regard to traction problems, and we had learned even then that from the editorial sanctum of the daily press could be gleaned valuable information as to public sentiment and public relations. We knew that the public was not in accord with the traction tactics of the day. Many local men were interviewed for the purpose of ascertaining just what could be done to bring about more harmonious relations.

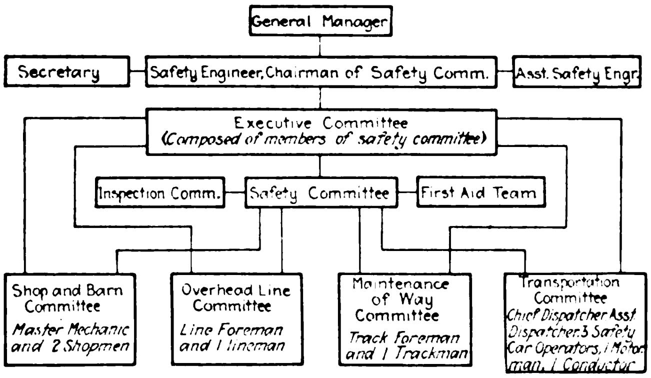
On Jan. 23, 1912, a letter was received from Mr. Allison setting forth a proposed campaign of paid advertising. In making that suggestion he said in part:

> Your advertising will prevent accidents through the education of the public. Try advertising for one year. One law suit less will more than pay the bill. You should advertise to teach the patrons of your line what they can do to make your service more satisfactory. It will create good will.

> If you should go along in a way implying that you are doing a favor to permit anyone to ride on your cars, failure faces you. You should be grateful, not the public. Let the public understand that you are grateful and you will win its approval.

In that we found the solution. Lapse of time has justified the belief. Shortly after this proposal was received, with the aid of Mr. Allison, an accident prevention advertising campaign was mapped out for the road and copy was written, considered and sometimes rewritten. As the project was so new, frankly we had some hesitancy about just how to take the first step.

One of our first advertisements was entitled "We Will Pay If We Owe; We Will Not Pay If We Do Not Owe." Another was a full page of "Don'ts" for passengers, pedestrians and drivers. Since then we have learned not to say "don't," we prefer the word "never," and to say what we have to say in fewer words. Our copy was read and began to have its influence. We were then convinced that we had rubbed Aladdin's lamp, and found the gold in "safety and publicity."


General Manager
Secretary
Safety Engineer, Chairman of Safety Comm.
Asst. Safety Engr.
Executive Committee
(Composed of members of safety committee)
Inspection Comm.
Safety Committee
First Aid Team
Shop and Barn Committee
Master Mechanic and 2 Shopmen
Overhead Line Committee
Line Foreman and 1 lineman
Maintenance of Way Committee
Track Foreman and 1 Trackman
Transportation Committee
Chief Dispatcher Asst. Dispatcher. 3 Safety Car Operators, 1 Motorman, 1 Conductor

PLAN OF THE ORGANIZATION OF THE SAFETY COMMITTEE OF THE BEAVER VALLEY TRACTION COMPANY, NEW BRIGHTON, PA.

SAFETY ENGINEER APPOINTED

Until Mr. Allison left the local newspaper field in 1916 to enter a manufacturing project we collaborated on the preparation of advertising for the road. The coming of the World War changed his plans and on our solicitation he entered the Associated Bureaus of the Pittsburgh Railways and Duquesne Light Company at Pittsburgh, Pa., under the able leadership of Cecil G. Rice. His progress there was rapid, and through a special arrangement a part of his time was devoted to our company, as we saw the field and need for some one learned in safety principles and accident prevention and had in mind his affiliation with our property just as soon as the position could be created for him. This was done in 1919 when Mr. Allison was appointed safety engineer of the property. It was the first case of such a position on any street railway, so far as I know.

THE RESULTS OBTAINED

In addition to the results mentioned at the head of this article it has been our good fortune to bring about the following:

1. Co-operation of the public, through an understanding of the problems of the company.
2. Material reduction in the cost of accidents and claims until the department has become a revenue producer through the amounts saved from this source alone when compared with other years.
3. Increased fares: Four specific changes have been made without protest.
4. Employee co-operation: The adjustment of wage scales has always been peaceable. During the period immediately following the war the employees loaned the company $8,000 to assist it over a critical period. The employees also have a material interest in the costs of operation and expenditures made as well as in the merchandising of rides.
5. Co-operation of the public in that requests for $420,000 for paving in 1921 were trimmed to $15,000. Relief has been had on other stretches through the granting to the company of a private right-of-way with curb alongside to prevent travel on the tracks. This has been of material assistance in reducing accidents and making schedules.
6. Prevention of accidents: Decrease of claims costs, decrease of prejudice, creation of friends instead of foes, co-operation instead of hindrance.

We have the facts tabulated. They are here to be seen. They stand as our record and our proof, and their study by any railway official in any capacity is welcomed.

Credit for these results does not center in any one individual. The entire personnel of our organization is important to the whole scheme. From employees in minor positions we have received suggestions and recommendations whose adoption helped in the whole result. Years of growth have been required to help mature some of the plans.

COMBINING DEPARTMENTS

We combined our claims department with the safety work supervision and employment. In doing this we did what we consider the only logical thing for any road of this size to do. The claims department is called upon to investigate all accidents and adjust all claims. Why should it not work to prevent them? The men are concerned in the accidents, so why should not the claims department have the say as to the type and character of the men employed?

Our safety engineer has made many contributions of safety articles to the public and technical press. He is frequently called upon to address various organizations on the subject of safety. During the past year more than fifty talks have been made in the public schools. He is the proud owner of some 1,500 accident posters made by school children, following his talks to them. These were made on a special card 11x14 in. which we supplied.

SAFETY COMMITTEE ORGANIZATION PLAN

The safety committee is composed of the safety engineer, the assistant safety engineer, a secretary, and fourteen members consisting of master mechanic, two shop employees, chief dispatcher, assistant dispatcher, three safety car operators, one motorman, one conductor, line foreman, one lineman, track foreman and one trackman, and is divided into an executive committee, inspection committee and department committees. The personnel of No. 1 first aid team is made up of members of the committee. A second first aid team is composed of selected employees.

Recommendations concerning any department are first referred to the members from that department, who in turn place it before the safety committee. The recommendation may then go to the inspection committee for a complete report, or may go direct to the executive committee, which, if approving, refers it to the safety engineer, who in turn refers it to the general manager.

Under the supervision of the executive committee special monthly meetings are held with all employees. Meetings of the entire committee are held at least once a month. Each six months the terms of six of the members expire and new members are elected from nominations proposed by any employee, subject to the vote of the remaining members of the committee. The secretary of the committee has charge of all records.

In our opinion no public utility is complete without its safety committee. Any public utility having experience with the work of such a committee will never after be without it. On this and the next page some of the activities of our safety department are listed.

THE QUALIFICATIONS OF A SAFETY ENGINEER

Complying with the editor's request that I analyze the qualifications of a man best fitted to become a safety engineer on a public utility, I should first say that this is a position that requires careful consideration in filling. Many employees can work at it, but few will be able to accomplish the desired results.

If the choice has to be made outside of the organization a man should be selected who has had a good general business experience, preferably one who has made a success of safety, claims or newspaper work or as a salesman. The qualifications should be those of a successful man in any walk of life. He must have initiative, persistency, judgment, diplomacy, sympathy and an earnest conviction of the fact that he is able to conserve human life by his work. He should possess the stamina, energy and vocabulary to express himself in any situation that may arise. He must be able to judge and handle men. His general knowledge must be sufficiently broad to compare favorably with that of those with whom he is to come in contact. He should be able to surround the position with a certain dignity and he should have a goodly portion of authority. Preferably he should have had some experience in accident prevention work. This is more important than a knowledge of electric railway operation, which can be acquired if he does not have it.

If the safety engineer is appointed from the employees of the company and has had no previous safety experience, he should have an opportunity to study up on safety organization and methods before beginning his new work. This information may be gained by getting into and keeping in touch with the electric railways that are among the foremost in organized safety work.

A man of family is preferred to avoid the same anomaly that is presented when old maids attempt to instruct the mothers of children in the care of their darlings. It takes a man with a child of his own to realize what an accident to a child means.

A good safety engineer is a treasure, because he will organize a safety committee and do wonders with it. Without him, such a committee would be like a ship at sea without a rudder. A general manager cannot couple such work with his own and get the results desired. It is perfectly proper for the manager to work in harmony with the project and probably pass on many of the things which are called to his attention. That is expected, but for him to be the "daddy" of safety gives the child a parent out of place with the schools he will attend as he grows up. Safety engineering is a profession, a commendable profession and one in which a man of the highest caliber is justified in working, and it is a work to which the highest type of men is being attracted. It is a work which, when it is once understood, grips a man's soul and energy to the point that he becomes tireless in his efforts. To sow that seed and create that interest among the indifferent is the work of a professional safety engineer and none other will be able to do it so well.

MORE ACCIDENTS IN CIVIL LIFE THAN CASUALTIES IN MILITARY SERVICE
DON'T TAKE CHANCES! THINK! SAFETY FIRST
TAKING A CHANCE! RISKING HIS LIFE —AND OTHERS
DON'T CUT OFF APPROACHING CARS.
TRAFFIC RUNS IN BOTH DIRECTIONS
TOO LATE TO BE CAREFUL
DEATH'S PLAYGROUND! WHERE DO YOUR CHILDREN PLAY?
WAIT! BETTER LOSE A MINUTE THAN YOUR LIFE
DON'T FORGET! ONE CAR MAY HIDE ANOTHER
GAMBLING! LIFE AGAINST SECONDS
SOMEBODY'S CHILD SOMEBODY'S FAULT! WHERE DOES YOUR CHILD PLAY?
TOO SMALL TO THINK OF SAFETY. KEEP HER OUT OF DANGER

SAFETY COMMITTEE OF THE BEAVER VALLEY TRACTION COMPANY

This photograph was published along with a first page news article in three daily papers of the territory announcing a public Safety Rally attended by 1,500 who came on individual invitations issued. The members of the committee are: Top row left to right: T. B. White; M. S. Walker; J. E. Cossin; O. W. Ward; W. F. Allshouse; Dana McDade; B. A. Beebout; Alex Webster. Center row left to right: J. J. Tesh; W. H. Boyce, general manager; Agnes F. Hartman, secretary of the committee; H. O. Allison, safety engineer; R. M. Ague. Bottom row left to right: J. W. Kelley; J. R. Marshall; D. Lee Noss.

OUR SAFETY ENGINEER'S DUTIES

From our office manual we take the following which defines in a general way the work of the safety engineer on our property:

> This department has jurisdiction, supervision and responsibility in degree set forth and concerning the following:
>
> *Accidents:* All investigation. All inspection. All adjustments if indicated for liability, possible liability or policy reasons. Declining if so indicated by the facts unearthed and assembled from all available sources. Preparation of all accident cases in suit. All necessary court inspection, records, assembling of the facts and concise presentation preparation for use of attorneys at trial. Consultation with legal department. Summoning of and payment of court witnesses. Locating of witnesses. Checking of claimants pending adjustments and those in suit. Preparation of defense and presentation of defense facts in cases at suit. Attendance at trials. Testifying. Direction of engineers' plan of scene of accident and the photographing of the scene. Indexing, filing, and recording all claimants, principals in no claim occurrences, observers, employees, public officials, doctors, lawyers, laymen, and those concerned in occurrences resulting in injury, and those involved in suits in trespass.

Accidents: Prevention of. Talks to men. Written instruction on rules concerning violation of and enforcement of rules. Bulletins giving cause of accidents, illustrating, and making known preventive measures. Training of men. Cautioning of men when indicated. Selection of trainmen. Creation of desire for no-accident record, and a first thought for safety.

Employment: Selection of all trainmen, source of supply and employment of barn, track and office employees. Application records. All inquiries and checking of past employment. Applicant tests. Service records.

Injury: First-aid room, equipment and supplies. Application. Instruction. Recommendation.

Workmen's Compensation: Entire charge. Complete responsibility as to records, reports, and payment as fixed and provided for under the State workmen's compensation law.

Safety: Inspection of property, plant, track, equipment and manner of work. Recommendations. Suggested improvements. Enforcement.

Medical: Attention. Selection of physicians. Physicians' reports. Payment of physicians. Physicians' records. Hospital selection. Payment of hospitals.

Employees' Welfare: Recreation. Physical recommendation. Consultation. Financial aid investigation and recommendation to general manager. Housing. Legal service. Medical attention.

Funds: Active account for payment of cash releases and expenses. Reimbursement made through proper department.

Incidental: Police report to this bureau. Records are kept here. This bureau advises and if need be attends at hearings.

Publicity: Construction. Policy. Discussion. Dissemination. Verbal and direction of publication.

Reports: Comparative and accumulative of accident claims cost, welfare, traffic, workmen's compensation, legal expense.

Annual Report: To be prepared at close of fiscal year and should contain reports comparative and cumulative. Samples of work. Records of occurrences. Bulletins. Suggestions. Recommendations.

But with all the direction, suggestions and detail duties outlined by the Office Manual it is impossible to obtain the results desired unless the man selected has a heart interest in his work and is one who continually dreams of and then thinks out new ways for accident prevention material to be put over properly with employees and the public.

Newspaper Reprints Houghton Safety Circular Entire

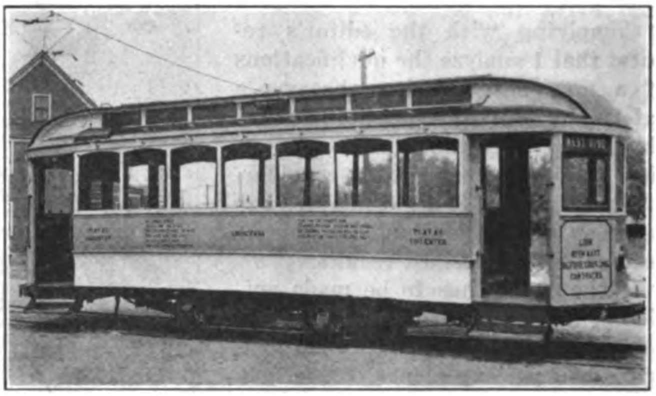
WITH the aid of matter and cuts supplied by the National Safety Council, Receiver S. B. Tuell of the Houghton County Traction Company has been doing some good work among the school children of the district—so much so that one of the local papers reprinted entire the four-page leaflet of June 2 issued as the School Safety Number of the company's own publication, *Traction News.* This leaflet carries brief safety talks on each of its four pages and carried catchy illustrations.

The safety message to the school children was put across in several ways. One was in the form of direct talks to the younger children by the company's safety representative; another was in placing a copy of the leaflet on the desk of every high-school student, and a third was in the usual distribution via the cars. A little different practice followed in the latter case is that in addition to the usual box from which passengers can help themselves, there are pamphlet clips on every window post. The platform men take care that each clip always contains one copy of *Traction News* so that the passenger having the circular staring him in the face is more likely to reach up for it than if he had to take it out of a remote box. The customer may be always right, but he is sometimes lazy.

Kiddies' "Play-as-You-Enter" Safety Car

CARRYING the message of safety to children at the time they are most responsive to the teaching—while at play—is the idea back of the "Kiddies' Kar" which the Pennsylvania-Ohio Electric Company has placed in Cascade Park, New Castle, one of the cities served by its railways.

A disused small car is used for the purpose and has been turned into a play car for the children's playground at the park. It has been completely redecorated inside and out, the outside being attractively painted in white and blue with red trimming. Inside the car in the advertising rack are nursery rhymes, pictures for children and the like to entertain them. The youngsters have the full run of the car and are at liberty to play at being street car men and passengers to their heart's content, the car being fully equipped with gong, fare register, signal bells, controller handle, brake handle, and all the other paraphernalia of a street car.



THIS IS AN UNUSED "PLAY-AS-YOU-ENTER" CAR IN A PARK, AND THE KIDS CAN PLAY IN AND AROUND IT. IT IS DECORATED WITH SAFETY MAXIMS

But while running about, in and out, the car the youngsters are met with safety suggestions designed to impress them with the danger of practices in which children are apt to indulge. Each of the four corner panels of the car has been painted yellow and on this vivid background in bright red are the warnings:

"Look both ways before crossing car tracks."

"Never touch hanging wires; they may be deadly."

"Don't play in the streets; it's dangerous."

"Be careful always and you will be safe."

Then on the bright blue band under the windows are painted parodies on Mother Goose rhymes carrying further safety thoughts. These are:

Hey, diddle, diddle,
The Cat and the Fiddle,
  The Cow jumped over the moon.
Take care when you jump,
Or you'll get a bump
  And spoil a whole afternoon.

Tom, Tom, the Piper's son,
Learned to play when he was young.
He learned the safest way to play
Was from the tracks to keep away.

Before the play car was placed in the park it was paraded over every car line in New Castle, carrying a boys' band, which made plenty of music to attract the attention of thousands of persons. It will be run over the lines of the city from time to time to carry the safety thoughts to as many youngsters and grown-ups as possible and at the end of the park season will be placed in various playgrounds about the city where it can continue to amuse the boys and girls and give them some safety instruction.

Organized Safety Work Pays

In Addition to Other Advantages Material Reductions Were Made in the Rate Paid for Compensation Insurance and in Damage Claims

By F. H. Hill
Vice-President Elmira Water, Light & Railroad Company

THE Elmira Water, Light & Railroad Company is a combination utility furnishing electric light and power, natural gas and street railroad service. The total number of employees is about 325. The company operates 48 miles of street railway lines, both city and interurban.

Organized safety work on our property was begun about two years ago, at the suggestion of the Utilities Mutual Insurance Company of New York City, our compensation insurance carrier. It was really the rather selfish idea of reducing insurance premiums which prompted us to undertake this work.

A safety committee was organized, with myself as chairman, consisting of a number of department hands, foremen and workmen, so that each department has one or more representatives. Then we have also a safety inspector, a member of the committee, whose duty it is to make weekly inspections of all the company's property for the purpose of discovering accident hazards. Usually another employee (a different one each week) accompanies the safety inspector on his weekly inspection trip. Similar inspections are frequently made by the engineers of the Utilities Mutual Insurance Company.

The safety committee meets once a month in my office, when the recommendations of our safety inspector of the utilities company and safety suggestions of employees are carefully considered and passed upon. Orders for carrying out suggestions and recommendations are sent to the proper foreman by the safety inspector, and such orders are followed up until completed. We constantly invite and urge employees to send to the safety committee suggestions and constructive criticisms, primarily having to do with accident prevention, but suggestions along other lines are also welcome. Many excellent suggestions are obtained in this way. All suggestions from employees are answered, telling what action was taken and giving the reason if the suggestion cannot be carried out.

A typical suggestion was that received from a motorman recommending the painting of the word "stop" on the folding doors of safety cars, so that when the door is open the word "stop" in large letters is plainly visible to the drivers of vehicles following the safety car.

The meetings of the safety committee are decidedly interesting and valuable. While most of the time is taken up with safety problems, quite frequently other matters of general interest to all employees are discussed. The meetings are informal—all members sitting around in a circle and cigars are passed. As a result all the members of the committee feel at home, and no one is afraid to give his opinion of the various subjects that are brought up. At each meeting all accidents during the preceding month are gone over with a view of preventing similar accidents in the future.

In order to reach all the employees of the company directly we frequently hold meetings of various groups where a representative of the Utilities Company gives a safety talk, followed by a demonstration of the prone pressure method of resuscitation. We have also held employees' meetings where safety talks were given to employees and their families.

We also make use of bulletin boards at points where they will be seen by all employees. We are subscribers to the Elliott service pictures, and these pictures, changed every day, are placed beside the bulletin boards. On the bulletin boards are posted safety bulletins furnished by the National Safety Council and the Utilities Mutual Company, also notices of our own asking for safety suggestions or giving the employees' accident record. As a means of preventing public accidents we have occasionally used newspaper space inviting the cooperation of automobile drivers in accident prevention.

Among the tangible results of our safety work has been a considerable reduction in the number and severity of accidents to employees and a marked decrease in accidents to the public.

ADVANTAGES SHOWN BY FIGURES

The reduction in accidents to employees can be seen from the following table of accidents:

	Lost Time Accidents	Days Lost
1921	31	2,441
1922 (at rate of)	14	160

The accident record for 1922 is based on actual results for the first six months, multiplied by two.

The effect of our good accident record is indicated in the rates per $100 payroll on our compensation insurance:

Carhouse rate 1921	$3.087
Carhouse rate 1922	2.233
Average rate for entire property 1921	3.268
Average rate for entire property 1922	2.559

As our payroll is in excess of $400,000 per year the reduction in rates has meant quite a saving in our annual premium.

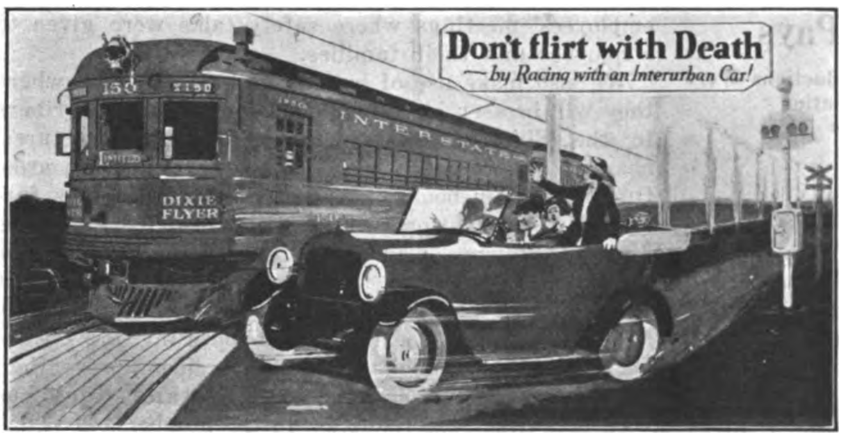
Another indication of the effect of safety work is the reduction in the cost of public accidents on our street railway system. For the past five years the cost has been as follows:

1917	$10,831.60
1918	17,881.47
1919	25,563.34
1920	13,375.79
1921	8,244.98

The increase from 1917 to 1919 was no doubt caused by the increased traffic and congestion of the streets due to the large increase in the number of automobiles.

As stated, organized safety work was begun on our property early in 1920, and at about the same time we began using safety cars. The reduction in public accident costs on our street railway system during 1920 and 1921 is due to both the organized safety work and the use of safety cars. It is rather difficult to say just how much of the credit should be given to organized safety work.

To sum up, I might say that organized safety work on our property has proved well worth while from many points of view. It has resulted in a reduction in accidents to employees, thereby decreasing the cost to us of compensation insurance and also greatly increasing the morale among our employees because of safer working conditions. Similarly a decrease in accidents to the public on our street railway system has occurred, with a great saving to us in damage claims and a reputation of safety for our street cars. To the manager of a public utility that has not yet undertaken organized safety work, I would say begin at once. It pays.


Don't flirt with Death
—by Racing with an Interurban Car!
150
INTERSTATE
DIXIE FLYER

WHEN YOU
HURRY—
—HURRY
WITH CARE

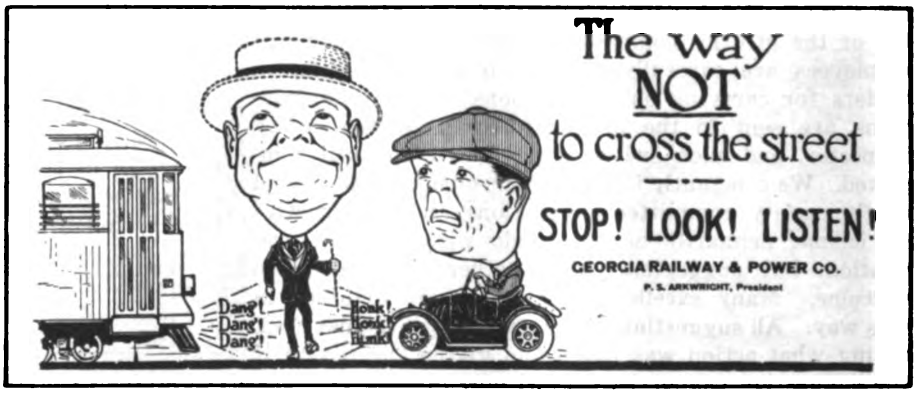
HERE are some typical modern bulletins in the interest of safety. Note particularly the automobile crossing warning poster at the top, somewhat along the same lines as that used by the steam railroads this year.

SAFETY FIRST ***now*** **and you will** ***be safe*** **when the Road Rule changes**

Cross only on the cross walk
Don't let children play on street
Wait until the car *stops*
Watch for car on other track

Prepare now for
January First

B.C. Electric


The way NOT to cross the street
STOP! LOOK! LISTEN!
GEORGIA RAILWAY & POWER CO.
P. S. ARKWRIGHT, President
Dang! Dang! Dang!
Honk! Honk! Honk!

SAFETY FIRST ALPHABET.

B Is for Best,
And it's best to take care
To see you are safe
When you go anywhere.

THE UNITED RAILWAYS & ELECTRIC CO.

SAFETY FIRST ALPHABET.

C is for Children,
And wise children play
Upon the pavement,
Out of harm's way.

THE UNITED RAILWAYS & ELECTRIC CO.

SAFETY FIRST ALPHABET.

D is for Doubtful.
It's doubtful if we
Would ever get hurt
If careful we'd be.

THE UNITED RAILWAYS & ELECTRIC CO.

BE SURE

Of your Footing as you leave the car. A slip, or a trip, may CAUSE A NASTY FALL

LOOK OUT FOR AUTOS

AS YOU LEAVE THE CAR

The Streets Are Slippery Now and Automobiles Cannot Always Stop Quickly Enough To AVOID STRIKING YOU

Organized Safety a Positive Force in Reducing Accidents

As So Much Depends on the Operatives, the Greatest Care Should Be Used in Their Selection and Training—The Collateral Advantages of Safety Campaigns Are Considerable—Safety Should Be Made a Major Policy

By A. W. Koehler
Director of Safety, New York State Railways

ORGANIZED accident prevention in the electric railway field is an institution of recent times. The last decade has seen it develop from a very humble beginning to a place where its positive progress is now readily discernible.

One of the difficulties in the way of the accident preventionist has always been the fact that the results of his work have been intangible. There was no means of knowing how many accidents might have occurred had it not been for some restraining influences. The results have been cumulative, however, and now after a period of ten or more years, during which time experience has shown that accidents do respond to preventive measures, it is possible to gage in terms of reduced frequency and severity rates and in dollars and cents the actual value of organized safety.

In a factory, where the process of manufacture of a product is largely a matter of repetitive movement, and where the worker does not have to contend with widely varying conditions over which he has little or no control, the conditions are different. Such an industrial plant lends itself far more readily to the establishment of safeguards which tend to lessen accidents.

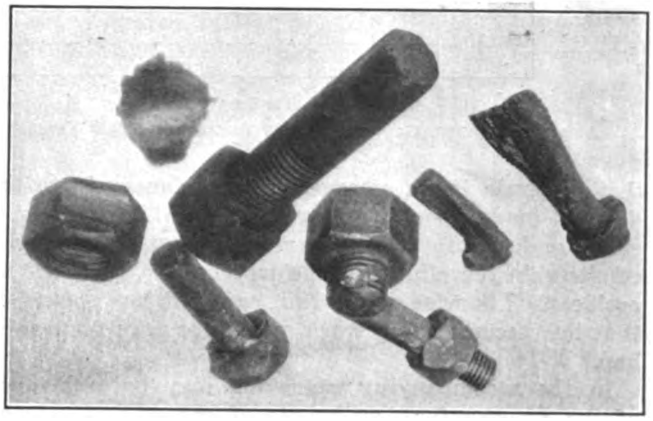
The human element, always the dominant factor in accident prevention, plays an even more important role in the safety program of an electric railway company than in industry.

Mechanical safeguards have but a limited application in street railway operation and consequently a much greater reliance must be placed upon the personal responsibility of the men in charge of the cars.

The motorman who operates a car under the congested traffic conditions of a city today is called upon to confront different conditions every day. Unlike the worker in a shop who is concerned chiefly in his own safety, upon the vigilance and careful conduct of the motorman and conductor depends the safety of all of the persons riding in a street car as well as many in the immediate neighborhood of the car.

While the co-operation of the public may be sought in preventing accidents through bulletins in the cars and such channels of publicity as may be open to the company, the bulk of the burden of saving people from accidental injury is borne by the men who operate the cars. Through a series of messages to the car riding public, the New York State Railways are endeavoring to enlist the help of the patrons of the street cars in reducing the number of preventable accidents. One of these is shown in the car card reproduced herewith. While a number of persons may respond to these suggestions, the inherent tendency of the American to take a chance is so deeply rooted in his general make up that it will require a long and persistent effort to rouse him from his apparent indifference to his personal safety.

Another means which is being employed to reach the public is the contribution of safety articles to the house organs of some of our large industries. Talks on safety before various clubs also serve as a means of awakening the members to a realization of the many thoughtless and really dangerous practices in which they indulge daily. The press gives space to these talks so that the public generally is introduced to itself in a light that may have a tendency to precipitate some sober reflection. The public schools are instilling into the minds of the coming generation the fundamentals of safety so that this problem may be simplified in time to come. The police are co-operating splendidly in our accident prevention activities and their assistance is a big factor in curbing the reckless motorist.



THESE OBSTRUCTIONS ON THE TRACK HAVE CAUSED DERAILMENTS

It is readily seen, however, that if any material progress in accident reduction is to be made, too much reliance cannot be placed upon the co-operation of the public.

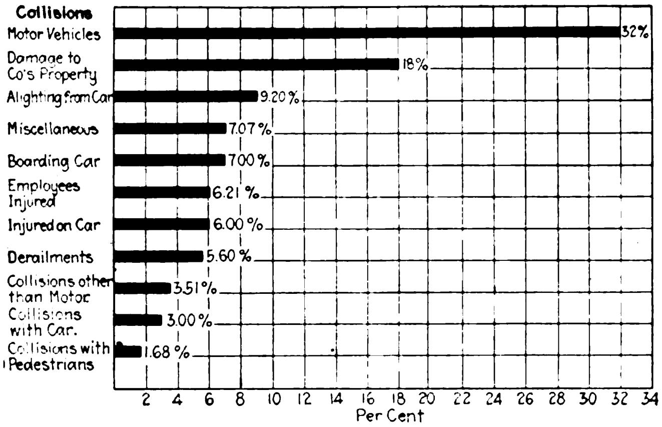
The major portion of the results from preventive measures must come from extraordinary effort on the part of the street railway men. A careful selection of men for positions to which so great a responsibility is attached should be made. It would be manifestly unsafe to the public, to the company and to a man himself to permit a man unfitted physically or temperamentally for a position of motorman to operate a street car.

A man on the front end of a street car must have keen eyesight, good nerves, a good sense of distance and a co-ordination of mind and muscle that will permit him to act on the instant. Again out of consideration of the public, the company and the man himself, no man should be permitted to operate a street car until he is thoroughly competent to do so and has satisfactorily demonstrated to the motor instructor his ability to handle a car safely. He should then be followed up from time to time to see that he has not developed any unsafe habits. Any time spent in better training the new man is well spent, as it is the new man who is involved in accidents far more frequently than the oldtimer.

The conductor, though less able to control the accident situation than the motorman, does contribute to or detract from the safety of the passengers by his actions.

A door opened before the car comes to a stop may mean a fall, or a door closed before a passenger is inside means a smashed finger or worse. A word of caution to an elderly man or woman, eager to get off as quickly as possible to avoid holding the car, may prevent an accident.

Of equal importance to careful men is an equipment that responds in an emergency instantaneously to the demand made upon it. A gong that will not make a sound or but a faint one, or a brake that fails to hold, counteracts the efforts of the motorman to prevent an accident. Likewise a bad rail, one that has spread or that has become badly worn, paves the way for a mishap.



ANALYSIS OF THE CAUSES OF 6,000 ACCIDENTS, NEW YORK STATE RAILWAYS

In the accompanying engraving may be seen some of the reasons for derailments of cars. Each of the objects shown was found on the car tracks in the city of Rochester, and several of the larger ones were responsible for the car leaving the rails. The bolts shown vary in size from ½ in. in diameter to 1¼ in. There are telltale marks on these "derailers" which bear evidence that more than one car passed over them.

After a heavy rain it is quite possible that in a low spot enough water might cover the track so as completely to hide from view an object such as is illustrated. Even though a car might pass over a nut or bolt without being derailed, it is inconceivable that the presence of the object would not make itself known by the jolt as the car passed over it. A motorman who will allow such an object to remain on the track, indifferent to the fate that might befall his follower, is not contributing to the safety of the car-riding public and his apathy may result in an accident which might have been avoided.

The finding of such objects as these on the rails should impress motormen with the need for the most careful scrutiny of the rail and should cause them to be particularly careful in running over track that is covered by water, snow or ice.

ACCIDENT RECORDS ARE ILLUMINATING

Accident records, aside from being necessary to furnish the basis for adjusting claims and bearing witness to the fact that accidents are costly, are very illuminating and full of valuable information to the safety department. They are the barometers of the accident situation and may be employed to serve as mileposts in the progress of accident reduction activities. By representing graphically all of the various classifications of accidents, it may be seen at a glance which of the groups are responding to prevention methods and upon which more strenuous efforts need be expended.

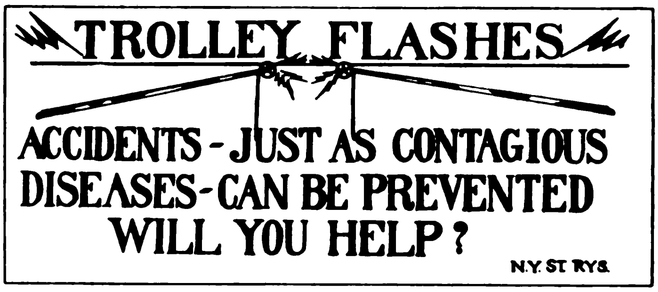
Thus it is possible to deal more intelligently with the accident situation than it is where the situation can be less readily visualized, and avoids also a too general application of the principles of safety. To tell a group of men that a certain classification has increased 10 per cent is not nearly so impressive as to let them observe a sharp rise in a graph which presents the fact to the eye in an unmistakable manner. An analysis of 6,000 accidents, including both serious and minor, brings to light a number of interesting and enlightening facts.

From the accompanying chart it may be readily seen that accidents involving the automobile are by far the most numerous. With the increasing number of automobiles that must operate on streets which are no more numerous or wider than formerly, it is plain that physical conditions are such as to make for an increasing number of motor accidents. Fines have not helped matters a great deal so that some more potent remedy must be found.

A locomotive engineer or a street car motorman is not permitted to operate a train or car until he has been found competent. The movements of steam railroads and electric cars are confined to a given territory, through which their tracks are laid. The driver of an automobile in many cities need pass no examination and may drive his machine wherever and whenever he pleases.

Until the operator's license is more universally adopted, incompetent persons will operate machines, and the number of their victims will not be lessened. All of the blame for automobile accidents, however, cannot be laid upon the motorist for pedestrians in many instances contribute through their own negligence to accidents which need not have occurred.

Next in order of frequency are accidents which cause damage to the property of the company. Although there may be no personal injury the cost of these accidents is no small item and adds to the burden of expense that must be borne by the company.



TROLLEY FLASHES

ACCIDENTS - JUST AS CONTAGIOUS DISEASES - CAN BE PREVENTED

WILL YOU HELP?

N.Y. ST. RYS.

EFFECTIVE CAR CARD TO CAUTION PASSENGERS

Accident frequency alone cannot be used as a criterion of the accident situation. Severity must be taken into account as a very few severe accidents may be far more serious from the standpoint of the effect on the minds of the public, as well as from the standpoint of dollars and cents, than a much larger number of minor accidents.

Nevertheless, every minor accident must be considered as a potential major one, for what may one time be a minor accident, under almost identical circumstances in another case may be a serious one. For this reason no pains should be spared or nothing left undone that might tend to prevent those accidents which may be looked upon as of small consequence.

To be successful, accident prevention must not be considered as a thing apart but should be regarded as part and parcel of efficient operation. It is an operating proposition just as truly as are some of the other problems which are considered as having a prior lien on the time and attention of the operating officials of the railway.

Common sense must govern the administration of a safety department in order to command the respect and co-operation of other departments. Nothing will more quickly make the safety department a target for ridicule and discount its effectiveness than the submission of trifling matters to heads of departments busy with more importants matters. On the other hand, every department head is glad to lend his assistance when worthwhile matters that do concern his department are referred to him.

To compare results achieved by one company with those of another in a city located in a different part of the country may be interesting but no definite conclusions may be drawn therefrom. Local conditions govern the situation in all cases. While certain measures that have proved effective in one locality may be used advantageously in another, it does not follow that the same amount of good will result.

While the saving made by accident prevention activities in actual dollars and cents is one of the benefits to be derived and a very substantial one, some of the by-products are not without considerable value. It is to be expected that as accidents fall off in number, operating conditions improve, there are fewer fill-ins, less abuse of equipment and a higher morale.

The value of courtesy, too, has an important bearing on reducing accidents. Courtesy wins favor from the car-riding public. Even a word of caution, when gruffly spoken, loses its effect. A motorman or conductor who has treated the people who ride on his car courteously has no difficulty in securing the names of witnesses in the event that an accident occurs through no fault of his. The testimony of such witnesses will go far in absolving him from blame and releasing the company from responsibility.

The good will of the public is an asset that is invaluable to any public utility company and one that may be cultivated or destroyed according to the manner in which it is represented by its motormen and conductors.

In conclusion, therefore, the most important considerations in connection with accident prevention are as follows: Safety a policy, not a side issue, careful and courteous men, safe equipment, co-operation of the public gained through various channels of publicity, and everlasting effort.

How to Prepare for a "No-Accident Week"

Much of the Success of Such a Campaign Depends Upon Arousing the Group Instinct, Latent in the Majority of Mankind—Suggestions of How This Can Be Done Are Given in Detail

By Fred M. Rosseland
Chief of the Public Safety Division, National Safety Council

AN EFFECTIVE means of introducing accident prevention work on an electric railway—or of reviving it if it has been allowed to lapse—is to conduct a No-Accident Week! The campaign need not involve the expenditure of any large sum of money, but it does require time—time in the preparatory work, time during the campaign, time of the executives who are directly responsible, and the time of the supervisory force. But the time need not slow up schedules; on the contrary, if well spent it will reflect to the advantage of all involved.

The psychological value of a No-Accident Week is well proved by the numerous drives in this country during the World War. Concerted action of this kind arouses the group instinct, latent in the majority of mankind, and wins by providing a definite objective in the possibility of honor reflected to the company and an assurance of appreciation for the effort. It is an appeal to the individual and group pride of the employee which, properly fostered, is invaluable to the management.

A No-Accident Week furnishes an interesting topic for conversation and discussion between employees of all grades and between employee groups and the supervisory force which can readily be developed into a valuable spirit of loyalty to the company. In a word, it is impossible for a group of individuals to work together intensively even for a week on a no-accident drive without developing a new regard, a new appreciation, a better understanding of one another.

In the following outline of preparatory work, I shall refer to the person in charge as the general manager, although the superintendent or general superintendent or a vice-president may have the responsibility for the campaign.

Having made the decision to conduct a No-Accident Week, the general manager will first arbitrarily select the week or he may refer this question to a special committee of his assistants. In either event the date chosen should allow at least two weeks for preparation. Three weeks would be better. The No-Accident Week may properly start at midnight on one Sunday night and continue until midnight the next Sunday night, a period of seven full days. Then the executive committee should be formed, to consist of the general manager as chairman and the four or five principal department heads of the organization. If a complete safety organization is in operation, this committee may be dispensed with and its duties given over to the central safety committee.

The executive committee should arrange to secure from the claims department, or the accounting department, the accident record of the company for two or three weeks preceding the No-Accident Week and for the corresponding week in the preceding year or two.

Plans should be made to hold a safety rally of all employees—divided into groups, if necessary—during the week before the no-accident campaign. These meetings should be addressed by the general manager or by the head of the particular division employing the men present at the meeting. The speaker should tell simply and forcefully what the company proposes to do, what the accident record has been and why the campaign is to be held. In closing, he should solicit the support and co-operation of every employee to make the campaign a success.

At these meetings signed pledges should be secured from every employee. The following pledge is suggested:

X. Y. Z. TRACTION COMPANY,
OMAHA, N. Y.

NO-ACCIDENT WEEK
Aug. 7-13, 1922

I am heartily in accord with my company's Accident Prevention work, and I will make a special effort to prevent accidents of all kinds during No-Accident Week.

(*Signed*) ....

(*Dept.*) ....

The dispatchers and supervisory force should be instructed to greet every employee with whom they talk on company business with some such phrase as "Remember, no accidents this week!"

A special letter to be signed by the general manager should be prepared to be mailed or handed to every employee just before the No-Accident Week begins. The letter should read something like this:

TO THE EMPLOYEES OF THE X. Y. Z. TRACTION CO.,
MY FRIENDS:—

Beginning at midnight next Sunday night, this company enters on a No-Accident Week, during which we hope not to have a single accident in which our cars or equipment are involved. To win out, we must think and act safely!

Some of us may thoughtlessly take chances to make up time, to finish a job quickly, or for some other reason, but we must stop taking these chances. If we all exercise every reasonable precaution to prevent accidents, chargeable to our negligence or carelessness, during No-Accident Week, the results will be a saving of pain and loss that we may well be proud of. The company asks every man to do his duty to prevent accidents to make the No-Accident Week an unquestionable success.

I know that you are with us and that you will work with me to make our record perfect.

Sincerely yours,
General Manager.

Each day during the campaign—after the first day—every motorman and conductor (or at least each crew) should be given a card or slip showing the record made the day before, together with a record for the week to date, bearing a one-line slogan or one sentence of encouragement such as:

"Do more than ring your bell. Slow down or stop, if necessary."

"Your co-operation is showing results. Thank you!"

"Don't wait for an accident to happen. Report the danger now."

"It pays to be careful. The more careful you are, the better it pays."

"It would be a disgrace to us if we did not give the best that is in us to prevent accidents."

"Careful folks seldom are unlucky."

"We are doing splendidly. Don't let any act of yours spoil the record."

"When caution becomes a habit, accidents will be few."

"It is your co-operation that is making the No-Accident Week a success. Let's keep it up!"

Each day the accident record of the week to date should be posted on the bulletin boards at the division points where all employees may see it. This record should show in comparison the record of the previous week and also of the previous year. These notices should have slogans, words of commendation or encouragement.

If the record is clear for the first two or three days, it is advisable to hold additional mass meetings of employees to "pep them up" and inspire them to continue the effort.

ATTENTION TO ADVERTISING IS ESSENTIAL TO SUCCESS

Preparations should also be made to give due publicity to the No-Accident Week campaign in the newspapers of the community served by the traction company. It is vital that all the safety committees—central, divisional and subordinate—be definitely lined up in the campaign and especially delegated to inspire their fellow workers to continue co-operation during No-Accident Week. It should be suggested that the subject of the no-accident effort be constantly brought up in conversations and every effort made to make it the most important activity of the organization.

Many National Safety Council members conduct an advance advertising campaign among their employees during the week or ten days preceding the opening of the week. For example, on the first day of the advance advertising campaign a large letter N is painted or posted on bulletin boards throughout the company. On the second day a large letter A is added. The third day the large letter W is added. The three letters are then allowed to stand for twenty-four hours. Then the date of the No-Accident Week is set up thus:

N A W
August 7-13.

This is allowed to stand for three or four weeks and then the letters N A W are removed and in place of them are inserted No-Accident Week, the first letter of each word being capitalized to indicate that they are the same letters previously posted. The next day the same copy, just described, is removed and replaced in smaller letters, and in large letters something like the following is placed beneath:

"For the Honor of the Company"

or some similar slogan, which may be changed daily until the actual opening of the campaign or until the end of the No-Accident Week. This idea, which may be adapted and enlarged upon, will most assuredly add "pep" to the whole affair.

It is advisable to use safety bulletins freely during the two or three weeks preceding the No-Accident Week and during the week of the campaign itself. Many such bulletins may be obtained from the National Safety Council by its members, and home-made bulletins developed on the property are easily prepared at small expense.

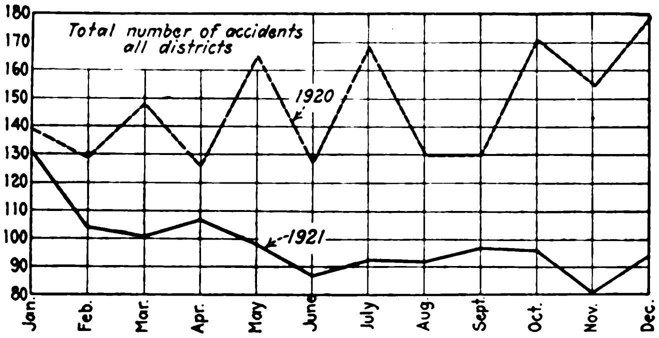
With these preparations made and the recommendations carried out in the proper spirit, a No-Accident Week should be successful. Executives, however, bear in mind that even though a perfect score—not a single accident during the week—is not attained, the week should be considered a success if a substantial reduction is made in accidents compared with the average for the year and with the corresponding week of the previous year.

Conducting Safety Work on a Business Basis

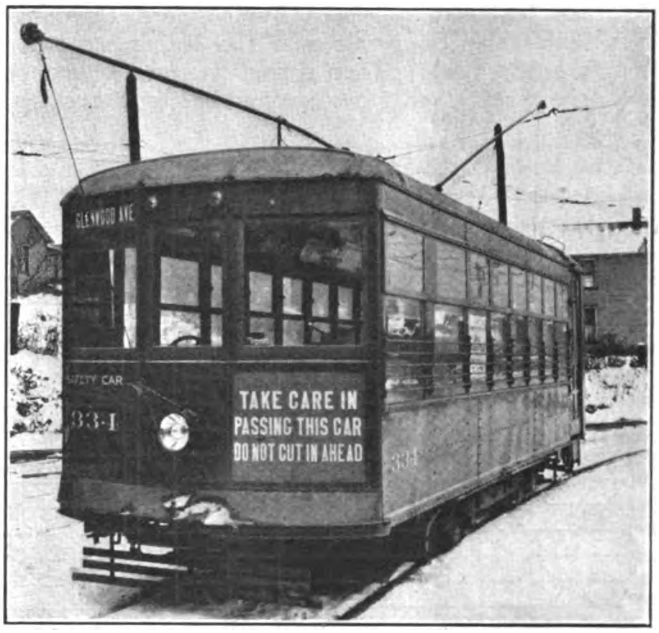
Quiet Study and Effort, Without "Hoorah" Meetings, Prove Very Effective in Youngstown—Solemn Hearing on Every Accident Has Important Influence—Work Conducted on the Theory There Should Be No Accidents Whatever

PREVIOUS to the present plan of conducting safety work on the railway properties of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, several sporadic attempts have been made to accomplish the desired end by means of a lot of "hoorah" meetings designed to stimulate enthusiasm. But each time the effort has been of temporary benefit, for it was impossible to keep up the interest. When G. T. Seely, vice-president and general manager, undertook to revive the safety work last year, a simple organization was effected, and the work started out in a very quiet way without any attempt to have big meetings or create padded interest. The work has simply consisted of a quiet, consistent plugging for greater caution and an effort to rid the property of dangerous equipment and bad practices.

The organization to handle the safety work comprises a central safety committee and nine local or "intermediate" committees—intermediate between the individual employees and the central committee. The central committee comprises the general manager and various department heads. It meets regularly once a month. Any individual may make a safety suggestion to a representative from his department who is a member of one of the intermediate committees and this committeeman can dispose of a good many of the suggestions, that is, put them in effect without carrying the matter any further. The intermediate committees also meet once a month to consider the various recommendations made as to improving safety. These committees make their recommendations on anything that cannot be done and forward them to the executive committee of the central safety committee. This executive committee is a subdivision of the central committee comprising the general manager, manager of railways, the secretary of the company, and the manager of the light and power department. If a proposal is approved by the executive committee, the work is ordered done and the local committee, and through it the individual, advised as to the action taken. If action is not to be taken immediately, information is given as to why it is postponed and when the work will be done. Any matter which is turned down by the executive committee is sent up to the central committee at its monthly meeting, which considers the question and either confirms the decision of the executive committee or approves the suggestion.



GRAPHS OF TOTAL NUMBER OF ACCIDENTS IN 1920 AND 1921, PLOTTED BY MONTHS AND SHOWING REMARKABLE IMPROVEMENT



DASH SIGN WARNING TO AUTOISTS ON PENNSYLVANIA-OHIO ELECTRIC COMPANY CARS

The advantage of the executive committee is that it provides a means of giving immediate attention to the great bulk of the suggestions made, without waiting for the monthly meeting of the entire central safety committee. Any steps requiring the expenditure of money or requiring a work order must be approved by the central committee of which the general manager is chairman. Nothing is finally turned down until it goes up to the central committee.

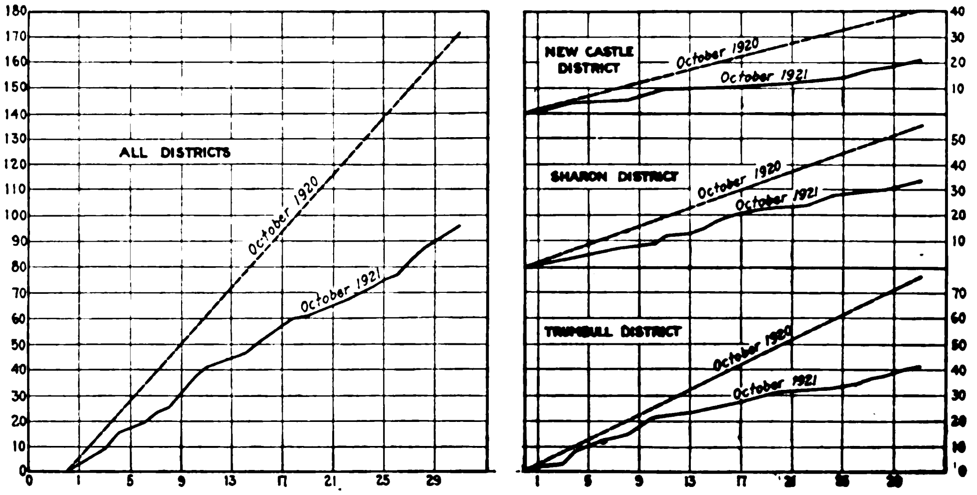
The members of the intermediate committees are selected by a popular ballot of the employees, the election taking place in all departments every six months.

A similar safety organization and scheme of conducting the work is in operation on the Youngstown Municipal Railway, which has a separate operating organization but is also under the management of Mr. Seely. For the entire system, the Pennsylvania-Ohio electric and railway properties and the Youngstown Municipal Railway, the number of safety recommendations received and the action taken during the years 1920 and 1921 were as follows:

INTERMEDIATE COMMITTEES	
Number of safety recommendations received	843
Number approved	660 or 78 per cent
Number not approved	117 or 14 per cent
Number pending	66 or 8 per cent

CENTRAL COMMITTEE	
Number of safety recommendations received	233
Number approved	169 or 73 per cent
Number not approved	38 or 16 per cent
Number pending	26 or 11 per cent

One thing which has undoubtedly contributed very materially to the good record made during 1921 in reducing the number of accidents, as shown in the accompanying curves, is the fact that a hearing is held on every accident. This hearing is conducted with great solemnity either by the manager of railways or general superintendent. A stenographic record of the proceedings is made and the whole conduct of the hearing is much the same as it would be in a court. To submit to this investigation and cross-examination is not a thing that any trainman relishes. Furthermore, there has been remarkable co-operation of the trainmen's union in this safety work. When a man has an accident he not only must stand investigation before the official board, but he must answer to his fellow trainmen, who "razz" him pretty hard because of their efforts to make the accident record of their division show up better than the record for the same period of the previous year and better than the other divisions of the company. Although no reward of any kind is made to the trainmen, the competitive spirit runs high. Each month the curves showing the number of accidents on each division are posted at the various division headquarters, so that the men can compare the results with their own work and with that of the other divisions.



LEFT—TYPICAL SET OF CURVES OF CUMULATIVE DAILY ACCIDENTS FOR THE ENTIRE PROPERTY POSTED MONTHLY IN DIVISION HEADQUARTERS AND SHOWING IMPROVEMENT OVER CORRESPONDING MONTH OF PREVIOUS YEAR. RIGHT—TYPICAL ACCIDENT CHART FOR THE THREE DIVISIONS DISPLAYED IN EACH DIVISION HEADQUARTERS TO KEEP TRAINMEN ADVISED OF DAILY RESULTS

Another part of the follow-up on accidents which has proved very effective is the plan of having each accident reviewed before the monthly meetings of the local safety committees. Reports on the accidents happening during the month are read, and the cause and responsibility pointed out. In this discussion it is brought out what trainmen are responsible and how much the accident cost the company.

The safety work is somewhat intensified by bringing in the influence of an outside man. A man from the Safety Bureau, Chicago, spends one week a month on the property and works with the local committees, talking over their suggestions, telling them how to carry things out, and giving them encouragement on the importance of the work. The men look up to him more than they would to an employee of the company because he is considered an expert on the subject and they respect what he says. His week culminates in the monthly meeting of the central safety committee.

A very large proportion of the accidents which the company has been experiencing are the result of automobiles hitting the street cars or cutting in ahead of a car. A campaign to induce greater care on the part of drivers has been carried on by painting a sign on the dashes of the cars, so located as to be on the right-hand side on the rear end. Some such admonition as the one shown on the car reproduced herewith is painted in large yellow letters on a red background, this combination making the message stand out very prominently. Several different warnings are employed all urging the use of care in approaching and passing street cars.

Another point in the psychology of the safety work in Youngstown is that the management takes the attitude that there should be no accidents whatever. It realizes, of course, that some accidents will happen, but it does not recognize this as a philosophy, and instead endeavors to impress on the men the idea that if the cars were operated right, there would be no excuse for any accident.

The safety work of the company on the present plan started in January, 1920, but a better showing was made in 1921 than during the first year, probably as a result of the cumulative effect of the effort. The curves reproduced herewith show a comparison of the daily cumulative accidents for a typical month — October, 1921 — as compared to the cumulative average for the same month of 1920, for the New Castle, Sharon and Trumbull districts, and for the entire property. A fifth pair of curves shows the total number of accidents by months for the year 1921 as compared with the total for 1920, from which it will be noted that the safety work is bearing fruit abundantly. The results of the safety work over the entire year 1921 showed a reduction of more than one-third in the number of accidents as compared to the previous year. The actual figures are as follows:

	1921	1920	Decrease
New Castle district	269	403	33.2 per cent
Sharon district	448	660	32.1 per cent
Trumbull district	458	704	34.9 per cent
Total	1,175	1,767	33.5 per cent

There have been other influences at work besides the accident prevention activities, to be sure. Some of the decrease in accidents must be attributed to the fact that a somewhat smaller number of passengers was carried, although the car miles operated increased slightly, due to the introduction of Birney safety cars on the city lines in the New Castle and Sharon districts in place of larger cars. The Birney cars in themselves and new interurban cars of the Peter Witt type in the Trumbull district contributed materially to the reduction of accidents. Nevertheless, in the opinion of Mr. Seely, the fact remains that in the cutting of accidents nearly in two in the period in which organized safety work has been carried on, much of the showing, probably the major part, must be attributed to care in operation, to interesting every employee in the cause of safety, to consistent, quiet, unremitting accident prevention work.

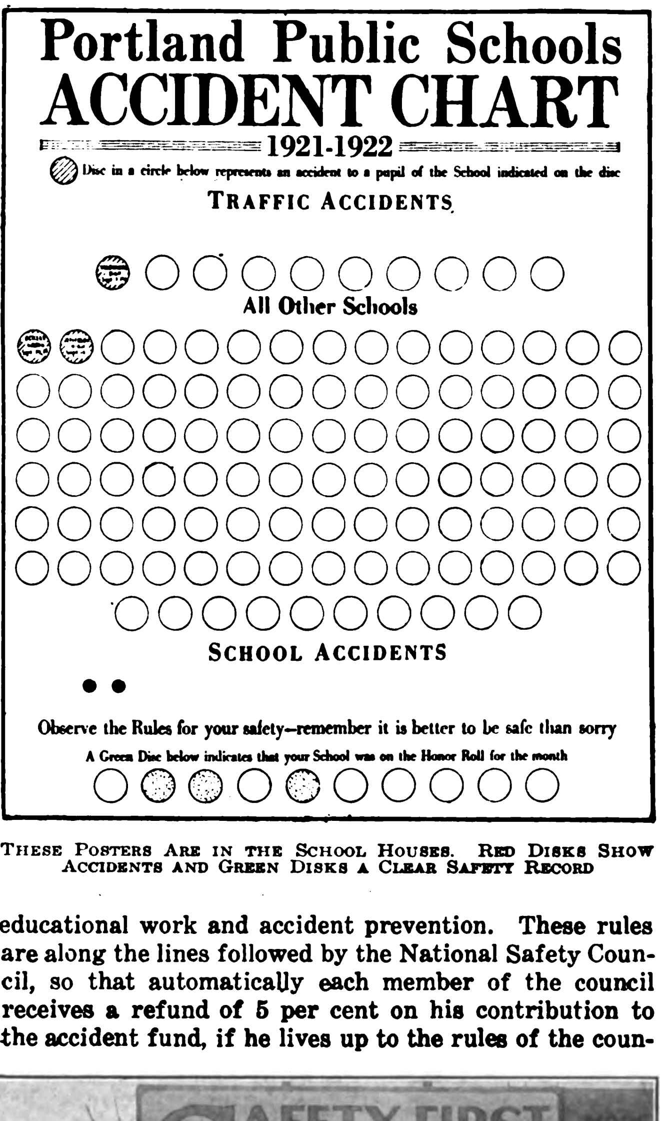
Teaching Safety to Children

Portland, Ore., Takes a Leading Position in Safety Instructions for School Children—There Is an Active Division of the National Safety Council and a Variety of Plans Is Followed

THE city of Portland evidently believes in the old proverb to train a child up in the way he should grow, and when he is old he will not depart from it. It has been customary for ages to speak of a child as being heedless, but many of the school children in Portland, thanks to the Oregon & Columbia Basin Division of the National Safety Council, assisted by the Portland Railway, Light & Power Company, are much less heedless than the adults.

The Oregon & Columbia Basin Division of the National Safety Council is an organization made up of the large industries in Portland who contribute to its support on the basis of 5 cents per employee a month. The Portland Railway, Light & Power Company is a member, and B. F. Boynton, its claim agent, is a vice-president of the organization. The city of Portland and the Chamber of Commerce contribute lump sums to the support of the organization, as does also the railway company. Some of the results obtained among the school children are shown in the accompanying table. While there has been an increase in the number of automobiles registered in the state and city as well as an increase in the school attendance, there has been a marked decrease in the number of accidents to school children.

Through action by the Oregon Legislature at its 1921 session a very practical impetus was given to the stimulation of educational work in accident prevention by employers. The state has a workmen's compensation law, as well as a state industrial accident fund and an industrial accident commission. The action of the Legislature was to pass two important amendments affecting the employers' contribution to the state industrial accident fund. These provisions became effective July 1, 1921, and provided a reduction of 5 per cent from each monthly payment required by the act to the fund, provided the employer followed certain rules of the commission designed to promote safety organization and educational work and accident prevention. These rules are along the lines followed by the National Safety Council, so that automatically each member of the council receives a refund of 5 per cent on his contribution to the accident fund, if he lives up to the rules of the coun-



Portland Public Schools
ACCIDENT CHART
1921-1922

Disc in a circle below represents an accident to a pupil of the School indicated on the disc

TRAFFIC ACCIDENTS

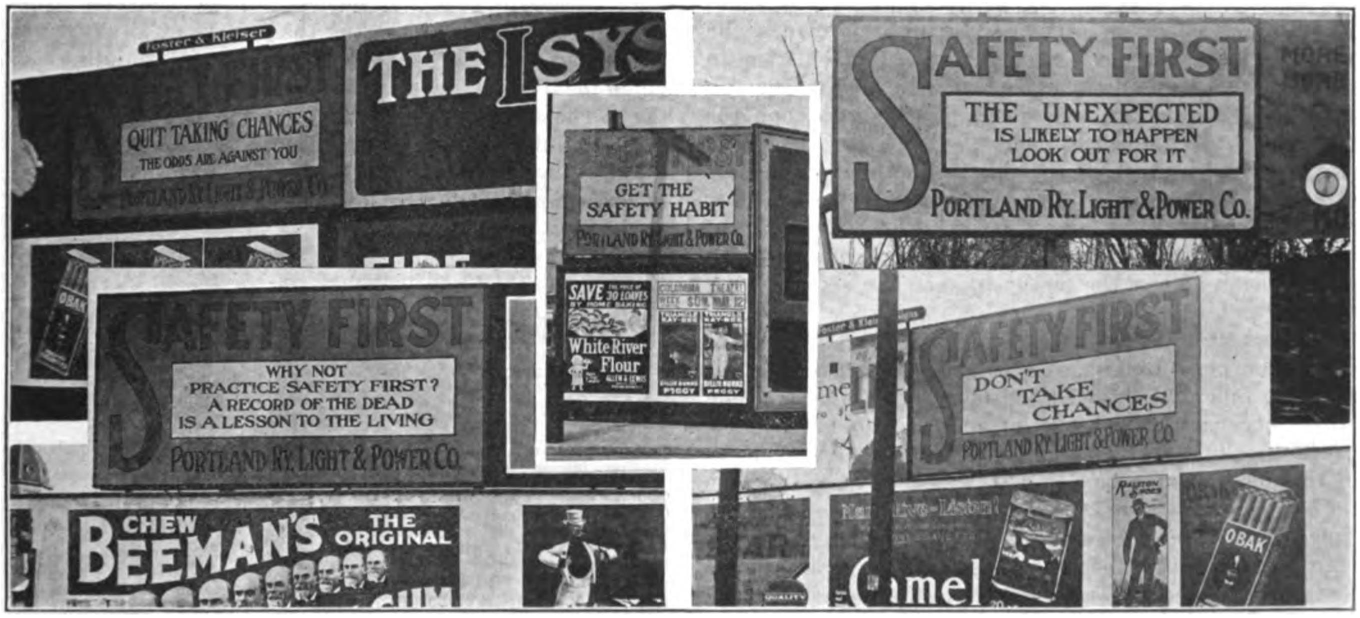
All Other Schools

SCHOOL ACCIDENTS

Observe the Rules for your safety—remember it is better to be safe than sorry

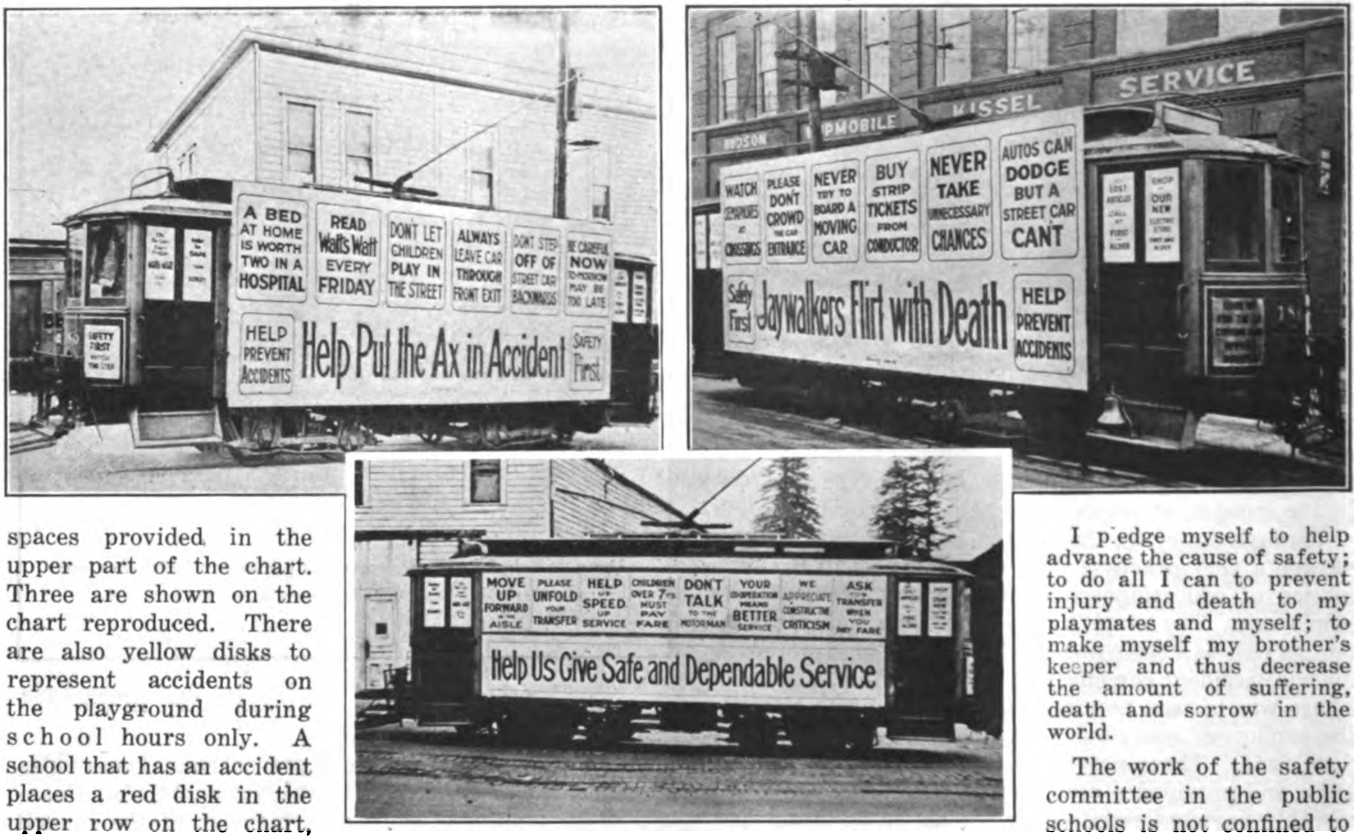
A Green Disc below indicates that your School was on the Honor Roll for the month

THESE POSTERS ARE IN THE SCHOOL HOUSES. RED DISKS SHOW ACCIDENTS AND GREEN DISKS A CLEAR SAFETY RECORD


Foster & Kleiser
THE
QUIT TAKING CHANCES
THE ODDS ARE AGAINST YOU
PORTLAND RY. LIGHT & POWER CO.
GET THE SAFETY HABIT
PORTLAND RY. LIGHT & POWER CO.
SAVE
White River Flour
SAFETY FIRST
THE UNEXPECTED IS LIKELY TO HAPPEN LOOK OUT FOR IT
PORTLAND RY. LIGHT & POWER CO.
SAFETY FIRST
WHY NOT PRACTICE SAFETY FIRST? A RECORD OF THE DEAD IS A LESSON TO THE LIVING
PORTLAND RY. LIGHT & POWER CO.
SAFETY FIRST
DON'T TAKE CHANCES
PORTLAND RY. LIGHT & POWER CO.
CHEW BEEMAN'S THE ORIGINAL
OBAK
Camel

THE PORTLAND COMPANY BELIEVES GOOD RESULTS CAN BE SECURED BY BILLBOARD SIGNS cil. The other amendment was to provide another rebate for those employers having a small number of accidents and an added rate for those having a large number of accidents.

A number of ways were followed to stimulate interest in safety in the public schools. One was the chart with paper disks illustrated in the accompanying engraving. This was placed on the bulletin board of each school with the name of the school printed on it. Red paper disks, to be pasted on the chart, are provided to represent accidents in traffic during the twenty-four hours. These disks are printed with the name of the school and the date of the accident and are pasted in the circular spaces provided in the upper part of the chart. Three are shown on the chart reproduced. There are also yellow disks to represent accidents on the playground during school hours only. A school that has an accident places a red disk in the upper row on the chart, while in the other schools the red disk is placed in one of the lower rows. If no accident to any child attending a school is reported during the month the school having this clear accident record is entitled to a green or safety disk, placed in the lowest row on the chart. There are ten spaces in this row, one for each month of the school year.


A BED AT HOME IS WORTH TWO IN A HOSPITAL
READ Watt's Watt EVERY FRIDAY
DONT LET CHILDREN PLAY IN THE STREET
ALWAYS LEAVE CAR THROUGH FRONT EXIT
DONT STEP OFF OF STREET CAR BACKWARDS
BE CAREFUL NOW TO-MORROW MAY BE TOO LATE
HELP PREVENT ACCIDENTS
Help Put the Ax in Accident
SAFETY First
SERVICE
KISSEL
WATCH SEMAPHORES AT CROSSINGS
PLEASE DONT CROWD THE CAR ENTRANCE
NEVER TRY TO BOARD A MOVING CAR
BUY STRIP TICKETS FROM CONDUCTOR
NEVER TAKE UNNECESSARY CHANCES
AUTOS CAN DODGE BUT A STREET CAR CANT
Safety First
Jaywalkers Flirt with Death
HELP PREVENT ACCIDENTS
MOVE UP FORWARD IN THE AISLE
PLEASE UNFOLD YOUR TRANSFER
HELP US SPEED UP SERVICE
CHILDREN OVER 7 YRS MUST PAY FARE
DONT TALK TO THE MOTORMAN
YOUR COOPERATION MEANS BETTER SERVICE
WE APPRECIATE CONSTRUCTIVE CRITICISM
ASK FOR TRANSFER WHEN YOU PAY FARE
Help Us Give Safe and Dependable Service

SAFETY CARS WITH SAFETY FIRST SIGNS ARE RUN FREQUENTLY ABOUT THE STREETS

An active interest in accident reduction is thus established among the children, and the bulletin board at each school is scanned every day to see that that school has been free from accident. This interest has created an endeavor among the pupils to keep the red disks off the chart.

To provide a definite organization, safety committees have been organized in each school, and buttons given to the members of these committees to distinguish them. A "safety patrol" was also organized among the boys, preference being given in the selection of the members of this patrol to the boy scouts. These boys wear green cloth arm bands, marked "Safety Patrol," and are detailed at the street crossings to assist in getting the little children across in safety and to report automobiles which violate the ordinance relative to passing schools except at reduced speed during the school period.

The duty of the safety committees is to read the school bulletins in their rooms each week and to lead discussions on safety topics. These committees meet once a week under the supervision of a teacher, and once a month the manager of the public safety section of the Safety Council meet with the children. Two assemblies of all pupils are held twice a year, spring and fall. In addition, there is a rally for the safety committees in May, and at the last meeting more than 1,000 children were present. A safety play was given by the pupils of a grammar school, and there were fire prevention exercises and short talks by city and school officials. The pupils then together took the safety pledge:

> I pledge myself to help advance the cause of safety; to do all I can to prevent injury and death to my playmates and myself; to make myself my brother's keeper and thus decrease the amount of suffering, death and sorrow in the world.

The work of the safety committee in the public schools is not confined to reduction of accidents on the streets. It includes other causes of casualty, including fires. Several fires occurred in the schools during the past year, all starting among the shingles on the roof, and one building in which nearly 700 pupils were housed was destroyed, but at the sound of the fire alarm the pupils were out of the building in forty-five seconds.

The railway company has taken an active part in this entire campaign, having done considerable work before

TABLE SHOWING COMPARATIVE ACCIDENT STATISTICS IN PORTLAND, ORE.

	1920	1921	1922	
Automobiles registered in Oregon	103,000	118,169	130,000	approx. 30% inc.
Automobiles in Portland (estimated)	40,000	45,000	50,000	
Accidents, traffic	10,038	13,161	....	
Accidents, persons killed	28	31	....	
Accidents, persons injured	1,238	1,410	....	
Accidents to school children (school yr.)	150	111	58	
Accidents to school children decrease	....	25%	60%	
Children injured between 6 and 10 years, inclusive			39	
Children injured between 10 and 18 years, inclusive			19	
Children struck by automobile			54	
Children struck by street car			1	
Children struck by bicycles			3	
Fault of operator of vehicle			20	
Fault of school children			38	
Number of public schools in campaign			70	
Membership of safety committees			750	
Membership of safety patrols			220	

the Safety Council was organized. Prizes were offered for the best paper among the children on "The Prevention of Different Types of Accidents." At one time 50,000 blotters printed with different "don'ts" on them were distributed through the schools. At another time the reminders took the form of small celluloid calendars with the list of "don'ts" on them, and on another occasion the children received "safety first" buttons which they could pin on the lapels of their coats. At one time it seemed as if nearly every child in Portland was wearing one of these buttons.

A statement of the safety campaign in Portland would be incomplete without something about the work done by the Portland Railway, Light & Power Company among its own men. Its first, and perhaps its most effective, work is among its new trainmen after they had been broken in and before they are allowed to operate their cars. On a certain day each week all these men are brought in to be instructed along the lines of safety and also what to do when accidents occur. Prizes have also been offered to the men for the best paper on the prevention of different types of accidents, and these prizes have been in cash. A portrait of the prize winner was then posted in the particular carhouse where the employee worked.

Safety talks are given in the company paper, placards are posted in the shops, carhouses and substations, and safety signs are carried on every car. Metal watch fobs with a safety warning on them have been presented to each motorman and conductor. Safety committees have been organized at the different carhouses, and occasionally means of furthering the safety idea are discussed with the safety committee over a dinner. Cars carrying safety first signs are operated through congested districts in the city, and safety first signs are carried on billboards throughout Portland. Illustrations are given of these.

An effort is now being made in Portland to have a more rigid test for automobile drivers' licenses, as it is felt that many accidents have been caused through the operation of automobiles by men and women who mentally are not qualified for this responsibility.

Accident Reduction in Los Angeles

The Safety Bureau Was Begun on the Principle that Carelessness Causes More Accidents than Want of Knowledge—The Men Are Thoroughly Drilled to Be Careful and Watch Out—Excellent Results Are Already Being Secured

BY JOHN C. COLLINS
Supervisor of Safety, Los Angeles Railway

IN PROBABLY no other city in the United States is the hazard of accidents involving street cars so great as in Los Angeles. It is true that Los Angeles does not have many days when the streets are slippery, but for that reason drivers of vehicles are not familiar with those conditions when they do occur. The automobile traffic is dense, both in the center of the city and in outlying districts, because every day of the year is an out-of-door play day in Los Angeles for those who have time to take advantage of it. In most Eastern cities automobile traffic is less during the winter months, but in Los Angeles it is almost twice as heavy in winter as in summer.

Several years ago I was engaged by the Los Angeles Railway Corporation to study the question of how the different types of accidents might be reduced by better instruction and other work among the trainmen. I found many angles to this question—type of men, different nationalities, frame of mind, etc.

As an experiment I started two years ago to work on a man who was less than twenty years of age and had had no previous experience with cars or automobiles. When he had learned to start and stop a car smoothly, I instructed him in safe operation along special lines with the idea of keeping him from having an accident for which he was to blame. When I thought he had formed the habit of doing what he should, he began at the foot of the extra list and has now worked up to a regular position on one of our main lines. In these two years he has not let any part of his car hit anything, nor made a report of a step accident. This is much more than I would expect from any man.

Another experiment was with a different type of man, more reckless and an auto driver thirty years of age, who had been instructed in the regular way. When he could operate a car, I went over the accident question very thoroughly with him in the office. He has been running cars almost ten months without an accident.

All this has proved to me that with men properly trained accidents can be avoided; that carelessness causes more accidents than want of knowledge, and all that is needed is to work on the man's mind—to get him to think. This may take time, or some reward may have to be offered to him for thinking and a penalty assessed for not thinking.

SAFETY BUREAU STARTED

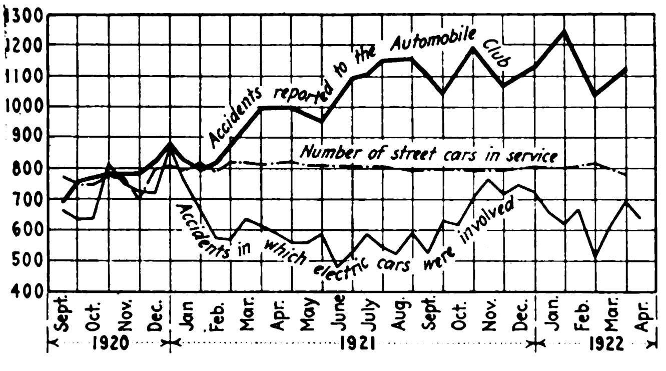
The Safety Bureau of the Los Angeles Railway Corporation was started Oct. 1, 1920, with this foundation —that any man, no matter how good, might have an accident, but that no man need have one for which he was to blame. By eliminating the accidents for which they are responsible, the men do away very largely with the so-called "unavoidable accident" as well.

In our weekly paper, *Two Bells*, we carry a series of short articles dealing with accidents, each class of accident being covered before another is started. The heading each week calls the attention of the trainmen to changes at some particular place, or to the fact that they are getting careless in observing some rule, jumping from one thing to another to get them to think. This is for general results and, in the language of the trainmen, worded so that the poorest man in the service can understand it, for he is the one that needs it the most. We present conditions just as the men meet them every day.

Every new motorman starts cautiously. As he gets acquainted with the other men and more familiar with the controller, the air and the lines, he is apt to become overconfident before he has had the practical experience necessary to guide him. After a while he settles down to street car operation, learning from experience that taking chances does not pay. We are trying to keep the new man from going through the overconfidence period by giving him the benefit of our experience. They say a thing cannot be done. We show them it can and more easily than they have been doing the old way.

We give no bonus for safety, although a man receives credits for each month he has a clear safety record, and demerits are assessed for accidents wherein he is to blame. This affects his standing when the yearly bonus is awarded. This bonus is based on the man's general record each month and is paid in a lump sum on Dec. 15 of each year.

We conduct a contest among our divisions, the winning division receives a safety pennant which it retains until some other division wins it. The duration of the contest was originally for ten weeks, but we find this is too long a time, the divisions falling behind losing heart as well as interest. In order to keep up the interest, we decided it would be better to have a vacation from April to October, then hold six contests starting Oct. 1, each contest ending with the month. The first five will be based on responsibility, the sixth one on the total number of accidents. While the contest is on each division is kept informed every day relative to its standing. We let the division superintendent use his own method to encourage the division spirit, as he should be better acquainted with his men and conditions more than any other man. He is given a free hand, so he cannot say that he was interfered with.



RELATIVE NUMBER OF AUTOMOBILE AND STREET CAR ACCIDENTS

This chart shows the increasing number of accidents reported to the Automobile Club of Southern California in which automobiles are involved, the decreasing number of street car accidents and the total number of street cars.

In this contest first place changes many times. This shows the men are interested and fighting. We have a trained man who looks over the files and places the responsibility without knowing the name of the man who had the accident, or his division, so there is no chance that one will be favored over another. We have a chance to recheck after the claims department has made its investigation or settled the claim.

We have not enlisted in a safety week contest, but work to that end the year around, devoting our attention particularly to the following six general types of accidents: Rear end collisions with cars or vehicles, steam railroad crossings, electric switches, curves, cross streets and the boarding or alighting accidents.

Road space is our main strong point working against collisions with any object ahead. It would take a fair size book to go into details of the plan. In an article like this I can give only a few ideas of the plan.

To explain road space it should be explained that the city is divided into two zones. No. 1 is the congested district and No. 2 is from the edge of the congested district to the terminal. In part of No. 2 zone, three or or four different lines run on the same track, then separate to go over their own routes. While running at full speed in this zone the cars must not operate closer than 600 ft. from one another. If the leading car stops, the motorman of the following car must throw off power immediately and approach the car in front with a decreasing speed, making a full stop 100 ft. back of it and remain there unless signaled to close up by the crew of the leading car. If signaled to close up, the motorman of the second car must not use more than five points on his controller and must stop 10 ft. back of the leader. This not only does away with rear end collisions but enables the men to coast a great deal with their cars under better control at dangerous places and does away with a great many unnecessary stops.

The Los Angeles Railway pays considerable attention to the enforcement of this rule. Each new man is thoroughly instructed in it, and this instruction gives him a foundation to work from in No. 1 zone, or when any objects, such as track intersections, curves or other cars, are ahead or there are autos standing on or near the tracks.

When a car is following an auto, the same road space is used as when a car is being followed except the distance is somewhat shorter, depending on the speed, but the safety stop is always in reserve. The idea is not so much to scare the autos off the track as it is to stay from them while they are on the track. We are working with the police and the Automobile Club of Southern California, trying to show them they have a responsibility as well as ourselves.

DETERMINING RESPONSIBILITY

The accident reports, which are made out in much better shape, go to the claims department, where they are looked over and passed to the Safety Bureau to be analyzed. We have a man who is an expert at placing responsibility, using the law of the last clear chance. On a large chart he shows the total number of accidents and the responsibility. The chart is by months and covers the year, shows who is responsible, division, line, type of car, kind of accident, place, time of day and length of service of the man who had the accident. This is entered by code numbers. From this chart we can get almost any information we wish. It is interesting to look over, as each month shows things not expected. For the start we used everything we thought might be useful, so we could cut later to what we needed.

Then we have an individual record card, trainman's name, age, division and when he entered the service. Every accident a man has is entered by code number on this card, as well as the type of accident, who is responsible and the degree of responsibility. No other record is made on these cards, except notes of our observation of the man's work and those received from the instruction office or supervisors.

These notes are for our information when we interview the man. When the clerk enters an accident on the record card he also looks it over. If the trainman is having too many accidents, although not to blame, or has had one where he was to blame, a yellow tag is placed on the top, so the card can be picked out at a glance. If we consider it desirable we look the man over on the road, and if we instruct him the yellow tag is replaced by a green one. If the man does not respond to instruction or continues to have accidents, a red tag replaces the green one, and the man is under closer observation.

When a yellow tag is placed on a card it is called to our attention. If the man is having more than his share of accidents, though not to blame for them, I know I will find a careless man.

There are two general types of careless operators, widely differing from each other. One is of fine texture, neatly dressed, shoes polished, hair trimmed, cap slightly to one side of his head and decorated with a flower. Most of his attention is on himself and lady passengers, very little on his work. The other is of coarse texture, doing rough work, careless about his personal appearance, shoes not polished, hair not trimmed, shaves probably twice a week, collar changed when he shaves, uniform dirty, just naturally careless all his life about his personal appearance and other things as well. I call their attention to their carelessness just to let them know we have an eye on them. They usually snap out of it then.

If checked with full responsibility, a red tag is put on the card and an appointment made for this man at the office for an interview, twenty minutes being allowed to each man. We accomplish a great deal of good at these interviews. Naturally we have looked up the man's record card and the file of his accident. After an explanation we may cut down the degree of responsibility on account of extenuating circumstances. This is very seldom, however.

We use no pictures but draw on a piece of paper the relative positions of the car and the vehicles, or what the nature of the accident happened to be, talk the accident over, explain the six types of accidents that we wish the man to avoid, giving him something to think about. This is partly routine.

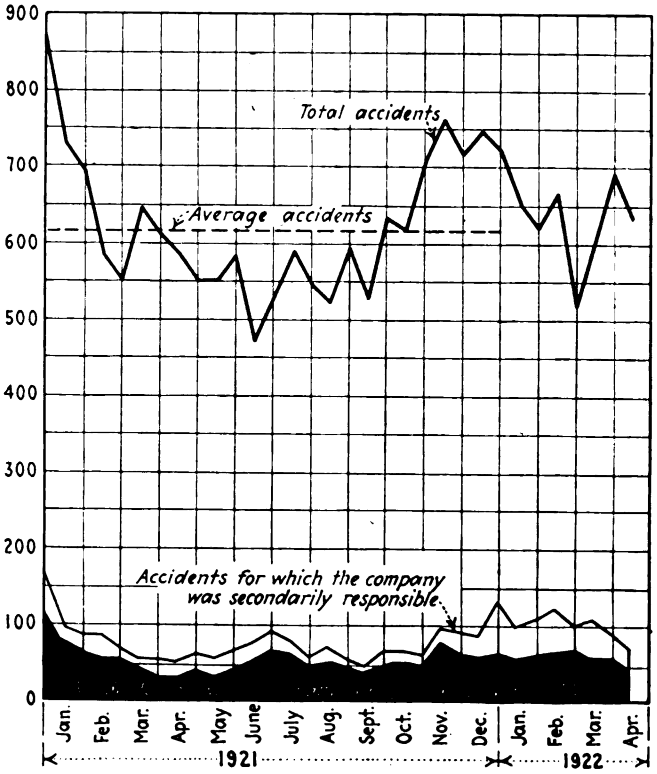
The type of man may change the conversation. If he is young and of the blond type, I try to show him that he is not a good gambler. Most of this type think they are. I show him that a good gambler might put up $5 to win a $25 jackpot but would not put up $5 to win a 25-cent one, and the chances he takes are like those taken by the latter type of gambler. Then I prove it to him.

The accident may show the trainman to be a poor observer. If so, we go about it from that angle. We tell him that a motorman must have good eyesight, smooth muscular action and a moderate degree of caution. Care must be taken in talking to a man of this type that in inculcating a spirit of caution his courage is not taken away. Instead he should be shown that he should be able to observe without concentrating his sight on any one thing.

He should look at nothing, but see everything. By looking steadily at one object, a person will soon shut out all surrounding objects. By looking ahead for different combinations, blind streets or alleys, his mind is more alert, his muscles are more active, his attention is scattered so he will see everything, and he is more likely to see the unexpected, recognizing it instantly. The co-ordination between the brain and muscles is such that he is more likely to act than to debate. The object of this is to get the man to think, to keep him more interested.

Take a man who is careless at heavy track intersection. First I show him his responsibility to his passengers; then where the danger comes from, where to look and when to look. In this manner, if a man is about to cross a crowded street, as he steps from the curb he looks first to the left for vehicles or cars coming from that direction. When he nears the center of the street he looks to the right, because he is going out of one danger zone into another where traffic is moving in a different direction. This glance is taken with no lost time, but must be taken in time.

We sometimes change a motorman over to the back end as a conductor, but I do not recommend changing a conductor to the head end. After a man has worked for any length of time at one thing his mind is drilled on that kind of work.



ELECTRIC RAILWAY RESPONSIBILITY CHART

This chart shows the classification of accidents as regards the responsibility of the company.

A great many of our auto accidents can be traced to the fact that the business man does not leave his office behind him when he starts driving his machine. For years conductors have had the car stop with no effort on their part except giving the bell. In consequence, a conductor as a motorman is subject to "eye" attention or lapse of attention. There is sure to be a time that his mind is that of a conductor, while he is acting as a motorman. He will see the danger and wonder why the car does not stop, not thinking in time that he is the one to stop it.

After six months work along this line, although only two-thirds of the plan is in operation, we see results. The chart showing automobile accidents and the line showing street car accidents are drifting apart, autos going up and cars going down.

We find a man always cuts his accidents down after we have talked to him. Each man tagged by a yellow, green or red tag was having from two to six accidents a month, though most of them were slight and there were many where an auto ran into the car.

An accident, no matter how slight, that might develop into a claim, calls for an accident report. It is cheaper to use paper than to investigate a blind case. In looking over the record cards at the end of the first six months we removed the tags from the cards showing a clear accident record for three months. Remember, these men were considered the worst. We removed twenty-eight red, eighty-three green and 141 yellow tags, making a total of 252 tags. Of these men 151 were interviewed in the office, the others on the road.

Three months of clear accident record is exceptionally good. Some tags were not removed from other cards, but each case showed a decrease in the number of accidents, and all of a much slighter nature. A great many of our men now have a clear record for the six months. That is remarkable, considering what a motorman has to face on the congested streets of Los Angeles.

The men having three months or more of clear record are recommended to the superintendent of operation for credits to offset any demerits they may have received.

If we could have kept our accidents from increasing we would have shown a big gain, but we have actually decreased them, though the hazard is much greater than heretofore. The city has doubled in the last three years, and it is almost impossible to keep up with its growth. The holiday season put the operating department to a severe test, but there was no serious accident.

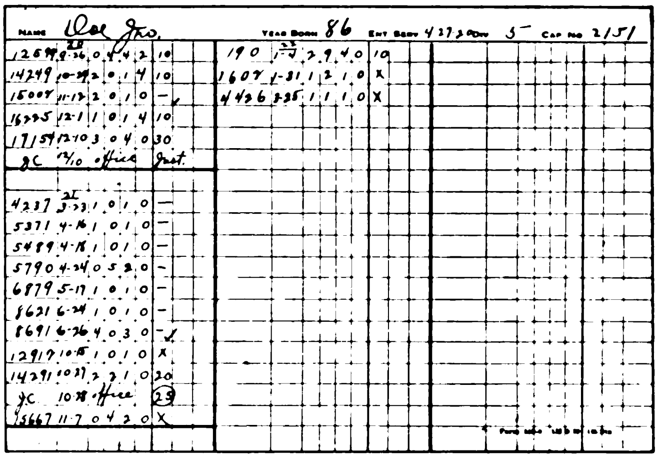
We have had only two serious accidents since starting this work. Both cases involved men we had not seen because they had just entered the service, and the accidents happened during a storm at night. Both were cases of man failure, though fortunately with no serious injury.

The rest of the plan concerns the instruction department chiefly through its line instructors. We did not want to start that angle until about June, so said nothing about it, as managers and superintendents the world over are anxious for results, and the more results they see the more they want. They are liable to shoot all their ammunition away with one shot, when it should be spread out over a long period of small shots.

A purely educational move affecting habits of long standing requires time. We have been operating for years with very little attention of this kind paid to the accident. Six months more will make very little difference. We must keep the men interested long enough for them to form the habit of thinking so that they will do it as part of a habit.

A doctor has to study for years to be able to save people from pain. We can save lives with one year of study just as surely as a good doctor can. I am confident that in a year we shall build up the safety organization of platform men on surface lines in the country. The men from all departments are more interested in this work, with better co-operation between heads of departments, closer and more friendly feeling between automobile club and police department and the Los Angeles Safety Council. In time they will all "Watch out."

The man who interviews the men should be a practical man with road experience, not a superintendent or claim agent, but he should be closely connected with both. The men put up a stiff fight sometimes. The interviewer must be able to beat them by showing them they do not think and prove it to them. By right thinking no one need have an accident.



NAME Doe Jno. YEAR BORN 86 ENT SERV 4 27 20 DIV 5 CAP NO 2151

	20												
12599	9-26	0	4	4	2	10	190	1-7 (22)	2	9	4	0	10
14249	10-29	2	0	1	4	10	1607	1-31	1	2	1	0	X
15007	11-17	2	0	1	0	— ✓	4496	3-25	1	1	1	0	X
16795	12-1	1	0	1	4	10							
17159	12-10	3	0	4	0	30							
JC	12/10	office				Inst.							
	21												
4237	3-23	1	0	1	0	—							
5371	4-16	1	0	1	0	—							
5489	4-18	1	0	1	0	—							
5790	4-24	0	5	2	0	—							
6879	5-17	1	0	1	0	—							
8621	6-24	1	0	1	0	—							
8691	6-26	4	0	3	0	— ✓							
12917	10-15	1	0	1	0	X							
14291	10-27	2	2	1	0	20							
JC	10-28	office				⑳							
15667	11-7	0	4	2	0	X							

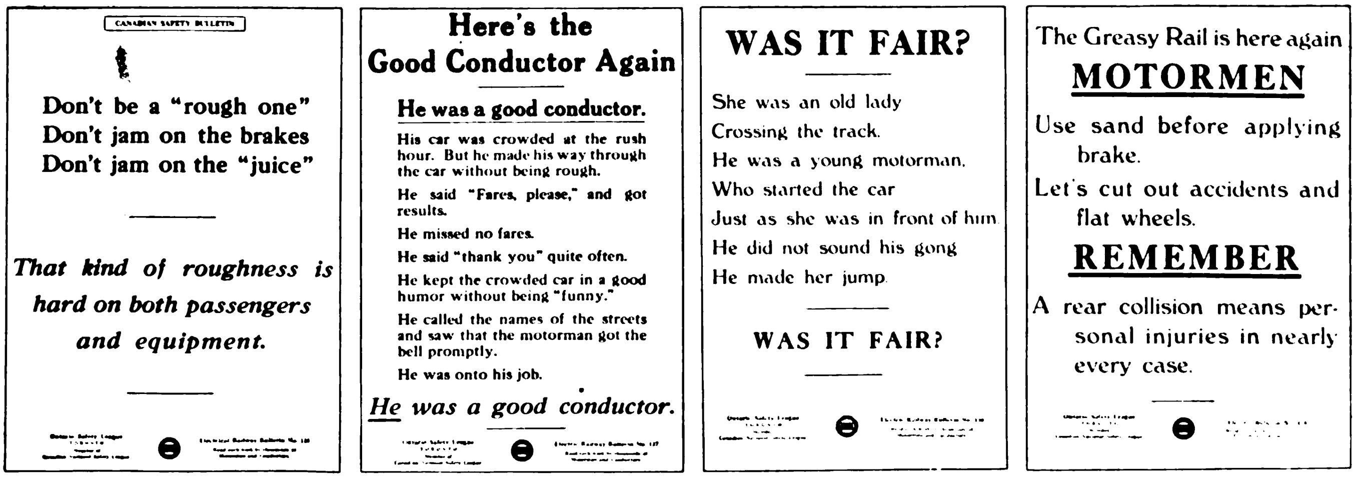
INDIVIDUAL EMPLOYEE RECORD CARD

A card like this is kept for every employee. The first column gives the number of the accident file; the second, the date of the accident; following four columns, the nature of the accident in code; the final column filled in, the responsibility of the operator, e.g. 10, 20, 30. The dash indicates no responsibility and the "X" mark that the car was standing still at the time of the accident.

We see the results by looking over a man's record card every three months. Each accident called to our attention is treated on its own merits, for conditions may be such that make it different from any other that has ever happened.

We do not know how many accidents we have prevented or how serious some of them might have been, but we do know we are saving property from damage, people from injury, and people's lives. We cannot tell whose lives we save, and it is not spectacular enough to draw a Carnegie medal.

To keep from hurting some one, be careful; to keep from getting hurt, "Watch out."



CANADIAN SAFETY BULLETIN

Don't be a "rough one"
Don't jam on the brakes
Don't jam on the "juice"

That kind of roughness is hard on both passengers and equipment.

Here's the Good Conductor Again

He was a good conductor.

His car was crowded at the rush hour. But he made his way through the car without being rough.

He said "Fares, please," and got results.

He missed no fares.

He said "thank you" quite often.

He kept the crowded car in a good humor without being "funny."

He called the names of the streets and saw that the motorman got the bell promptly.

He was onto his job.

He was a good conductor.

WAS IT FAIR?

She was an old lady
Crossing the track.
He was a young motorman.
Who started the car
Just as she was in front of him
He did not sound his gong
He made her jump

WAS IT FAIR?

The Greasy Rail is here again

MOTORMEN

Use sand before applying brake.

Let's cut out accidents and flat wheels.

REMEMBER

A rear collision means personal injuries in nearly every case.

The Ontario Safety League Has Published Some Excellent Posters for Trainmen

Work of a Safety Engineer

Tacoma Has Such an Officer, Whose Work Has Been Largely with the Trainmen and with the Public School Pupils

FOR a number of years past the Tacoma Railway & Power Company and the Puget Sound Electric Railway have taken an active interest in safety work. Some of the work done may be briefly summarized as follows:

Co-operation with safety commissioners in drafting revisions of existing ordinances.

Co-operation with the traffic division of the Police Department in detecting and punishing automobile drivers for violation of traffic ordinances, especially with reference to passing cars while the latter are receiving or discharging passengers.

Co-operation in general matters with the local safety council.

Co-operation with the State Board of Public Works in its efforts to lessen the number of grade crossing accidents.

Preparation from time to time of safety posters, bulletins and other safety literature and their distribution, especially in public garages and automobile clubs, and at the rooms of different civic organizations.

Transmission of letters of caution to careless automobile drivers, based on reports from the trainmen who have been instructed to be on the lookout for carelessness of this kind.

In addition the companies have now a special safety department, in charge of C. Paul Bates, safety engineer. The efforts of Mr. Bates so far have been devoted principally to the work among the men and in the public schools. One part of his duty which he considers very important is a special training in safety, courtesy and service, given to the trainmen after they have been accepted by the transportation department. To each new employee Mr. Bates talks individually, explaining the importance of the railway business as related to the industrial and commercial enterprises in Tacoma, the dignity of the work and its advantages, the necessity for operating rules and the importance of their application, and the need for a trainman to place himself in relation to his work as would be done by a salesman in a department store.

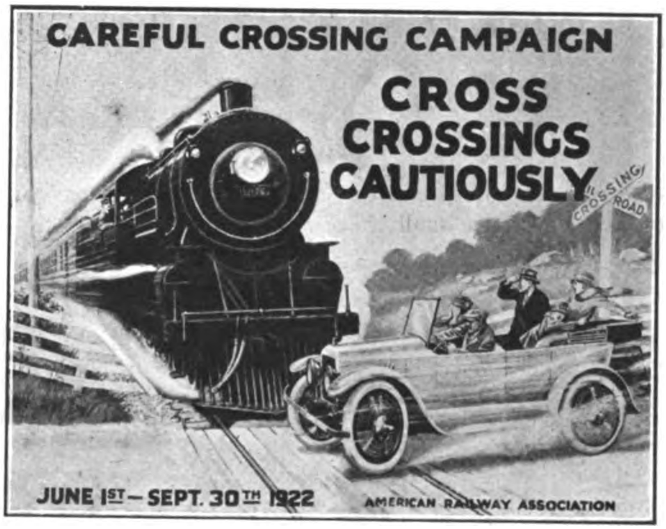
Another of his assignments is to work with and through the general safety committee in carrying out safety reforms throughout the system. This committee is composed of twelve representatives, namely, eight trainmen from the city line, one trainman representing the interurban line and one representative each from the track, power and mechanical departments. The personnel of this committee changes quarterly. Meetings are held monthly at one of the local hotels, where safety recommendations affecting car operation or employees are talked over at a luncheon provided by the company. After these recommendations are approved and formulated, they are submitted to the general superintendent.

The safety department also provides posters for the twelve bulletin boards maintained on different parts of the system for the use of safety poster material exclusively. Two of these boards are for the track department, one for the linemen, three for the mechanical department and six for the transportation department. Bulletins are changed weekly. Some of those used are selected from the service of the National Safety Council and others are prepared by the company's own safety department. Much time is also spent by Mr. Bates in riding over the lines and visiting the properties of the company to keep in touch with what is going on. The safety department also keeps an accident record of each trainman through notations on the employment card furnished by the transportation department. Charts are kept showing the daily average number of accidents per month, the number of accidents classified by nature of accident, etc.

The work done in the public schools is carried out in the same thorough manner. In each of the twenty-six grammar schools in which the company works it arranges with the principal of the school to appoint a safety scout master and then, through this leader, to have a boy and a girl in each room from the fourth to the eighth grade endeavor to induce all of the pupils to learn the safety rules, as given in the Safety Scout Guide. Each pupil who qualifies by learning these rules becomes a safety scout and receives a bronze safety scout pin. One boy and one girl from each grade are selected for especially meritorious work, the selection being made by the principals, the teachers and the safety scout master. Each receives a commission signed by the superintendent of public schools and by the president and the secretary of the local safety council. These commissioned scouts are further rewarded by being invited as the guests of the railway company at the annual safety scout picnic. The commissioned scouts are also eligible to compete for prizes offered by merchants and by the railway company in preparing safety reports, as prescribed in the Safety Scout Guide. A large American flag is also presented to the school having the largest number of safety scouts in proportion to the number of pupils enrolled.

Some of the schools include the safety rules as a portion of their regular English lesson.

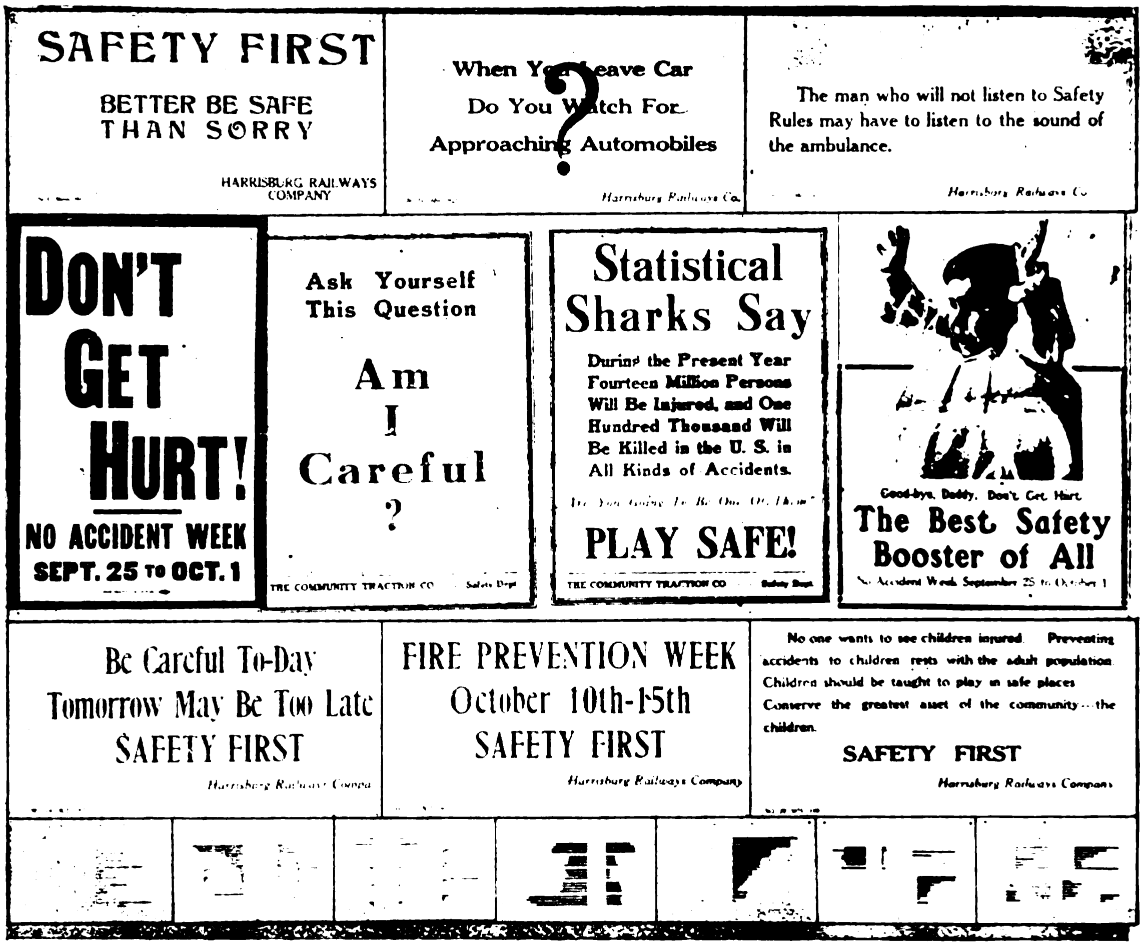
A Familiar Poster


CAREFUL CROSSING CAMPAIGN
CROSS CROSSINGS CAUTIOUSLY
CROSSING ROAD
JUNE 1ST – SEPT. 30TH 1922
AMERICAN RAILWAY ASSOCIATION

Copyright, 1922, by the Sales Printing Corporation, N. Y.

A STEAM RAILROAD POSTER, NOW VERY FAMILIAR

LIKE the electric railways, the steam railroads have found the automobile has created a special hazard, and this summer the American Railway Association is conducting a special campaign to induce automobilists to cross crossings cautiously. The campaign is being carried on largely by use of the poster reproduced.



SAFETY FIRST

BETTER BE SAFE THAN SORRY

HARRISBURG RAILWAYS COMPANY

When You Leave Car Do You Watch For Approaching Automobiles ?

Harrisburg Railways Co.

The man who will not listen to Safety Rules may have to listen to the sound of the ambulance.

Harrisburg Railways Co.

DON'T GET HURT!

NO ACCIDENT WEEK

SEPT. 25 TO OCT. 1

Ask Yourself This Question

Am I Careful ?

THE COMMUNITY TRACTION CO Safety Dept

Statistical Sharks Say

During the Present Year Fourteen Million Persons Will Be Injured, and One Hundred Thousand Will Be Killed in the U. S. in All Kinds of Accidents.

Are You Going To Be One Of Them?

PLAY SAFE!

THE COMMUNITY TRACTION CO Safety Dept.

Good-bye, Daddy. Don't Get Hurt.

The Best Safety Booster of All

No Accident Week September 25 to October 1

Be Careful To-Day

Tomorrow May Be Too Late

SAFETY FIRST

Harrisburg Railways Company

FIRE PREVENTION WEEK

October 10th-15th

SAFETY FIRST

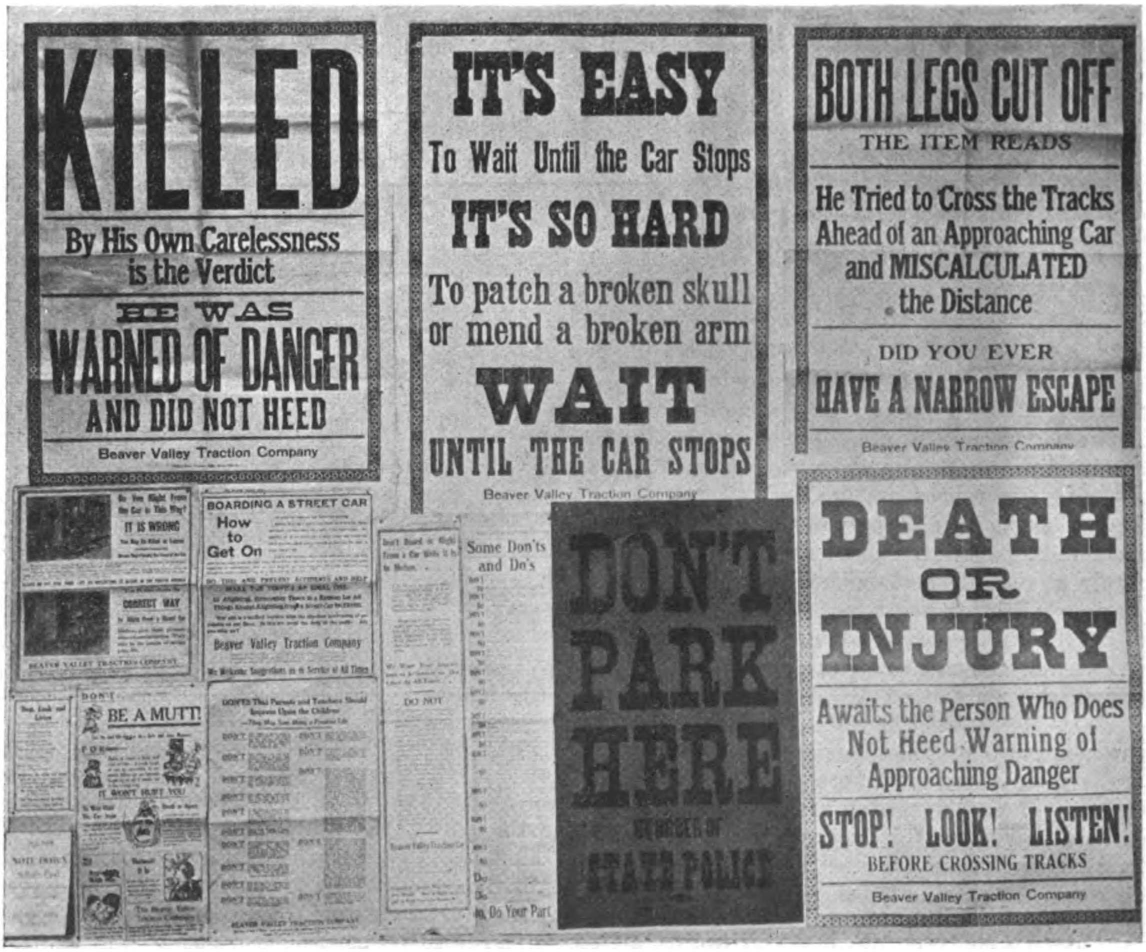
Harrisburg Railways Company

No one wants to see children injured. Preventing accidents to children rests with the adult population. Children should be taught to play in safe places. Conserve the greatest asset of the community—the children.

SAFETY FIRST

Harrisburg Railways Company

Safety Posters take a variety of forms. Some picture the mournful results of carelessness.



KILLED

By His Own Carelessness is the Verdict

HE WAS WARNED OF DANGER AND DID NOT HEED

Beaver Valley Traction Company

IT'S EASY

To Wait Until the Car Stops

IT'S SO HARD

To patch a broken skull or mend a broken arm

WAIT UNTIL THE CAR STOPS

Beaver Valley Traction Company

BOTH LEGS CUT OFF

THE ITEM READS

He Tried to Cross the Tracks Ahead of an Approaching Car and MISCALCULATED the Distance

DID YOU EVER HAVE A NARROW ESCAPE

Beaver Valley Traction Company

Do You Alight From the Car in This Way?

IT IS WRONG

CORRECT WAY

BEAVER VALLEY TRACTION COMPANY

BOARDING A STREET CAR

How to Get On

Beaver Valley Traction Company

We Welcome Suggestions as to Service at All Times

DON'T BE A MUTT!

IT WON'T HURT YOU

Some Don'ts and Do's

Do Your Part

DO NOT

DON'T PARK HERE

BY ORDER OF STATE POLICE

DEATH OR INJURY

Awaits the Person Who Does Not Heed Warning of Approaching Danger

STOP! LOOK! LISTEN!

BEFORE CROSSING TRACKS

Beaver Valley Traction Company

Others show the advantages of care, like the "Best Booster of all" in the upper group.

San Diego's Accident Bonus

Three per Cent of the Gross Is Set Aside for Accidents and Accident Prevention, Including in the Latter a Bonus to the Men—The Plan Is Popular and Effective

By W. H. Moore
Claims Agent San Diego Electric Railway

ALONG "safety first" lines I suppose we have tried about everything that is usually tried by all electric railway companies, including campaigns in the schools, stereopticon slides for the benefit of the platform men, and all kinds of literature that seemed good and came to our attention from time to time. Of these no further mention is necessary, as all roads, no doubt, have tried all these different ways. But in 1914 our general manager, quoting from his bulletin, "sought to find some way in which motormen and conductors could take a more personal and vital interest in the safe operation of street cars and protection of the public; . . . seeking some solution of the accident troubles in relation to street cars."

Each year since that date, with few changes, 3 per cent of the gross receipts from cash fares, ticket revenue, and special car revenue was set aside as an accident fund. Out of that 3 per cent all claims for personal injuries and property damage (including outside law, court, medical, hospital, surgical supplies, coroners' and undertakers' expenses, including fees for witnesses at coroners' inquests, etc.) are paid and the rest is divided at the end of the calendar year among the platform men on a man-hour basis. All men, whether they have had accidents or not during the past year, participate, but when the "safety checks" are passed out, the attention of those who have been careless is called to the accidents they have had and they are cautioned to be more careful during the new year.

OPERATING COSTS CLASSIFIED AS SEPARATE EXPENSE

The cost of operating the claim department and services of our attorneys and the law department (salaries and expenses of the law and claim departments) are not deducted from the 3 per cent fund, but are considered as separate expenses.

The probable cost of cases pending before the Supreme or Appellate Courts is held out of the amount to be distributed to the car men; that is, the amount of the verdict is prorated over the number of years estimated to elapse before the decision of the court of appeal is anticipated and so much is taken out of the fund each year. If the case on appeal is reversed, the amount held back is given to the men at the next distribution.

Any man not on our payrolls on the day of distribution does not participate. By this we mean that if he has worked eleven months of that year and has resigned before the day of distribution, he loses whatever had accrued to his account had he stayed on the job. Many of the men have, from year to year, received checks of about $100, quite a neat little sum when you take into consideration that no extra work was required on the part of the men to receive this increased earning.

The good safety record of the company is greatly helped by the carmen's safety committee, made up of five carmen appointed thus to act. Their duties are to meet once a week and review the accidents during that current week. In that manner they are conversant with any dereliction of duty by any of their fellow employees and they have full authority to take the matter up with the platform man in question and caution him about any future carelessness. The members of the carmen's committee are paid for the services they perform in meeting weekly, at the rate of $3 each per night, which is deducted from the carmen's fund.

This system has continued from its inception in 1914 to the present date, with several small changes from time to time.

The position of the men in regard to this plan has been set forth by a member of the carmen's committee (Motorman F. Hollingsworth), who says:

> The advantages of the bonus plan as a prevention of accidents are many and far-reaching.
>
> In the first place, there are many persons who do not regard a hazard of accident seriously, while with others it leaves a lasting impression. This being the case, we are unable to interest all platform men alike in the prevention of accidents from a moral point of view.
>
> We find, however, that there are few persons who will not become interested in a movement where there is a chance of ultimate reward, especially if it be of a pecuniary nature.
>
> If a motorman or conductor sees a chance to add $5 or $10 to his monthly pay check, he at once becomes interested, and, knowing that his chance lies in the prevention of accidents, he will strive to that end regardless of what his attitude might be from a moral standpoint.
>
> A motorman starting out with a determination to prevent accidents soon discovers that if he is to be successful he cannot take chances, he must have his car under control at blind corners, he must sound his gong freely, he must not run in a reckless manner. In other words, he finds it to his advantage to obey all rules and regulations pertaining to safety.
>
> The conductor is in a similar position. He must be careful not to start his car before his passengers get aboard or alight, he must watch his steps closely and be ever mindful of the safety of his passengers.
>
> With both motorman and conductor striving to prevent accidents it becomes apparent to them that safe operation and violation of rules will not work in harmony. With this idea instilled in the minds of platform men, we are not only preventing many accidents but also find that we have raised the standard of platform efficiency through the hope of reward, vastly more than could have been done by any fear of punishment.
>
> Benefits derived by the bonus plan for the prevention of accidents are not confined wholly to platform men, but to the public as well. For instance, when it becomes generally known that platform men on the street cars are working for a bonus, in preventing accidents, it has the psychological effect upon the public of making them more careful, and creates an impression that the carmen are doing their best to transport them safely and that a certain amount of responsibility for their safety lies within themselves. It also has the effect in many accidents of the injured person taking the blame upon themselves, rather than to think the car crew is to blame for every accident that happens.

Municipal Employees to Watch Out for Safety

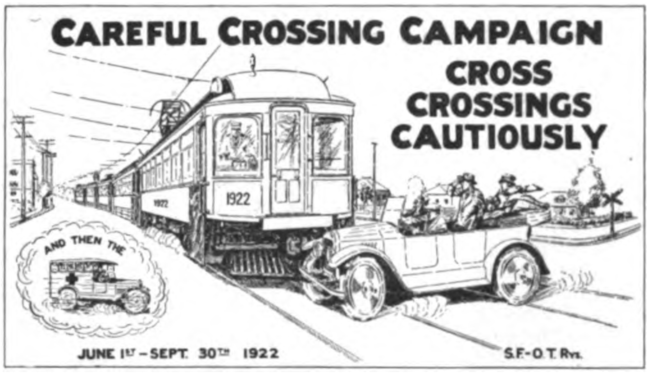
ON JULY 8 Mayor John F. Hylan of New York addressed a letter to the heads of all city departments asking each city employee to watch out for safety. The letter reads, in part:

> It is the duty of every such employee to bring to the notice of the proper officials any conditions that may come to his or her attention that tend toward danger or injury to the public, even though it be in places or departments in which the city employee as such has no official concern. This is a duty every city employee owes to the city as a loyal citizen.

The Mayor said that while the recent subway disaster in New York was one in which no department of the city government had any responsibility, its happening called into action several city departments to arrest and alleviate conditions arising out of the disaster and that each of these departments functioned with the utmost promptness and efficiency.

Safety Campaign in Oakland

THE San Francisco-Oakland Terminal Railways are taking an active part in the current campaign to instill caution into automobilists, and for this purpose the company has prepared a poster for display on all of its cars, picturing an automobile accident. The design, as will be seen, is somewhat similar to that being used by the steam railroads, but the background is a street and the colliding agent is an electric train instead of a steam locomotive. The electric train shown is like that used on the rapid transit service of the San Francisco-Oakland Terminal Railways, operating between Berkeley, Oakland, and other Eastbay towns and the ferry to San Francisco.


CAREFUL CROSSING CAMPAIGN
CROSS CROSSINGS CAUTIOUSLY
1922
AND THEN THE
JUNE 1ST - SEPT 30TH 1922
S.F.-O.T. Ry.

POSTER OF KEY ROUTE TO EDUCATE AUTOMOBILISTS

A Traction Edition of the Safety Pin

AN INDUSTRIAL edition of the *Safety Pin* has been published at Erie, Pa., for about three years. Recently a traction edition has been issued. Briefly, it is a small twenty-two-page pamphlet in the form of a diary, for distribution among the trainmen. There is a maxim on safety or good service for each day of the month, with other sententious paragraphs and enough humor to make it interesting.

Uniforms Given for Good Safety Record

THE trainmen of the railway of the Wisconsin Public Service Company, Green Bay, Wis., are not labeled "safe" or "unsafe" and probably if they were they would object seriously to the labels; but C. E. Warwick, superintendent of the railway department, has evolved a plan that accomplishes practically this very thing and the men are working hard to keep the signs polished and bright. A safety campaign was started on April 1 and publicly impressed upon the employees and the traveling public on May 14 when every trainman blossomed out in a new uniform with a carnation in honor of Mothers' Day. The offer made by the company was that a rebate on the uniform of $4 would be paid to each trainman who passed a period of three months in the employ of the company without a serious avoidable accident. In this way it was possible for a man with a good record to pay for a new uniform in a year.

For those who completed a period of three months with but one slight accident that might have been avoided by extra precaution, the company agreed to give a $3 refund on his uniform, and a $2 refund with but two not serious accidents charged to them. Every serious accident avoided by foresight or by extraordinary skill of the operator will offset one slight avoidable accident.

The men took up the plan with spirit and out of about twenty slight accidents that occurred between April 1 and July 1, but one was considered to have been avoidable by greater care on the part of the operator. Two men closed the quarter with "A plus" records. This means that in addition to not having any avoidable accidents during the quarter each avoided a near accident by foresight and extraordinary skill.

How One Company Cautions Automobilists

THE carhouse of the Paducah Railway is on the main artery of travel in that city, and the company has utilized this fact to do some effective "Safety First" advertising, particularly to automobilists. Adjoining the carhouse is an open plot, and here the company has erected in a conspicuous position a series of effective signs. Adjoining one, a Ford car which had been damaged in an accident was placed, with a sign of its own which declared that there were more than thirty automobile accidents in Paducah during April and twelve persons were injured.

The number of accidents in which street cars in Paducah have been involved has been reduced materially during the past two or three years, and this fact is attributed by the company to the result of its safety-first campaign, of which the signs are a part. Thus, for the five months ended May 31, 1922, the company, which operates more than 19 miles of single-track equipment, has paid out only $7.50 for accidents. Practically all of the trackage is in the city of Paducah. The Paducah Railway is controlled by Stone & Webster.

Letters to the Editors

Good Wear from Journal and Axle Bearings

KENTUCKY TRACTION & TERMINAL COMPANY,
LEXINGTON, KY., JULY 15, 1922.

To the Editors:

I notice in your issue for May 13, page 794, in the report of the Central Electric Railway Engineering Council, a reference to Ulco brand Frary metal bearings.

In January and February, 1922, the Kentucky Traction & Terminal Company at Lexington, Ky., received from the Cincinnati Car Company ten new lightweight double-truck cars weighing 25,100 lb. completely equipped. Ulco brand Frary metal journal and motor axle bearings were specified to be furnished with the new equipment, and this company, I believe, was the first to specify this material in both journal and motor axle bearings on new equipment. To date we have operated 327,282 miles and have not had a single failure in any instance, either in broken or hot bearings. These cars are averaging about 7,200 miles per car per month with a lubrication cost of 4.3 cents per 1,000 car-miles, all of which, in my opinion, speaks well for Ulco brand Frary metal bearings.

W. G. STUCK,
Master Mechanic.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Another Chicago Offer

Nature of Proposition Made by Surface Lines to Its Employees on July 18 Not Made Public

Possibilities of a strike on surface and elevated lines in Chicago were strong at the end of the week. With the men holding out for a renewal of present contracts and the companies insisting that there would have to be a cut in wages, the situation was recognized as being serious. It was thought the break might come suddenly when the men had a chance to vote on another offer made by the Surface Lines on July 18.

The nature of this proposition was not made public, but it was thought to be about half way between the original suggestion of President Blair of a 60-cent wage and the present maximum of 80 cents an hour. President Budd of the elevated roads has not named any new wage for his trainmen, but he has stated that they might look for a reduction in the near future. It has been customary to pay motormen on the elevated 2 cents an hour more than the maximum rate on the surface lines.

Fortified with the endorsement of 99 per cent of those who voted on the strike proposition, union officials for the trainmen of the surface and elevated lines in Chicago insisted that nothing but a complete backdown of the companies would prevent a tieup of the roads. This was the situation on July 14 when the result of the elevated employees' vote was announced as being practically unanimous.

It was then stated that the two unions would get together and determine on a common basis for action. Conferences were also held with Presidents Blair and Budd, who said they could not consider a renewal of present contracts but were willing to hear from the men on compromise proposals. It was also rumored that rates of fare on the elevated roads would be lowered if a satisfactory adjustment could be made with the men as to wages.

The Chicago situation is said to be complicated by a political angle, the trainmen as well as the management of the Surface Lines having stated that they feared they had been singled out for punishment because they were not on friendly terms with the city administration. They also rejected the overtures of the state board of arbitration, saying they have their own provisions for arbitration if that method is finally accepted.

In commenting on the threatening situation in Chicago in its issue for July 18 the *Evening Post* said:

> The car men will do a stupid thing if they strike in order to show their antagonism to the city administration. Chicago will object to having its nose cut off in order to spite its political face, and that is what such a strike would amount to.
>
> The gentlemen of surface and elevated lines are doubtless efficient motormen and conductors, but when it comes to playing politics with the city hall they are likely to find themselves well outside the class of experts.
>
> For shrewd ingenuity in the advantageous use of opposition we have had no equal in local politics to our present Mayor. We are inclined to think he would welcome a car strike aimed at the Pageant of Progress. We are certain he would make capital out of it far exceeding in value to him any satisfaction the strikers might derive.
>
> Better forget the political aspect of the situation. The time to deal with that is when the campaign begins and the votes are being made. The place to deal with it is at the ballot box.
>
> If Messrs. Blair and Budd are in the reasonable humor which report attributes to them, the wise course is to make the best terms possible, and let us all get on with our work.

Local union officials at Chicago were waiting on July 20 on the decision of Mr. Mahon, International president, for strike orders. Mr. Mahon is in Worcester, Mass., and has failed to take any action. Mr. Blair in offering 65 cents an hour announced that the company had submitted the best terms it conceived possible under the 7-cent fare. He emphasized his willingness to meet Mr. Mahon or any other union officials in a conference looking toward mediation.

Bill Fixing Hours of Labor Killed

The bill of Representative Reilly which passed the Legislature at its recent session has been vetoed by Governor John M. Parker. The bill provided a maximum of nine hours work in twenty-four hours for conductors and motormen in the employ of the New Orleans Railway & Light Company, New Orleans, La., instead of eleven hours in twenty-four as now obtains.

The bill was energetically supported by the trainmen's union and other labor organizations, and just as energetically opposed by Receiver O'Keefe, of the New Orleans property. He predicted that it would disrupt the contemplated reorganization of the company and would lead to a higher rate of fare than that contemplated by the company under the new agreement with the city calling for the reorganization of the company.

The Governor was urged by the interests behind the labor organizations to ignore the fact that the legislative committee had pronounced the measure unconstitutional and to leave this matter to be determined by the courts. He turned a deaf ear to these appeals, however. In affixing his veto the Governor declared:

> In my judgment they (the carmen) should work as long and make as much overtime as in their wisdom they see fit. No man's productivity or hours of labor should be limited without his consent. We should encourage real work, with reasonable hours and good pay for extra work.

Operations Resumed

Service Restored on Steubenville Line in Jefferson County—Tie-Up in Other Three Counties Continues

At a conference held in Steubenville, Ohio, on July 10 between representatives of Division 285, Amalgamated Association of Street and Electric Railway Employees, members of which division walked out on May 1, and officials of the Steubenville, East Liverpool & Beaver Valley Traction Company, the controversy which existed between the union and company was settled and the next morning operations on the lines of the company in Jefferson County were resumed. However, an agreement has not been reached with the men who operate the lines of the company in Columbiana County, Ohio: Beaver County, Pa., and Hancock County, W. Va., and the tie-up in those three counties continues.

Failure to succeed in arbitrating was attributed to the fact that the traction company refused to deal with union representatives at the meetings, but at the final conference they did so. In the contract signed, it is stated that the company shall recognize Division 285 and deal with the local committee in settling any difficulties which may arise during the continuance of the contract, but that the company does not recognize the international union. It was reported, but not confirmed, that representatives of the international union were present at the conference and sanctioned the action of the union men in signing such a contract. Aside from a slight wage cut of about 5 to 8 per cent, this is the only feature of the new contract which differs from the old.

During the continuance of the agreement, the wages for motormen and conductors in cents per hour will be as follows:

First six months of service	45
Next twelve months of service	47½
Thereafter	50

Five cents per hour additional for one-man car, express or freight, including messenger, work cars and snow sweepers.

Line car men same rate as two-man passenger cars.

The wages for carhouse men, in cents per hour, will be as follows:

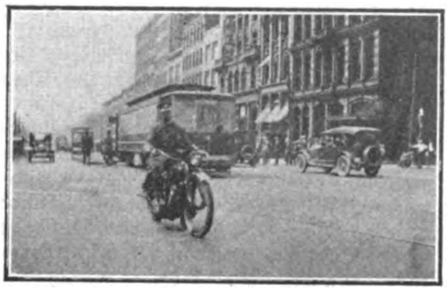
Day utility men	35
Night oiler	38
Night Inspector	38
Day repairmen	42

There appear to be no developments in the reaching of an agreement with the men operating cars in the counties outside Jefferson, but it is understood that the negotiations with these men are progressing, with the outlook fairly favorable. At the present time cars operate only as far as Port Homer, a small town on the northern border of Jefferson county.

All Day Service on Many Buffalo Lines

Mitten Management Is Carrying Out Successfully Its Plan for Opening Up All Lines With Men Recruited Under Its Co-operative Plan

MITTEN MANAGEMENT, Inc., operating the local and interurban lines of the International Railway, Buffalo, N. Y., has broken the backbone of the trainmen's strike in western New York and is operating cars on regular schedule throughout the day on most of the city lines of the International in Buffalo and on the Park & River division at Niagara Falls, Ont.



MOTOR CYCLE POLICE PROTECTING BUFFALO CARS

Although all cars are being operated under police guard, the company has discontinued the use of wire screened cars. Very few passengers are being carried but various men's and women's clubs are urging the public to patronize the cars to encourage the company in its fight against union domination by the Amalgamated Association. There has been some rioting, but up to July 19 no serious damage has been done by the strikers and their sympathizers.

Although the cars are being operated by experienced trainmen brought to Buffalo from other cities, Herbert G. Tulley, president of the International, says the company has received the assurance of a large number of men who went on strike that they are standing loyal to the company and are willing to return to work whenever they are called upon by the company. Until better protection is afforded by the police, it is said, these men will not be called upon to operate cars.

Cars are being operated on all West Side lines and some East Side routes of the International on 5 and 10-minute schedules and President Tulley said cars would be operated on all lines if the company could be assured of adequate protection. Some of the East Side lines will be the last to be operated by the company because they run through large foreign settlements and the company fears rioting and disorder as soon as cars are operated on these lines. Cars are being operated from 6 a.m. until 7 p.m.

Uniformed police ride on each car and in many instances motorcycle police trail each car. On some of the west side lines motorcycle police are detailed to patrol two or three blocks and do not follow the cars. At the outset the company used double-end cars on all lines, but now the International is using the type of cars adopted by the various lines.

President Tulley said that there can be no arbitration of the question of union recognition and that the only basis upon which men can return to work is the Mitten co-operative plan similar to the plan now in operation in Philadelphia.

As soon as the International feels that it is giving the public adequate service, President Tulley said he would appeal to the Mayor to have a ban placed on the operation of jitney lines within the city and in competition with the company's cars. If this does not prove successful, the company says it will apply to the courts for an injunction restraining the operation of jitney lines and also restraining the striking employees from interfering with the operation of cars or intimidating loyal employees and passengers.

CO-OPERATIVE PLAN EXPLAINED

This statement on the strike situation was made to the *Electric Railway Journal* by President Tulley:

> The only remaining question at issue is whether the electric transportation system in Buffalo shall be controlled by the foreign leaders of the Amalgamated Association, with headquarters in Detroit, or whether it shall be controlled at home and for the benefit of the people of Buffalo. In order that the company might be able hereafter to provide uninterrupted and satisfactory service, it is plain that this question as to whether control shall be lodged here or in Detroit must be fought out once and for all time. If we should sign an agreement as demanded, we should have only a recurrence of the disturbance upon the expiration of the new agreement in May and periodically thereafter, and Buffalo never could be assured of undisrupted and adequate service.
>
> The International and Mitten Management, Inc., are through with the old union and its closed shop and foreign dictation. The men who come back must come back under the Mitten Co-operative plan.

President Tulley of the International issued a statement setting forth the principles of the so-called Mitten co-operative plan. His remarks on this matter follow in part:

> The Mitten Co-operative plan for adjustment of the relations between employee and employer is based upon the fundamental principle that the successful running of a railway depends most upon the men who run it.
>
> The plan recognizes the right of employees to bargain collectively upon all matters affecting their wages, working conditions and discipline. It provides uncontrolled election of wage workers' representatives by each branch group of employees, elected by and among themselves by secret ballot. These, with an equal number of representatives appointed by the company, constitute branch committees, department committees and general committees.
>
> The branch committees serve as lower courts, where local points of difference are for the most part settled on the spot.
>
> All branch committeemen in each department come together as the department committee. Differences not settled in branch committees, on departmental questions, are carried to the respective department committees, as a higher court, where, by across-the-table discussions, local branch differences of opinion are adjusted to the broader viewpoint of the department as a unit.
>
> All department committees elect, from their own numbers, their representatives constituting the general committees as a superior court, where any limited departmental viewpoint merges into the larger vision of the best good for all.
>
> Final arbitration—the Supreme Court—if needed, is assured through an arbitration board in which the public, as the third great party in interest, is given the decisive voice.
>
> The co-operative association supported equally by employees and employer, assures the workers sick and death benefits and old age pensions, together with opportunity for the safe deposit and investment of their surplus earnings, made possible by their own thrift and the joint accomplishment of men and management.

The Rotary Club of Buffalo has adopted a resolution supporting the open-shop attitude of the International Railway and the Mitten Management, Inc.

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EMERGENCY JITNEYS AWAITING BUSINESS

S. F. Northrup, director of the Bureau of Relations of the State Industrial Board and Henry D. Saylor, State Industrial Commissioner, were in Buffalo during the week ended July 15, but nothing was accomplished by either official. William Weatherwax, former superintendent of the Chicago traction lines under Mr. Mitten, who is acting as Mr. Mitten's Colonel House in Buffalo, continues to work in conjunction with President Tulley.

As the result of the injuries sustained by members of several train crews who were mobbed on July 19 by bands of strikers and their sympathizers, the International was forced to suspend service over several East Side lines until more adequate protection can be furnished.

Franchise Ordinance Hangs Fire

Refusal of the General Council to pass the new railway franchise ordinance as agreed on by the Mayor and officials of the Louisville (Ky.) Railway, and favored by the various leading civic and business clubs, attorneys for the city, etc., is resulting in the fare argument getting no place for the time being. The Mayor is showing plainly that he favors passage of the ordinance, and has gone before the Council Committee, with Clayton B. Blakey, City Attorney, to explain the settlement plan in detail. It is reported that the Board of Aldermen is in favor of the plan, and will vote for it when it comes up.

Among the tangles to be unraveled are the question of the 7-cent cash fare, service to be guaranteed by the company, one-man car issue and valuation of the properties of the company. Attorney Blakey claims that a valuation of a little more than $18,000,000 as proposed by the bill is the best that the city can expect, and held that he did not believe any court could overturn that proposal, as Federal courts have held that replacement cost of such companies should be used as the rate-making basis. The city in assessing the property value used a method provided by law, explained City Assessor E. E. Bristow, who explains that the capitalization on the net earnings or the market value of the stocks and bonds of a public utility must be used as the basis of an assessment.

The Mayor holds that delay in passing the ordinance is costing the citizens $2,000 a day, and that it may take years to reach a final decision in the courts if the case is further delay. The Mayor in part said:

> While, of course, I want to give the Council a reasonable time to consider the measure and do not want to be in a position of interfering with the legislative functions of the Council, I wish to call attention to the fact that the ordinance was well studied by the administration before it was submitted. If it is amended and the company does not agree to the amendments, it will be absolved from making the $900,000 of improvements called for. The case may then be thrown back into the courts, meaning a long delay and much expense for the settlement of the case.

There are indications that the lower board is holding out for a flat 6-cent fare, instead of 7-cent cash, and 6 cents on tickets, opposing a 7-cent fare in any form.

Suggests Reorganization Based on Actual Valuation

Scaling down the Cincinnati (Ohio) Traction Company's capitalization by reorganization based on its actual valuation, has been suggested to Mayor Carrel's Street Railway Committee, by William C. Culkins, executive secretary of the Chamber of Commerce and former street railroad director of Cincinnati. At the fourth meeting of the Mayor's committee, Mr. Culkins explained the history of the various railway ordinances leading up to his issuance of an order to the traction company for an effective financial reorganization and a discontinuance of the interlocking interests with the Ohio Traction Company. He said he did not commit himself as to the method to be used, because at the time he held a public office. As a private citizen, however, he said, that he could call attention to two methods. One was by reorganization based on actual valuation and the other was by a readjustment of outstanding securities.

Of the three valuations made in 1914 he said, he thought, that of the State Public Utilities Commission at $24,000,000 came nearest to being fair and equitable. That of the late Ward Baldwin, at approximately $12,000,000 he regarded as being too conservative and being merely a "junk" value, while the traction company's own estimate of $36,000,000 seemed excessive. A valuation made by his office as of Dec. 31, 1920, based on the methods used by the utilities commission, fixed the valuation at $23,000,000.

Members of the Mayor's committee were given to understand that the suggestion made by W. Kesley Schoepf, president of the traction company, that the meetings be executive, "when the affairs of the company are gone into deeply" was not prompted by a desire to conceal anything from the public, but to prevent publishing "disconnected or partial statements to misrepresent the affairs of the traction company."

Minnesota Road Now Doing Well

Rehabilitation of the former Dan Patch gaso-electric line operating from Minneapolis to Northfield by the present owners, who took over the bankrupt plant in May, 1918, has proceeded to an extent that its business is about to pay a return on the investment. The road was sold in 1918 under the receiver's hammer at $200,000. In the coming report of the Interstate Commerce Commission the valuation of the line, as a basis for determining freight rates will be about $4,000,000.

The capitalists who took over the line discovered that the Minneapolis, Northfield & Southern, as the road is now known, is an effective belt line reaching the great transcontinental and Chicago, Winnipeg and Duluth railroads. Its freight business in automobiles is greater than that of all other Minneapolis roads, due in part to the fact that the president is the head of a great motor car distributing agency. More than $400,000 has been spent in rehabilitation. The freight business has grown from almost nothing to 2,000,000 tons a month and its passenger business to ten trains a day.

One move of the new owners was to reduce the passenger rate on the electric lines from the legal 3.6 to 2½ cents per mile. This increased the train demand very materially. March passenger business was 50 per cent more than in 1921. The March report of tonnage was 2,000,000 tons as compared with 1,200,000 in 1921, and a negligible amount in 1918.

Outing for New England Men

The New England Street Railway Club will hold its annual outing at Newport Beach on July 27. Machines will leave Boston at 7.30 a.m. from the Engineers' Club, corner of Commonwealth Avenue and Arlington Streets, and will arrive at Newport Beach at 10.30 a.m. The day's festivity will consist of sports on the beach, bathing, shore dinner, dancing and an automobile tour through the famous summer colony. Trains leave Boston for Newport 8.20 a.m. (daylight saving). Automobiles will be at Newport station to carry those going by train. Trains leave Newport for Boston 4.50 and 9 p.m. (daylight saving). Tickets covering day's program will be $2.50.

Compliance With Commission Order Brings Satisfactory Results

Very satisfactory results have been reported by the Bureau of Accidents to the Pennsylvania Public Service Commission due to the compliance on the part of the electric railway companies to the General Order No. 5 of the commission. This order requires the conductor to precede the car over the tracks of railroad grade crossings and signal the motorman as to the safety of the movement. During a period of eight years and nine months there were only five street car passengers killed in collision accidents of railroad trains and street cars, although the latter cross the tracks of railroads at 611 points, 310 of which are on main lines.

Service Restored on Abandoned Line

The Chamber of Commerce of Bridgeton, N. J., is considering a plan to aid Clayton W. McPherson in operating the line of the Bridgeton & Millville Traction Company, which was abandoned by the corporation on June 15. Officials of the company announced at that time that the line had not paid in two years.

Mr. McPherson, after a conference with officials of the American Railways, purchased the 10-mile line of the Bridgeton & Millville Traction Company and has begun operations. The present cars are now being used but modern one-man cars will later be placed in service. The lease secured by Mr. McPherson is a short one and has been sanctioned by the Board of Public Utility Commissioners.

Merger Talk Revived

Senator King, of Utah, is preparing to introduce in the Senate a bill requiring the merger of the Washington Railway & Electric Company with the Capital Traction Company, operating railway service in the District of Columbia. Talk about a merger of this kind has been revived at every session for the last ten years, at least.

Railway Seeks New Franchise

Following the recommendation of the citizens' transportation committee's report made to the City Council last March, the San Diego Electric Railway on May 29 made a formal petition to the City Council, asking that body to submit to the voters a charter amendment to enable the company to apply for and receive a new franchise to replace its present franchise.

The purpose of the move, it is announced by Claus Spreckels, the general manager of the company, is to relieve the company of paving obligations and also to secure an indeterminate grant. According to the company manager, the election is asked merely to empower the Council to grant the new franchise, and the details of the franchise itself are to be negotiated between the City Council and company officials after the election. At present the charter makes a 2 per cent tax on gross receipts and certain paving obligations mandatory.

Compromise Agreement Reached in Grand Haven

A compromise agreement was reached some few weeks ago between the employees and the management of the Grand Rapids, Grand Haven & Muskegon Railway, Grand Haven, Mich., which established wage rates for another year of 42½ cents an hour for the first three months service men, 47½ cents for the next nine months service men and 52½ cents for those in service more than one year.

At the expiration of the previous year's agreement the company had made an announcement of a 5 cents an hour reduction, at the same time changing certain working conditions. The men protested but agreed to accept the reduction if certain provisions were made for the maintenance and repairmen and extra men. A meeting resulted in the compromise which was made upon the basis of 2½ cents per hour from the former rates.

Twin City Company's Right to Abolish Neutral Zone Sustained

Decision was filed by the Minnesota State Supreme Court on May 19 upholding by vote of three to two the decision of Judge F. M. Catlin of the Ramsey County District Court abolishing the so-called neutral fare zone on the Minneapolis-St. Paul and other interurban lines of the Twin City Rapid Transit Company. The decision was based on the terms of the Brooks-Coleman act, passed by the last Minnesota Legislature conferring on the State Railroad & Warehouse Commission right to determine reasonable rates.

The zone was established by the St. Paul City Railway in 1905, carrying the one-fare limit from Minneapolis to Snelling Avenue in St. Paul and from St. Paul to Bedford Street in Minneapolis, and it was abolished by the company on Jan. 7, 1922.

The decision is to effect that the St. Paul City Railway may collect fare at the city limits and that the right was not taken away by the Brooks-Coleman law of 1921.

It has been estimated the decision means an annual increase of about $300,000 in fares in the so-called midway or neutral zone, due to the fact that those who board the cars in this zono bound for Minneapolis will pay two fares and a second fare riding from Minneapolis into this zone.

The case arose through appeal by the petitioners, John H. Anderson and others, who were refused an injunction in the lower court forbidding the railway from wiping out the zone, which includes a district largely industrial employing people in both cities. The judges all agreed that the one-fare zone had been maintained voluntarily by the company up to the time the state railway act was passed. It could have been abolished any time up to then. The majority of the court held that the 1921 law did not change the right of the company to wipe out the zone. The dissenting judges, including the chief justice, held that the fare arrangement was authorized under the meaning of the law and that it should have been kept in effect until the Railroad & Warehouse Commission authorized the change.

Doherty Reported to Be After Kansas City Properties

Henry L. Doherty has an eye on the Kansas City street car system, says the Kansas City *Star*. According to that paper:

> Doherty engineers are giving the railways property a close scrutiny. Singly and in groups his representatives have been here and negotiations are understood to have been in progress with Armour and other interests. One of Doherty's best engineers is supervising this examination of the street car system.
>
> Coupled with Doherty's interest in the railways is an understanding in financial circles that an effort soon is to be made to extract the railway from the receivership and effect a reorganization.

At the office of Henry L. Doherty & Company in New York no secret was made of the fact that Doherty engineers were in Kansas City examining the property there, but it was said there was nothing for publication at this time.

Accident Circular Distributed

A sixteen-page accident prevention circular for distribution in the public schools of Cincinnati was prepared last summer in co-operation with the local Safety Council of the Cincinnati Chamber of Commerce by John A. Murkin. It is well illustrated, many of the views being of electric railway subjects and designed to encourage safety ideas in children while on the streets. They relate not only to the safety of the child himself but the safety of others, as when a thrown ball or stone breaks the windows of a street car. The older folks also are not forgotten in the injunctions.

News Notes

Service Resumed.—Service was resumed recently by the Washington (Ind.) Street Railway after an interruption of two days, during which time not a car was operated. Lightning burned out the armature coils and generator set supplying current.

New Company Becomes Reality.—On July 1, Spokane's trolley car riders exercised transfer privileges over all car lines in the city, the "Spokane United Railways," the new merger company, taking over the lines at midnight. All old franchises were surrendered by the two companies when the new one was issued by the city. Under the agreement with the city, jitney bus competition will be eliminated after Jan. 1 next, when the physical merger of the lines must be complete.

May Try Trackless Trolley.—It was recently intimated to the Rotary Club by Street Railway Commissioner Cann of Toledo, Ohio, that the Community Traction Company was considering trying out the trackless trolley on the south Erie Street tripper line because the present line was losing money every day. He also referred to the stabilizing fund of the company which he said would be close to $500,000 today but for bus competition. In his opinion a saving of $400,000 could be effected yearly by the installation of one-man cars over the entire system.

General Tax Fund Protected.—Completing the victorious litigation of the "fourteen taxpayers" to protect the general tax fund of the city from invasion for the Seattle (Wash.) Municipal Railway, Superior Judge J. T. Ronald recently signed a judgment enjoining the city from using in any way, including borrowing, any moneys from the general fund of the city in the maintenance and operation of the street railway, or in the payment of depreciation charges and making replacements. The judgment was based on the *remittitur* of the State Supreme Court, and was issued on motion of Attorney O. B. Thorgrimson of counsel for the "fourteen taxpayers."

Meetings on Safety Will Be Called.—Employees of the Monongahela Power & Railway Company are to be called into monthly meetings at which safety matters will be discussed. The first of the sessions will be held in Fairmont in the near future. Like gatherings will be called in Clarksburg and Parkersburg. One feature of a coming meeting will be the presence of a surgeon who will give employees practical demonstrations as to how to apply first aid treatment in case of accidents. The local company at Fairmont is placing great stress upon the safety features in an effort to instill the safety idea in the minds of the employees.

Financial and Corporate

Reorganization Operative

Preparations Being Made for the Sale of New Orleans Road to Bondholders Under Foreclosure

The plan outlined and described in the ordinance adopted by the Commission Council of New Orleans some months ago looking to the reorganization of the New Orleans Railway & Light Company is now in effect. The holders of 98 per cent of the 4½ per cent bonds of the company deposited their securities with the bondholders protective committee, of which R. S. Hecht is chairman. A resolution declaring the plan operative was adopted by the committee on July 15.

It is now proposed that, pursuant to the reorganization plan, the property of the New Orleans Railway & Light Company shall be put at auction, sometime in August, when it will be bid in by the protective committee, representing the bondholders. The date of the sale to be fixed shortly by Special Master Chaffe will be advertised for thirty days before the sale. Following the purchase of the property, another month may elapse in proceedings to be instituted to wind up the receivership, after which the new company will be launched. The new car fare and gas rates will probably not become effective before October.

J. D. O'Keefe, receiver of the New Orleans Railway & Light Company, has issued a statement showing the earnings of the company for the first three months of 1922, for all departments, were $1,058,340 out of a gross revenue of $3,876,447, making a rate of return of 9.5 per cent on the compromise valuation of $44,700,000. The earnings of the company, for all departments, for the year ending March 31, 1922, were $3,379,610, out of a gross revenue of $14,844,295, making a rate of return of 7.6 per cent on the compromise valuation. This return is on the basis of 8-cent fare. Under the new agreement, when effective, provision is made for a 7-cent fare, the reorganized company to be allowed a rate of return of 7.5 per cent.

While this would seem to indicate a rate of return of only 6.2 per cent beginning next October, when the new agreement becomes effective, those in position to know say that they feel fairly certain that the 7-cent fare can be successfully maintained, through the trial period, on account of the company being able to operate its several departments more economically through the installation of additional equipment, at the power station, and the use of large modern cars. This will make for greater convenience and comfort as well as for faster schedules, which is confidently expected will increase the carrying capacity of the company.

The detailed report, sent to Commissioner Paul Maloney of the department of Public Utilities, and given out by him for publication, is as follows:

	Railway	Electric	Gas	Total
THREE MONTHS ENDED MARCH 31, 1922				
Operating revenue	$2,086,211	$900,250	$889,985	$3,876,447
Operating expenses	1,287,479	474,478	430,167	2,192,125
Net operating revenue	$798,732	$425,771	$459,818	$1,684,322
Taxes	182,993	74,418	68,570	325,982
Net operating income	$615,738	$351,353	$391,247	$1,358,340
Renewals and replacement reserve	185,000	65,000	50,000	300,000
Gross corporate income	$430,738	$286,353	$341,247	$1,058,340
TWELVE MONTHS ENDED MARCH 31, 1922				
Operating revenue	$8,705,029	$3,401,770	$2,737,496	$14,844,295
Operating expenses	5,484,501	1,921,472	1,569,822	8,975,795
Net operating revenue	$3,220,527	$1,480,298	$1,167,674	$5,868,500
Taxes	735,592	290,295	263,001	1,288,889
Net operating income	$2,484,935	$1,190,002	$904,672	$4,579,510
Renewals and replacement reserve	740,000	260,000	200,000	1,200,000
Gross corporate income	$1,744,935	$930,002	$704,672	$3,379,610

Large Tax Payment Made

The sum of $781,411, representing the first payment of taxes that the Connecticut Company, New Haven, Conn., has made to the State in five years was recently handed to the State Treasurer at Hartford by President Lucius S. Storrs. This leaves a balance of $1,469,258 in unpaid taxes due the State from the company, which has been unable to meet its obligations to the State since 1917. Through legislation passed at the last session of the General Assembly, when it was apparent that the financial condition of the company had immensely improved, it was decided that the Connecticut Company should be called upon to pay one-half of its annual net earnings to the State in taxes until it had completed payment of all obligations, and at the same time an annual tax of 3 per cent of the gross earnings of the company for current taxes was levied. The company formerly paid at the rate of 4½ per cent, but the Legislature reduced the figures to 3 per cent.

Overtures for Purchase Must Come from City

Charles N. Black, president of the Market Street Railway, San Francisco, Cal., has notified Supervisor Warren Shannon, chairman of the special negotiation committee for the city, that his company would not name a price at which it would be willing to dispose of its transportation system to the people of San Francisco. The city must make an offer, President Black said, since the movement to purchase the properties of the company was not inaugurated by the directors of the company but by the city.

Mr. Black is quoted in part as having said:

> We desire to assure you that the disposition of the company and of its stockholders expressed in our letter of Dec. 17, 1921, remains unchanged, and the officers of the Market Street Railway are prepared to meet with your committee at any time for a discussion.

President Black's letter is an answer to a communication dispatched by Supervisor Shannon on behalf of his committee on June 14, following a series of meetings at which the valuation of the company's properties was under discussion.

Supervisor Shannon requested the directors of the company to name the price at which they would be willing to sell to the city.

Engineers for the Market Street company have placed a $51,856,218 valuation on its system. The State Railroad Commission engineers named $41,424,961 as the physical value of the system, while M. M. O'Shaughnessy, city engineer reported to the supervisors that he believed the properties to be valued at $40,000,000.

Disregarding the physical valuation estimated, Supervisor Shannon favored an offer of $25,000,000, based upon the earning reports of the lines for the past year. Valuations of $17,000,000 and $18,000,000 were suggested by Supervisors James B. McSheehy and Eugene E. Schmitz.

Eastern Massachusetts on Dividend Basis

A dividend of 3 per cent has been declared by the public trustees of the Eastern Massachusetts Street Railway, Boston, Mass., on the sinking fund stock and first preferred stock, series A, of the company.

The dividend is payable on Aug. 1 to stockholders of record July 25, 1922.

A statement which was made by the company about the matter says:

> This dividend declaration follows numerous fare reductions and rehabilitation of the street railway by the public trustees, under the leadership of Homer Loring, who has just resigned as chairman of the board.

The public trustees have had charge of the management of the system since June 1, 1919, and discontinued 123 miles of track since that time. In 1920, the road was operating 681 miles, but has since reopened some of its discontinued track, so that it is now operating 734 miles.

Earnings Favorable on Boston Property

The Boston (Mass.) Elevated Railway on July 14 made its first payment to the Commonwealth of Massachusetts on the $4,000,000 loan assessment which was advanced by the various communities in which the company operated in 1919 to cover the company's deficit from operation. This initial payment amounted to $517,196. It will be distributed among the contributing communities.

Under the Public Control Act the company has accumulated a reserve fund which last June amounted to $1,517,196, and the law requires that what the company can set aside in excess of $1,000,000 shall be applied to a reduction of its debt to the communities. Earnings are so favorable on the road at present that it is believed that the company will be able to pay off on this indebtedness regularly until it has been wiped out. Until this debt has been paid the Elevated has no legal right to reduce fares. At the present time it is carrying children for a limited period for a 5-cent fare, just as it is maintaining short hauls over which it is charging only a 5-cent fare, but these are not general reductions.

The June receipts in excess of cost were $87,529, against $79,415 for June a year ago. The number of 5-cents passengers it carried last June was 5,978,699 as against 1,803,309 in June a year ago. The total revenue passengers for June 1922 were 28,659,926 against 27,569,116 during June, 1921.

The Boston *Herald* of July 16 said:

> The Boston Elevated Railway today has more than $3,000,000 cash on deposit, and for the first time in 11½ years does not owe a dollar to the banks. The road earned more than $1,000,000 in excess of dividends in the first half of this year and on Friday made an initial payment of $517,196 on account of the municipal loan assessment of 1919. This brief account of their stewardship is one in which the public trustees might well take pride.

Interurban Road Acquired by North American Company

The North American Company has taken over the Milwaukee Northern Railway, operating about 57 miles of interurban electric railway line from Milwaukee north to Sheboygan, Wis. The company has a large passenger and freight business and furnishes electric light and power in the intermediate territory. Its total assets approximate $4,000,000 and its annual gross earnings are about $600,000.

By this acquisition practically all of the electric railway lines radiating from Milwaukee except the Chicago & North Shore line running south to Chicago are under the control of the North American Company.

Substantial economies in operating costs will be effected by operation of the Milwaukee Northern Railway in conjunction with the present system of the Milwaukee Electric Railway & Light Company and the latter company's large public service building in Milwaukee will be used as the southern terminus of the Milwaukee Northern line.

It is probable that the Milwaukee Electric Railway & Light Company will establish a bus line from Sheboygan to Fond Du Lac, thus permitting direct connection between the Milwaukee Electric Railway & Light Company's system and the Fox River Valley, making possible direct travel from Milwaukee to Green Bay.

Financial News Notes

Purchase Announced.—Oshkosh Gas Light Company, Oshkosh, Wis., has been purchased by the Wisconsin Securities Company through its subsidiary the Wisconsin Public Service Company. The price was in excess of $2,000,000. The Wisconsin Securities Company has also purchased the Menominee & Marinette Light & Traction Company which supplies Marinette, Wis., and Menominee, Mich., with utility service.

Preferred Stock Offered.—Dominick & Dominick and W. A. Harriman & Company, both of New York, N. Y., are offering $1,200,000 of 7 per cent cumulative first preferred stock, par value $100, of the American Water Works & Electric Company. The stock is offered at 87 to yield about 8.05 per cent. The stock may be redeemed as a whole or in part, after three years from date of issuance at $110 per share and accrued dividends.

Surplus Reported. — The Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., has a corporate surplus as of June 1, 1922, amounting to $432,927, according to a statement which President J. Ledlie Hees sent to the stockholders. Mr. Hees stated that for the year ended May 31, 1921, the company earned 1.52 times its interest requirements, after deducting depreciation reserves, and 5.74 times its 6 per cent preferred stock dividend.

Capital Structure Changed.—The Appalachian Power Company, Princeton, W. Va., has been authorized in an amendment to its charter to increase its capital stock from $12,000,000 to $7,500,000 of preferred and 60,000 shares of common stock. The change in the capital structure of the company is in accordance with the plan to pay off the accumulated dividends on the preferred stock referred to in the *Electric Railway Journal* for June 10, page 949.

New Issue Offered.—Blodget & Company, New York, N. Y., are offering $900,000 of first and refunding mortgage gold 5s of the Cumberland County Power & Light Company, Portland, Me. The bonds are offered at 89¾ and interest to net 5⅞ per cent. They are dated Aug. 1, 1912, and are due September, 1942. The purpose of the issue is to reimburse the company in part for the cost of a new steam turbine generating plant and other additions now under construction.

People Will Decide.—The application of Oscar J. Mutchler, receiver of the Slate Belt Electric Street Railway, Easton, Pa., to issue $60,000 of receivers' certificates was heard recently before Judge William McKeen at Easton. It developed during the hearing that the company had been notified to pave certain streets in Pen Argyl and Bangor. The court signed a decree permitting the receiver to issue $21,000 of receivers' certificates to cover the cost of the paving. A reorganization plan for the company was proposed and the court directed the people interested in the reorganization to submit the plan signed by Oct. 2, stating that otherwise the receiver would be directed to offer the property at public sale.

May Appeal Tax Issue.—Litigation in which Kings County, the City of Seattle and the Puget Sound Power & Light Company figure over taxes imposed on the municipal railway for 1919 may be carried to the Supreme Court of the United States on an appeal. A. W. Leonard of the company has advised that the company wishes to make the appeal, and asks the city to join with it. A tax of approximately $400,000 was imposed on the railway in 1919, the year the property was purchased by the city, three-fourths of this being levied against the city and the remainder against the company, which had possession of the lines for three months of that year. The tax was opposed in the state courts both by the company and the city, but the Supreme Court held it valid. It is now two years overdue, and the interest, accumulating at the rate of 15 per cent, now amounts to about $15,000. The Council finance committee has the matter under consideration.

Public Utility Rating Book Issued.—A new edition of Moody's Public Utility Rating Book has just come off the press. The new issue contains the latest financial statements and earnings reports of public service enterprises of every kind in this country and Canada as well as the prominent foreign concerns. Analyses of securities are presented and a definite investment rating is assigned to every bond and stock issue. For many years Moody's rating books were used mainly by banks, financial houses and investors, but recently the public utility volume has come into general use upon the part of officers and managers of electric light and power, traction, gas, water, telephone and telegraph companies. The Public Utility Rating Book is one of a series of four volumes, the other sections covering Industrial, Government and Municipal securities, and Railroads. The industrial book for 1922 was issued early this summer, while the government and railroad books will be out within the next few weeks. They are all issued by Moody's Investors' Service, New York.

Traffic and Transportation

More Service Ordered

Transit Commission Requires B. R. T. to Add Sixty Trains in Rush and Forty in Non-Rush Hours

The New York Transit Commission issued an order on July 14 directing a marked improvement in service on the subway and elevated lines of the Brooklyn Rapid Transit System. The order, which will become effective on Aug. 15, directs the operation of 100 additional trains daily. Sixty to be supplied during the rush hours and forty during the non-rush hours. A further addition of thirty-five trains a day will be required in the fall.

The commission also directed the company to purchase and equip at once fifty new steel cars to permit the removal of the last of the wooden cars from the Centre Street subway loop. An effort will be made to have this equipment ready for service during the coming winter. In the meantime the wooden cars will be replaced temporarily by 100 metal-sheathed cars having a base that is said to be as strong as a steel car. This will remove much of the hazard of wooden car operation in the loop at once and provides ultimately for all-steel equipment.

While the commission did not go quite as far in its order to the Brooklyn Rapid Transit Company as it did in its recent order to the Interborough Rapid Transit Company, particularly in regard to new cars, the commission explained that the financial situation of the Brooklyn Rapid Transit Company, which is in the hands of a receiver, was such that it seemed that fifty new cars, to cost about $750,000, was all that the commission could direct the company to order. The commission added that it was expected that an improved financial condition would permit further outlays for new cars by the company in the fall.

The commission stated that in providing the increased subway and elevated service and in the provision made for financing the purchase of the new cars it had had the co-operation of Judge Julius M. Mayer of the United States Circuit Court and Receiver Lindley M. Garrison. After receiving a copy of the order, Mr. Garrison announced that it would be accepted. The purchase of the fifty new steel cars will not require any new financing, as in the case of the Interborough, which was directed to purchase 350 new cars, 100 of them immediately. It has been agreed that the Brooklyn Rapid Transit will purchase the new cars out of funds on hand in the depreciation fund provided for by contract No. 4 of the dual subway contracts.

The additional car mileage effective on Aug. 15 will be approximately 9,000 during the non-rush hours, and 3,000 during the rush hours. In the non-rush hours, the order contemplates that the company shall provide a seat for every passenger. The percentage of increase in seats provided on the different lines and during the different hours runs from 5 to 70 per cent. The greatest proportionate increase is on the Broadway elevated line, where there will be an increase of 70 per cent in service between 3 and 4 o'clock in the afternoon.

The service order does not apply to schedules for Saturday afternoons, Sundays and holidays. The commission said it would issue an order later covering such periods, but because of the great fluctuations of traffic on these days had refrained from making a definite order at this time. The commission will exercise close supervision over this traffic, and the company has promised its co-operation in taking the best possible care of the Saturday afternoon, Sunday and holiday crowds.

Five-Cent Fare Must Wait

Nothing can be done by the officers of the city to bring about 5-cent carfare on the Seattle (Wash.) Municipal Railway lines until after the Circuit Court of Appeals hears the appeal of the city in the so-called "specific performance" suit brought by the Puget Sound Power & Light Company, Mayor J. Brown states. The Circuit Court is scheduled to sit in Seattle and hear this case early next fall. The suit was brought by the Stone & Webster interests, to compel the city specifically to perform the contract of purchase under which the city took over the local road at Seattle from Stone & Webster. It was heard by Federal Judge E. E. Cushman in the District Court, and the decision upheld the Stone & Webster interests. The city appealed the case to the higher tribunal.

Six-Cent Cash Fare Authorized in Duluth

Authority to increase its fares to 6 cents with a provision that tickets be issued in minimum lots of five at the present rate of 5 cents, effective on Aug. 1, 1922, was granted to the Duluth Street Railway in a decision handed down on July 14 by the Minnesota Railroad & Warehouse Commission. By its decision the commission rejects the application of the company for a 7-cent fare, or four rides for a quarter. The commission also establishes 7½ per cent as a fair rate of return on the company's investment. The city had recommended 6 per cent. The city will seek a temporary injunction against putting the new fare schedule into effect. The fare is 5 cents now.

Ten Cents in Levis

Interesting Commission Decision Covering Eleven Mile Road Beset by Strike and Fire

The Public Service Commission of Quebec has decided to grant the request of the Levis County Railway for authority to modify its schedules and zone limits. An order to this effect has been formally entered. Under it, the company is authorized to charge 10 cents per passenger per zone, but tickets are to be sold to school children at the rate of twenty-five for $1.25 at the company's offices to children not more than sixteen years old.

The commission also decided that cost of maintenance of that part of the highway between the company's tracks and outside of them to the ends of the ties shall hereafter be borne by the municipality in which the tracks are located. Moreover, the company is to be reimbursed for all expense incurred to it for any change of location or repairs necessitated by work carried on by the municipalities.

In St. Romauld snow removal is to be carried on by the tramway as at present, but in Levis, Bienville and Lauzon the municipalities are to pay up to $16,000 toward the expense of snow removal but are not to be subject to costs beyond this amount. These payments are to be made in the proportions of eleven-sixteenths by the city of Levis, four-sixteenths by the town of Lauzon and one-sixteenth by the village of Bienville.

Within the limits of their legal authority, the four municipalities are to prevent competition against the tramway by bus and other common carrier. A full report of operations for the first year of operation under the new order is to be filed with the commission during the first month after the completion of the full year's operation. Any questions arising in dispute over the interpretation of the provisions of the new order are to be submitted to the commission for settlement.

Operation of the property at Levis has been fraught with unusual difficulties in the past few years. Up to 1919 the track and rolling stock were in poor condition, but in that year the railway effected an almost complete reconstruction. In 1920 there was a strike, and no sooner had the road again been returned to a condition for satisfactory operation when on Feb. 21, 1921, the carhouse and its contents of cars and snow-fighting equipment were destroyed by fire. Since then service has been unsatisfactory because of the inability of the company to refinance itself under the existing conditions. Although the municipalities realized the need of the company for relief they were unable in conference with the company to arrive at an agreement and so the case came before the commission. This occurred on March 24, 1922, under the provision of an amendment to the acts of the province.

The company contended that the line

had always been operated at a loss and that as this fact was well known the company was not in a position to secure the new capital required to rebuild the system.

In view of the conditions which existed the commission was called upon to value what remained of the system and to determine what would be required to insure proper service, and at the same time guarantee to those who advance funds a legitimate return on the investment. The commission said quite frankly that there could be no question of guaranteeing the interest upon all the money sunk in the venture but only upon the part which remained as an asset. Dr. L. A. Herdt for the railway and William R. Russell for the city estimated the value of the system as to the serviceable capital upon which there should be a return. Mr. Herdt was of the opinion that the system should not be valued as if it were about to be sold, but rather at its renewal cost at the moment of valuation. Mr. Russell did not express any opinion as to the principle, but valued the system partly according to its renewal cost and partly according to its depreciated value. The commission valued the system by endeavoring to estimate the cost of labor and of intact materials as in the case of a new enterprise, the balance being valued at its actual or depreciated worth. The commission said:

> The commission is of the opinion that in fixing the rates, the theory that the visible assets should be estimated at their cost of renewal is fair, as otherwise the invested capital could never be fully remunerated, because of the fact that from the moment material is employed, and even before the construction work has been terminated and the system put into operation, it has already undergone a certain depreciation; further, the system under valuation should originally have been constructed of new material and kept in such a good state of maintenance that its cost of operation would be equivalent to that of a new system.

This was the theory propounded by the commission. It found, however, that some second-hand material was used in building the line and in reconstruction and that the company never carried any reserve fund. Such being the case the commission felt called upon to make an option between the two theories on the basis previously stated. It accordingly placed the total value of the visible assets at $575,096, of which $467,558 was credited to the value of the visible assets without the general outlay. The new capital requirement the commission placed at $219,068, making a total of $794,165. With reference to a legitimate return the commission ruled for 6 per cent on present capital and 7 per cent on future capital. It estimated the total fixed charges at $65,723, made up of $34,505 representing interest at 6 per cent on $575,096; $15,334 representing interest at 7 per cent on $219,068; and $15,883 representing depreciation at 2 per cent on $794,165.

Then came the nice question of fixing the fare. As previously indicated, it was concluded that by adults paying a 10-cent fare and school children 5 cents the average fare would be at least 9 cents. Two million passengers at 9 cents would produce a revenue of $180,000, an increase of $28,479 in the gross receipts over the probable revenue under the old rates. This estimate the commission pared to $20,000 because it felt that the suppression of the sale of tickets would tend to diminish the riding habit. In consequence there would be a deficit of $12,196. The opinion of the commission was that the only visible means of meeting the deficit was to oblige the municipalities to bear a portion of the expenditures for paving and snow removal.

The commission's estimate of earnings of the Levis County Railway follows:

Gross receipts	$171,521
Cost of operation	105,581
Surplus	$65,939
Fixed charges	65,723
Net Surplus	$215

The Parish of St. Romauld sought to abide by the contracts in existence, but the commission held that its ruling, in order to be binding, should apply alike to all the municipalities through which the company operates. Since the order was issued St. Romauld has entered an appeal on a point of law, maintaining that the commission has no jurisdiction. Later the city of Levis entered an appeal, although it was in fact this municipality that brought on the investigation by the commission. In consequence, the company after having started to reorganize the fire loss suspended all operations. Four days later the city of Levis withdrew its appeal and the company is now proceeding to take the steps necessary to replace the fire loss, although the appeal of St. Romauld is still pending. Should St. Romauld win, the company will probably discontinue service in the winter in that municipality, simply operating when it pays to do so.

Other Cities Will Try Dollar Pass

Following studies made by Walter Jackson, the railways in the cities of Tacoma, Everett and Bellingham, Wash., in which Stone & Webster operate, have decided to adopt the dollar pass. The new plan goes into effect in Tacoma on July 24 while Bellingham is expected to begin with the pass on Aug. 1. In Tacoma the pass will replace the 10-cent cash fare and a ticket rate of about 8 cents. Bellingham retains the 7-cent cash fare with fifteen tickets for one dollar, and Everett retains the 10-cent cash fare with four tickets for a quarter, but has promised a trial of the 5-cent fare when the new franchise and improvements become effective.

Backing up Mayor A. V. Fawcett in his fight to force the Tacoma Railway & Power Company to establish a 5-cent fare basis in the city, the City Council has issued a franchise for the operation of twelve sixteen-passenger buses over the South Tacoma-Point Defiance line, in competition with the railway lines. The buses will charge a 5-cent fare. The jitney franchises was granted by the city after the Tacoma Railway & Power Company, through its manager, Richard T. Sullivan, had refused the proposition of Mayor Fawcett that the company issue twenty tickets for $1 without transfer rights, and sixteen tickets for $1 with transfer rights. The company has definitely declined to consider further such a plan, ascertaining that such a reduction in fare would be ruinous to the company.

Transportation News Notes

One Fare Extension Benefit Patrons.--The Detroit (Mich.) Municipal Railway has extended its one fare zone service in several sections of the city. This has meant a considerable saving to car riders.

Lower Fares in Effect.—A reduction in fare amounting to about 25 per cent is in effect on the lines of the Rutland Railway, Light & Power Company, Rutland, Vt. An increase in riding has resulted on the North Belt line.

Additional Fare Allowed.—The Capital Traction Company, Washington, D. C., has been authorized to charge an additional fare of half a cent for each passenger over the new Georgetown bridge. This extra fare goes to the government for use of the bridge.

Seven-Cent Fare Extended.—The Public Service Commission recently authorized the United Railways, St. Louis, Mo., to continue to charge the 7-cent fare for a period of thirty days. The fare would have returned to 5 cents if this order had not been issued.

Lower Fares to Continue.—Fares on the city line of the Connecticut Company in Bridgeport and Norwalk, will remain 5 cents until after Sept. 1, Public Utilities Commissioner Charles Elwell has officially announced. This extension of time will give a ten months' test on which to base the fixing of permanent rates.

Wants to Operate Bus Line.—The Johnstown, (Pa.) Traction Company has protested to the Public Service Commission against the proposed extension of routes of motor bus companies operating in Cambria, Somerset and other adjoining counties. At the same time the company asks for a permit to operate a bus line of its own.

Seek Five-Cent Fare.—Employees of the Bethlehem Steel Company who ride between the Steelton plant and their homes will ask the Harrisburg (Pa.) Railways for a 5-cent fare. A petition to this effect has been placed in the hands of the safety and welfare committee by the employees' representatives. The petition states that wages are the same as in the time of the nickel fare and that the present fare should be cut 1 cent.

Personal Mention

St. Louis Names School for Railway Pioneer

As a continuous reminder of what Erastus Wells, pioneer street railway operator of St. Louis, Mo., contributed to the progress of the city stands the Erastus Wells Grammar School at Clarence, Newstead and Carter Avenues. This school, which in a few years is to be reconstructed as a grammar or junior high school, was recently named in honor of the veteran railway operator by the City Council.

Recognition of the great part which railway men have played in the building up of the country is not lacking. A conspicuous example of tribute paid to a railway executive is the monument that was erected in Minneapolis, Minn., to Thomas Lowry, founder of the Twin City Rapid Transit Company. St. Louis is but giving honor to whom honor is due in naming this group of buildings after Mr. Wells.

Pioneering with a fighter's spirit perhaps best describes Mr. Wells' entire railway work. In association with Calvin Case, Mr. Wells established the first onmibus line in St. Louis and west of the Mississippi River and ran it successfully for a number of years. To Mr. Wells also falls the credit of organizing and operating the first street railway, the Missouri Railroad Company of St. Louis, west of the Mississippi. He ventured on this project in 1859 and was president of the company until 1861, when he sold out his interest. He was also at various times president of the Steam Suburban Road, which operated between St. Louis and Florissant, Mo.; a director of the Ohio and Mississippi Railroad and president of the Laclede Gas Light Company. He was also an active leader in all city affairs and in United States Congress, where he served for eight years. Mr. Wells died in 1893.

The connection of the Wells family with the railways of St. Louis has never been entirely ended. For a time there was no direct participation by the family in the actual management of railway affairs there, but at the present another member of the family is performing an important work. He is none other than Rollo Wells, receiver of the United Railways—an illustrious son of the illustrious Erastus Wells.

Commission Engineer Studies Transit Abroad

Daniel L. Turner, the consulting engineer to the New York Transit Commission, has sailed for Europe to spend two months in the study of new methods of transit construction in France, Germany, and Austria. The commission has already made public its $218,000,000 plan of new construction, but hopes to have the aid of the various new methods that have been introduced abroad since the war. Mr. Turner will combine a search for the practical and the beautiful. While in Germany he will study the system employed there in building open-cut subway lines through suburban territory.

Honor Post for C. M. McRoberts

C. M. McRoberts, general claim agent of the Los Angeles (Cal.) Railway, who was elected president of the Pacific Claim Agents' Association at its convention in Los Angeles June 7-9, has been in claims work since 1906.

Mr. McRoberts was born in Indiana in 1874. He was educated at the college at Oakland City and the Indiana Law School at Indianapolis. From his graduation in 1898 until 1903 he practiced law at Princeton, Ind. In 1903 he was appointed to the Government Bureau of Indian Affairs, with headquarters at Muskogee, Okla.

C. M. McRoberts

He entered the employ of the Illinois Central Railroad in the claims department in 1906, being located at Greenville, Miss., and later at Freeport, Ill.

When he went to California in 1911 he was made assistant general claim agent of the Los Angeles Railway and was appointed general claim agent in 1919.

F. W. Brownell, who has been general accountant for the Puget Sound Power & Light Company, Seattle, Wash., now has the title of comptroller.

P. W. Thomson, formerly general manager of the New Brunswick Power Company, St. John, N. B., furnishing railway, light and power service, has returned to his private business in the William Thomson & Sons Company, insurance agents, St. John.

Manuel Trucco, director general, and other representatives of the Chilean State Railways are in this country and recently made a tour of inspection of the Westinghouse Electric & Manufacturing Company plant at East Pittsburgh, Pa., where the $7,000,000 order for electrification equipment which was received last October is now being fulfilled.

A. J. Anderson, auditor of the Salt Lake & Utah Railroad, Salt Lake City, Utah, has been made general freight and passenger agent. A. V. Kipp, who held this position, has been made traffic manager; George W. Shaver has been appointed electrical engineer, and C. M. Osborn acting auditor.

J. C. Kennedy, Dallas, Tex., has been appointed general manager of the Marshall (Texas) Traction Company, succeeding P. J. Hayes, who has been transferred to Hugo, Okla., as general manager of the utility company's plant in that city. Mr. Kennedy announced that the improvements begun under Mr. Hayes would be continued until completed.

Obituary

Martin S. Decker

Martin S. Decker, formerly chairman of the Public Service Commission of the Second District of New York and for twenty years associated with the work of the Interstate Commerce Commission, is dead. His long connection with the Interstate Commerce Commission began with the inception of the commission in 1886, when he was appointed docket clerk. At that time he was a Deputy Clerk of Ulster County, and had studied law while in that position. He drafted many Congressional bills affecting interstate commerce law, including several sections of the Hepburn bill of 1906. He was chairman of the Public Service Commission in 1913 and 1914. In 1909 and 1910 he was president of the National Association of Railway Commissioners.

Walter Hinmon, Detroit (Mich.) Railway Supply Company, was killed in an automobile accident near Detroit on June 23. Mr. Hinmon was formerly connected with the Peter Smith Heater Company and prior to that with the Cooper Heater Company.

Charles E. Arnold, railroad builder, died at his home in Mount Vernon, N. Y., on June 8. Mr. Arnold organized the Saratoga Electric Railroad, and also built railways at Albany, Lake Placid and Saranac Lake. He was interested in steam roads also and was connected with the Port Chester road, which became the New York, Westchester & Boston Railroad, and the West Shore Railroad. He established the Commercial Union Telegraph Company, and for some years recently was manager of the Western Union Telegraph Company in Mount Vernon.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Power Improvements Will Total $250,000

Improvements and additions costing $250,000 are being made during the present summer by the Indiana Service Corporation on the company's power plant in Fort Wayne.

A new switch house is to be built. This unit, which will cost $10,000, will be an auxiliary to the main plant and an addition to the present building housing the distribution system. The first unit of the new building was begun last November. It will be finished together with a second unit, by the middle of August. Work on the second unit was started recently. The company is doing the construction work itself. Its electrical and civil engineer departments drew the plans for the structure.

The improvement made by this new building will permit a better distribution of power. It will tend to eliminate interruptions to service, assuring a more uniform flow of current. Current, as the result of this new arrangement, will be furnished more uniformly and with less chance of temporary cessation for lighting, for street and interurban systems and for industrial plants.

Another change of importance is the addition to the company's equipment of a new turbine which, it is said, will be larger than either of the two now in use. This change has necessitated the installation of new machinery at the various sub-stations of the corporation and this work is now in progress.

Bids for Chicago Cars

The Chicago Surface Lines is receiving bids on forty-five double-truck four-motor one-man safety cars, sixty-five double-truck four-motor two-man cars and four additional four-motor double-truck cars equipped with motors with sufficient capacity to haul trailers all day and through tunnels. The last four will be purchased by the Chicago City Railway Company. The sixty-five four-motor cars will be purchased for the Chicago Railways to replace those lost in the Devon carhouse fire. These will be very similar in design to the standard Chicago car known as the Pullman type and will seat forty-nine passengers. Of the forty-five one-man safety cars, nineteen will be purchased for the Chicago City Railway and twenty-six for the Chicago Railways. These will be equipped with the double passageway and automatic exit door. They will be ten-window cars, seating fifty passengers with a weight not exceeding 30,000 lb. The sample double-truck safety car equipped with the automatic exit door and double passageway and described in *Electric Railway Journal* for Jan. 14, 1922, page 65, was a nine-window car, weighing 28,050 lb. and seating forty-five passengers. The possibility of a more satisfactory arrangement of equipment was the determining factor in adding one window to the car length. It is expected that the order will be placed in the near future. The report in the *Journal* last week stated that the company contemplated the purchase of fifty trailers, but it is now planned to purchase the above noted motor cars and no trailers.

Kansas City Plans Track Reconstruction

The Kansas City Railways has been authorized by its receivers to do a large amount of track rehabilitation. Trackage changes in the yards at Forty-eighth Street and Harrison and at Ninth and Brighton include the renewal of eight turnouts and additional tracks and entrance curves to provide for freer movement of cars and also additional storage space. The estimated cost of the track changes for the Forty-eighth and Harrison yard is $32,000, and the improvements in the yards at Ninth and Brighton are estimated at $78,000.

Tracks are to be reconstructed on Eighth Street from Broadway to Wyandotte. This requires 560 ft. of double track to be rebuilt. The track is to be 7-in. 91-lb. T rail laid on International steel ties, with 9-in. of ballast. All joints will be welded. The paving is to be of granite upon a 6-in. concrete foundation. Approximate cost of this work is $15,000. Tracks are also to be reconstructed on Thirty-first Street from Troost to Woodland and on Grand Avenue from Twelfth to Fifteenth Street. The same type of construction will be used. The work includes the reconstruction of 3,840 ft. of double track at an estimated cost of $101,000. In addition to this work a large number of minor renewals are also being made, and several layouts of special trackwork are being entirely renewed.

New Cars Being Constructed for Melbourne

The Melbourne & Metropolitan Tramways Board has decided that future rolling stock will be constructed partly in the board's own workshops and partly by contract. In order to provide for the new equipment necessary for the conversion of the cable tramways, additions will be made to the rolling stock equipment at the rate of between fifty and sixty cars annually for several years. Provision will be made at once in the new workshop for constructing and equipping thirty of these cars and tenders will be invited for the balance. It is probable that the board will invite tenders within the next few months for the construction of about sixty single-truck electric tram cars, delivery to be spread over approximately two years.

Wholesale Prices in June

A further increase in the general level of wholesale prices for June, as compared with the preceding month, is shown by information gathered by the United States Department of Labor through the Bureau of Labor Statistics in representative markets of the country. According to the bureau's revised index numbers, this increase measures 1⅓ per cent, which compares with an increase of 3½ per cent from April to May.

The largest price gains were reported for fuel and building materials, in each of which groups the June level was over 4 per cent higher than that of May. Food articles averaged nearly 1½ per cent higher and cloths and clothing over 2¼ per cent higher than in the month before. Metals showed an advance of ⅜ of one per cent, while no change in the price level was shown for chemicals and drugs and house furnishing goods. Farm products, on the contrary, due to declines in grains, hay and eggs, decreased ⅜ of one per cent in average price from May to June, while the group of miscellaneous commodities, due largely to the drop in cattle feed prices, decreased 1⅜ per cent.

No Bidders for Car Plant

No bidders made their appearance, when Sheriff J. E. Cusick of Montgomery County, Ohio, offered the plant of the Barney & Smith Car Company, Dayton, for sale at the courthouse on July 12. No deposits had been received from prospective bidders. Valentine Winters, receiver of the company, stated that a reappraisement would be sought by court order in an effort to dispose of the property. The present appraisement is $200,000. A sale of the property cannot be made for less than two-thirds of the appraised value, which the bondholders manifestly consider too high.

Metal, Coal and Material Prices

Metals—New York	July 18, 1922
Copper, electrolytic, cents per lb.	13.875
Copper wire base, cents per lb.	15.75
Lead, cents per lb.	5.42
Zinc, cents per lb.	5.72
Tin, Straits, cents per lb.	31.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.55
Somerset mine run, Boston, net tons	3.50
Pittsburgh, mine run, Pittsburgh, net tons	....
Franklin, Ill., screenings, Chicago, net tons	....
Central, Ill., screenings, Chicago, net tons	....
Kansas screenings, Kansas City, net tons	4.25
Materials	
Rubber-covered wire, N. Y., cents per lb.	5.90
Weatherproof wire base, N. Y., cents per lb.	15.50
Cement, Chicago net prices, without bags	$2.05
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	91.50
White lead, (100-lb. keg), N. Y., cents per lb.	12.50
Turpentine (bbl. lots), N.Y., per gal.	$1.18

Proposed Subway for Lisbon

The United States Department of Commerce reports that the promoters of the proposed subway for Lisbon, Portugal, are developing their plans, and it is stated they have recently presented a formal petition to the Municipal Chamber of Lisbon for the necessary authority to construct and operate such an undertaking. The chamber has requested the petitioners to supply it with detailed information concerning the project in order that it may be properly considered.

Another Record Shipment of Railway Material Made

Another trainload of electric railway apparatus left the Pittsburgh plant of the Westinghouse Electric & Manufacturing Company last week for France. The shipment consisted of equipment for the French Midi Railways as part of an order which totaled over $1,000,000. The apparatus shipped weighed approximately 800 tons.

Commercial Conference Called

To assist in the development of international good will and of better commercial relations a Pan-Pacific Commercial Conference will be held in Honolulu in October under the auspices of the Pan-Pacific Union. This is the fourth in the series of conferences which this organization is calling. The first was a conference of scientists, the second of educators and the third of journalists.

Saving in Repairs to Cars Effected

Although there has been an increase in the number of cars in service on the Los Angeles (Cal.) Railway, making safety standards harder to maintain, the total cost of repairing cars as a result of accidents in the first five months of 1922 was only 3 per cent more than the cost for the same period in 1921. According to *Two Bells*, the official publication of the Los Angeles Railway, the total number of accidents of all classes from Jan. 1 to June 1 of this year was 6,257 against 6,084 in the same period a year ago. This shows another benefit of the safety-first practices.

Electrification Planned by French

A special cable to the New York *Times* of July 4 states that the French Cabinet decided to communicate to the Reparation Commission a plan for construction by Germany on account of reparations several big power stations in the Rhone valley for electrification of the railroads in the district. All contracts made between the French government and the German contractors will be submitted to the commission which will negotiate with the German government to secure payment to the contracting firms. A similar plan was proposed by the late Dr. Rathenau several months ago and at that time was rejected by the French government.

Rolling Stock

Valdosta Street Railway, Valdosta, Ga., has ordered fare registers for all its cars from the Ohmer Fare Register Company, Dayton, Ohio.

Cheyenne (Wyo.) Electric Railway has purchased two new cars of the Birney Safety type which will be put in operation during latter part of August.

Ottawa (Can.) Electric Railway has been authorized to spend $30,000 for the delivery within two months of twenty of the latest type Westinghouse motors equipped with helical gears.

Savannah (Ga.) Electric & Power Company started the operation of new safety cars on the Habersham Street line on July 5. The thirty safety cars purchased cost more than $200,000.

Muskogee Electric Traction Company, Muskogee, Okla., will purchase six new cars for use in the downtown district. As soon as the new cars arrive the company will begin rebuilding some of its old cars to provide more efficient service.

New York Consolidated Railroad Corporation, which operates the subway and elevated lines of the Brooklyn Rapid Transit System, has been directed by the New York Transit Commission to order and equip at once fifty new steel cars so as to retire the wooden cars which are now in service in the Centre Street loop, New York. Efforts are to be made to have this equipment ready for service during the coming winter.

Track and Roadway

El Paso (Tex.) Electric Railway is well under way with the work of laying double tracks at Five Points. The program of improvement represents an expenditure of $60,000.

Valdosta (Ga.) Street Railway will extend its tracks several blocks if the commission approves its application for bond issue.

Indiana Service Corporation, Fort Wayne, Ind., has been granted a franchise to double track Columbia Avenue from Anthony Boulevard to Crescent Avenue.

Capital Traction Company, Washington, D. C., has been authorized to extend its tracks over the new Georgetown bridge. The underground current system will be used at a cost of $150,000.

Olean, Bradford & Salamanca Railway, Olean, N. Y., expects to strengthen, for heavier loading, various bridges over the entire system. An extensive interchange track with the Erie Railroad will be built at Allegany, N. Y.

Los Angeles (Cal.) Railway will reconstruct Third Street from Main to Traction Street. New girder rail and ballast will be installed. Work will soon start on York Boulevard between Avenue 56 and Avenue 62. The track will be lowered and new ballast put in.

New York, N. Y.—The Transit Commission received bids for land and river borings in connection with the plans for the construction of the Flushing extension of the Corona branch of the Queensboro subway. The lowest bidder was P. J. Heley, $2,944.

Wichita Falls (Tex.) Traction Company, expects to build within the next month two miles of track to the north side of the town bridging the Wichita River with 200 ft. of steel bridge which has already been purchased. This improvement will mean an investment of about $10,000.

Westville, N. J.—The Common Council of Westville, has appointed a committee to confer with the Public Service Railway relative to removing tracks to the center of the borough streets. The tracks are now on the extreme western section along the Delaware River.

Detroit (Mich.) Municipal Railway is continuing the extensive repair work, rehabilitating the former Detroit United Railway tracks and overhead system taken over by the city on May 15. General manager Goodwin is desirous of equipping the new Belle Isle bridge with car tracks to provide for the routing of through cars to the Isle from various parts of the city for a single fare.

The Connecticut Company, New Haven, Conn., will shortly resume operations on the 1½ mile line on North Main Street, Bridgeport, from the present terminus of the North Main line at Wentworth Street, to what is known as the Bethany Chapel switch. The line has not been in operation for the past three years. The company has been repairing the road-bed and tracks.

Winnipeg (Man.) Electric Railway has practically completed the half mile double track extension on Academy Road. In various sections of the city track rehabilitation work is going on. Portions of the track on Osborne Street have been improved by putting in new stone sett liners. Work on relaying the intersections of Main and Dufferin and Main and Euclid is proceeding.

Virginia Railway & Power Company, Richmond, Va., has received permission from the Common Council to remove its tracks from the loop around Broad, Marshall, Twenty-fourth and Twenty-fifth Streets and from other streets on Church Hill where there are duplicate tracks. In return the company must smooth-pave Twenty-fifth Street four blocks. The company will also double-track Jefferson Avenue.

Tacoma Railway & Power Company, Tacoma, Wash., has been directed to pave between tracks on Pacific Avenue, between Twenty-fifth and Twenty-sixth Streets and to repair the pavement between the tracks on north K Street from Division Avenue to north Eleventh Street; south K from Division Avenue to south Thirteenth; Sixth Avenue from south E to south G Streets and north Twenty-sixth from Alder Street to Union Avenue.

San Francisco-Oakland Terminal Railways, San Francisco, Cal., will soon complete the final unit of reconstruction work on the Oakland-Hayward roadbed along east Fourteenth Street because of the arrival of a large shipment of rails. The last unit will cost about $75,000. Double tracking is being relaid along the Key Route Twenty-second Street line at an estimated cost of $5,000. The company is also preparing to spend $130,000 on repaving and relaying of tracks along Telegraph Avenue from Fifty-fourth Street to the Berkeley line.

The Connecticut Company, New Haven, Conn., will start work shortly on the relaying of trackage and roadbed along Union Street, Rockville, Conn. N. J. Scott, manager of the Hartford division, states that the work will cost between $17,000 and $20,000 and will be done by the engineering department of the company. The company is also laying new ties and repairing the trackage on the suburban line from Rockville to Manchester, Conn., and also on the line to Stafford Springs, Conn. On the Union Street job in Rockville, 90-lb. rail will be used, as the section of the track is located on a deep grade and must endure very heavy traffic.

Houston, Tex.—The new interurban line from Houston down the Ship Channel and extending around the shores of Trinity Bay, serving numerous resorts on the water, has been brought nearer to realization by the action of the City Council of Houston in passing the proposition back to the promoters for a revision of plans before granting a franchise. Mayor B. E. Holcombe and other members of the Council say the franchise will be granted as soon as the desired changes in the plans are made. The promoters had already modified their original plans so that instead of using 4 miles of the municipal belt railway track they will use only half a mile, if the franchise is granted.

Indiana Service Corporation, Fort Wayne, Ind., is considering a plan whereby the congested traffic conditions on Broadway near the General Electric plant in Fort Wayne, Ind., during the noon and evening rush hours will be materially remedied. This will consist of the construction of a "Y" at Wall Street and the construction of car storage tracks at Wall and Broadway. The corporation has secured an option on a triangular piece of property at the corner of Wall and Broadway at a price of $25,000 and this property will be purchased at this price provided the board of safety and the board of public works agree to give the traction company a franchise for the improvements. A present considerable difficulty has been experienced at this point when the great number of employees at the General Electric and Dudlo plants are turned upon the streets at noon and evening.

Power Houses Shops and Buildings

Kansas City (Mo.) Railways through its receivers has authorized an addition to the Trainmen's building at Forty-eighth and Harrison Streets. The building can now take care of 225 cars and more than 600 men.

Jackson (Miss.) Public Service Company, through General Manager Brown, has just closed a contract for a new General Electric engine and boiler having 2,500 kw. capacity. The expenditure with auxiliary equipment involves $125,000.

Trade Notes

Okonite Company, Passaic, N. J., manufacturers of Okonite insulated wires and cables, splicing tapes, etc., has recently opened a branch office in San Francisco, Cal., at 509 New Call Building. S. Herbert Lanyon has been appointed manager.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that H. D. Shute, vice-president and general sales manager of the company, has been elected a member of the board of directors of the Standard Underground Cable Company.

The Standard Underground Cable Company, Pittsburgh, Pa., announces that A. B. Saurman, general sales manager for the company, has been elected a vice-president and will combine the duties of his new office with his previous duties.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has changed its Richmond (Va.) representation from a field location to a sub-office. The change was made to meet increased activities at that point. The new office is in the Virginia Railway & Power Company Building, and W. O. Peale is in charge.

O. O. Berry, of the Wheeler-Schebler Company, Indianapolis, Ind., manufacturers of carburetors, was elected chairman of the Indiana section of the Society of Automotive Engineers at a recent meeting. Lon R. Smith, vice-president of the Midwest Engine Company, who has just retired as chairman, was named vice chairman. Bert F. Kelly, of the Weidley Motors Company, was named secretary, and Mark A. Smith, of the Midwest company, treasurer.

The Johns-Pratt Company, Hartford, Conn., whose selling arrangements through the Johns-Manville Company were recently dissolved, has established a Pacific Coast branch of its own. This office, located in the Call Building, New Montgomery Street, San Francisco, will be in charge of A. J. Moan. Mr. Moan was with Johns-Manville Company for a number of years and is familiar with the Johns-Pratt line of Noark fuses and protective devices, Vulcabeston packing and Johns-Pratt molded insulation. To facilitate deliveries on the coast, a comprehensive stock of all lines will be carried at San Francisco.

Heine Safety Boiler Company, St. Louis, has sent a letter of instructions to all of its erecting men in regard to a special kind of service to customers which they are expected in the future to render. This is to visit different installations of Heine boilers from time to time, according to a list to be furnished by the main office, to receive complaints and make recommendations as to ways in which the setting or operation of the boilers can be improved. It is expected that by this plan users of these boilers will realize that the interest of the Heine company in them does not cease with the final payment. The erection engineers are also authorized on these visits to accept orders for repair parts, should they be required.

New Advertising Literature

General Motors Trucks Company, Pontiac, Mich., has issued a twenty-page booklet which serves as a résumé of outstanding features of G M C trucks. The G M C two-range transmission is described in detail.

Hydraulic Society, New York, N. Y., has just issued a second edition of its phamphlet entitled "Trade Standards in the Pump Industry." This edition contains some additional tables and explanatory data and also a revised list of members of the society.

Metals Coating Company of America, Philadelphia, Pa., has issued a pamphlet describing the Schoop metal coating process. Illustrations are given of various uses made by electric railways, such as the coating with zinc of transmission towers, car frames, railway structures, etc.

Briscoe Devices Corporation, Pontiac, Mich., is advertising its Scoe carburetor in a booklet, explaining in detail the phases of its operation. The travel of the carburetor is governed entirely by the quantity of air drawn in by the motor. The pamphlet states that for the medium-priced car, weighing from 2,200 to 2,400 lbs., a mixture of air may be used which will give an average of 20 miles to the gallon.

The Younglove Construction Company, Sioux City, Ia., has been appointed representatives of the Conveyors Corporation of America, 326 West Madison Street, Chicago, Ill., for the sale of American Trolley Carriers in northwestern Iowa, and in South Dakota. The new representatives located in the United Bank Building, Sioux City are well and favorably known in that section of the country as designers and builders of grain elevators, flour mills, transfer houses and coal pockets. The American Trolley Carrier is equipment for handling coal from cars to storage pile or overhead silos by means of monorail and through the use of self-dumping buckets.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review
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Safety in Pressure Tanks—Check Up Your Heating Torches

OIL-BURNING heating torches, which are frequently used on electric railways, involve an element of danger in the pressure tanks which are a part of the equipment. An explosion of one of these tanks seldom has been recorded in recent years and the comparative immunity from explosion has, no doubt, led those in responsible charge to overlook the need for careful, periodical inspection of such equipment with the view toward accident prevention.

Recently a 20-gal. pressure tank supplied by a hand-pump, normally working at 30 lb. pressure, blew up and injured three men seriously. This tank supplied pressure for an oil-burning heating torch used to preheat rail ends. An examination of the tank disclosed a structural weakness in design and manufacture which was the underlying cause of the explosion, although the direct cause probably was the failure of the pressure gage correctly to indicate the pressure.

Sometimes it takes such an accident to rouse one to appreciate a lurking danger and the attention of users of this sort of equipment is called to the necessity for periodical inspection and thorough tests of all parts of such apparatus as well as the establishment of rules governing its use by employees who are trained for the purpose. It will be well, also, to be certain that the construction of the pressure tanks is adequate to withstand the extraordinary pressure to which they may be subjected if gages happen to fail.

No doubt the matter of proper construction of these tanks will be taken up by the Engineering Association in co-operation with the work which the boiler code committee of the A. S. M. E. has undertaken.

Saving Property, a Byproduct of Telephone Dispatching

THE telephone is now so useful a factor in everyday life that it is really amazing that so many electric railway managers should consider city telephone dispatching with indifference. The same men would not dream of walking 50 ft. to talk to another person who had telephone connections, yet they do not admit the desirability of keeping in touch with men out on the line miles away, with most of the company's valuables (cars in operation) in their possession.

The other day two examples of the usefulness of city telephone dispatching, purely as a byproduct, occurred on one property. A crew on reaching the end of a line in a wooded district noticed that a fire in the dry shrubbery had made such headway that it had already set one of the wooden trolley poles aflame. Therefore, in addition to giving the dispatcher his whereabouts, as usual, the motorman described the progress of the fire. The dispatcher at once got into touch with the nearest traveling repair gang. He had heard from the latter but a quarter of an hour before, so he knew what outside telephone he could call up for immediate results. Even if an outside call had proved impossible, he would have heard from the crew within a quarter of an hour at the longest. On the same property and on the same day the telephone report from one crew that it had crossed a trestle just starting to burn led the dispatcher to instruct the following crew to borrow waterpails for the quenching of the fire.

Thus in one day the telephone dispatching system helped to save hundreds of dollars of property and to prevent delay in service and possibly a serious accident. Any user of the telephone for car control could relate scores of incidents of this nature. With telephone material scarcity a thing of the past, telephone dispatching by city railways surely deserves renewed consideration.

Even the Municipal Railway Is Not Boosted

SEATTLE, justly described as "Queen City of the Northwest," is running its own railways, and one might think from this that all classes of citizens would join together to boost the property in increasing its traffic and in other ways. An editorial in the Seattle *Post Intelligencer* for July 15 shows, however, that the amount of help which it gets, at least in this instance, is not very large. The amusing part of the situation is that this paper has been strongly advocating a return by the Municipal Railway to a 5-cent fare.

The circumstances of the case are that a pageant, called "The Wayfarer," was to be reproduced at the Stadium during the week of July 24-29, and this meant that considerable traffic would naturally come to the railway at that time and for the preceding few weeks during the rehearsals. Nevertheless the paper mentioned published in its issue of July 15 the following choice suggestions:

> Six or seven thousand Seattle folk are generously giving of their time—long and tiresome hours—for rehearsals and for the daily production of "The Wayfarer." The great majority of these must use street cars to get to the Stadium. This total street car bill will amount to a contribution of something like $8,000 or $10,000 in actual cash to "The Wayfarer" upon the part of these same people, who are already contributing free their time and energy to making this great pageant one of Seattle's most widely advertised civic assets.
>
> It is only proper that the citizens of Seattle, who indirectly profit by the good done their city in nation-wide "Wayfarer" publicity, should at least share a part of the burden borne so cheerfully by the cast and chorus of "The Wayfarer."
>
> A call has gone out for the donation of automobiles to transport the cast and chorus from their homes to the Stadium for three rehearsals next week and for the six productions during the week of July 24-29.
>
> The call deserves prompt and generous response. If you can spare a little time to give these worthy Seattleites a lift with your car, by all means do it.
>
> Lend a hand—and a gallon of gasoline!

In other words, the advocate of a lower car fare suggests that the municipally owned street railway be deprived of the $8,000 to $10,000 it could use as at least one drop in the bucket toward lower fares. It evidently did not occur to the writer of this editorial that the amateur Thespians could be supplied with street car tokens at a small fraction of the total cost of automobile transportation, especially as most of this load will come outside business hours.

Car Cleanliness Is a Factor in Building Good Will

NO RAILWAY is completely successful if the interiors and exteriors of its cars are not kept in a condition pleasing to the public eye and nose. Next to good painting comes the general cleanliness of all parts of a car if it is to present an attractive appearance.

Where cars are operated in well-paved streets, or where there is very little dust, clean water will do the trick, but where smoke and dust have to be fought, pumice on waste should be used. Special attention should be given to keeping windows and floors clean, as dirt there is especially offensive to passengers. Floors should be well swept and all interior car parts dusted at least daily. If floors are sprinkled with water or sawdust the dust will be prevented from depositing elsewhere in the car. A disinfectant in the water or sawdust is a good thing also. It has been suggested that cars should be swept at the end of each run. This, however, is expensive and is apt to result in deposits of dust on window ledges and consequent complaints from passengers. In new construction or in remodeled old equipment rounded sanitary corners can be introduced and will be found useful in preventing accumulation of dirt in inaccessible places. Proper design of floor strips and careful attention to their layout and installation will also greatly facilitate the work of cleaning.

Make the job of cleaning cars an easy one and the work will be done in a satisfactory manner.

The Faithful Superintendent

WHO has not met him? You will find him most often on a small-town property that has passed, perhaps, through the hands of half a dozen syndicates. Managers have come and gone, some moving to higher places, others flitting on request when financial control changed hands. Through it all, the superintendent has remained. He holds the men together through thick and thin. He asks the local paper to "lay off a bit" when the nagging gets under the manager's skin. He knows every man, woman and child in town and can tell you how many really can't afford to own a gas-droshky.

Most managers respect the sterling honesty and bluntness of these superintendents who are a decade or two beyond them in years. Few managers are willing to believe, however, that these old bears can be taught new tricks. Our observation runs to the contrary. Though the local veteran has been narrowed by being in one place so many years, it does not follow that he is not good for other things than maintenance of discipline and pulling of political wires. There are few men in this world who are not flattered if asked to give their opinion of a new method; and they will surely try harder to make new plans a success, if they have been advised beforehand, than if such plans are thrown at them fully formed and without time for digestion and correction.

We may tell the sequel of one such case. The local manager was anxious to put the advertising touch into his traffic department. Although his superintendent had always declaimed against advertising, he took him into consultation. The old-timer had the chance to examine ride-selling campaigns conducted by other companies, as shown by their newspaper copy, car placards, etc. No one argued with him while he pondered this material. Finally, he said: "Say, you can't start this kind of stuff too soon for me; and what's more, I'd like to have the chance to handle it myself with the boys and the public from soup to nuts. I thought street railway advertisin' was just framin' excuses for not makin' good. But this is somethin' else again. Lead me to it." And so new wine has been poured successfully into an old bottle!

New England Roads Making Earnings Records

COMMENT was made early in the year on the good news coming out of New England contained in the annual reports of some of the larger companies. As a record of the past these reports were very satisfactory, but it was in the promise for the future that these documents were most inspiring. Another six months has rolled around. Another period of accounting is at hand. The figures for the half years are not presented with the formality that accompanies the publication of the reports for the full year and they lack the helpful comment which goes with the reports for the calendar year, but they are nevertheless an accurate record of achievement.

All of the three big systems—the Boston Elevated Railway, the Eastern Massachusetts Street Railway and the Connecticut Company—show very distinct progress. For the first time in more than eleven years the Boston Elevated Railway does not owe a dollar to the banks. In fact, it has more than $3,000,000 in cash on deposit. In the first half of the year the road earned more than $1,000,000 in excess of dividends and has just made an initial payment of $517,196 on account of the municipal loan assessment of 1919.

As for the Eastern Massachusetts Street Railway, that road has just declared a dividend of 3 per cent on the sinking fund stock and first preferred stock, Series A. Just three years ago the road was placed in the hands of the trustees a financial wreck. The rehabilitation has been brought about chiefly by the use of one-man cars and the discontinuance of lines where the towns did not care to consider paying their share of the possible operating deficit.

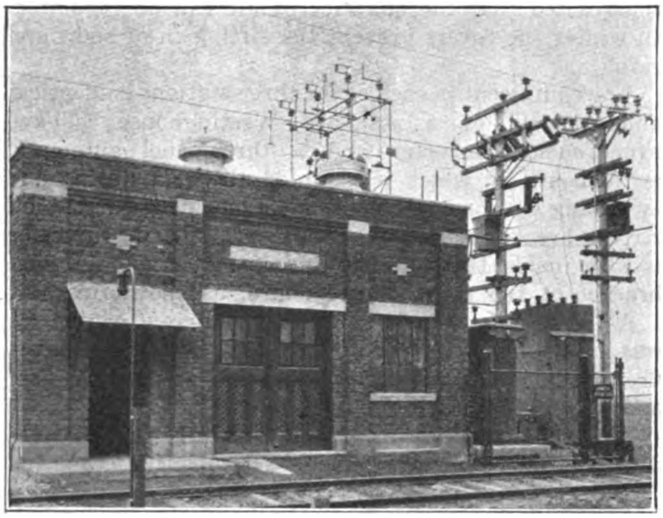
As for the Connecticut Company, it is doing so well that the sum of $781,411 has been paid by it to the State as the first installment of taxes on an accumulated sum of about $2,000,000. It is the first payment made by the company to the State on account of taxes since 1917. This might be considered by some to be a negative figure. It is. But it is none the less significant as a barometer.

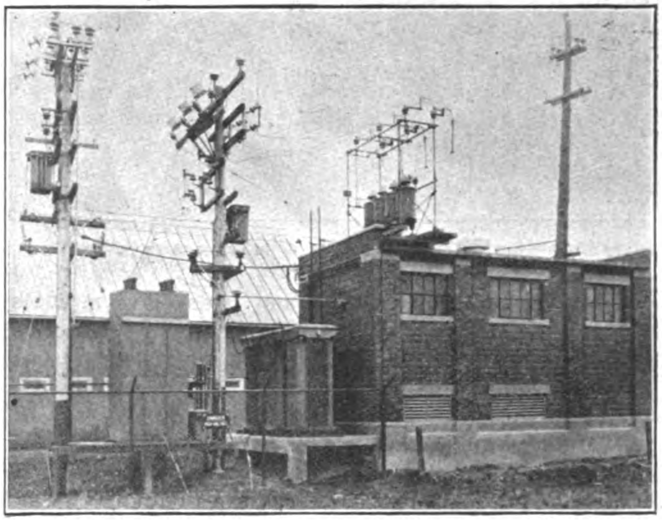
There are still some factors present in the situation in New England that are working against the roads there, but there are so many other factors favorable to the companies that progress in the next six months is not likely to be seriously retarded.

Substation Layout of an Ohio Railway

The Columbus, Delaware & Marion Electric Company Uses Three Automatic Substations on Its Interurban Lines, Operating in Conjunction with Two Manual Substations—Some Details of Design and Construction Are Given

By R. P. Meily
Sales Engineer Westinghouse Electric & Manufacturing Company


AUTOMATIC SUBSTATION AND WAITING ROOM AT RADNOR, LOCATED ON A 2 PER CENT GRADE. NOTE THE SIGNAL LIGHT OPERATED FROM WAITING ROOM BY PROSPECTIVE PASSENGER


REAR OF RADNOR SUBSTATION, SHOWING LOCATION OF TRANSFORMERS, SWITCHBOARD AND HIGH-TENSION EQUIPMENT AND THE ELECTROLYTIC LIGHTNING ARRESTERS ON THE ROOF

THE Columbus, Delaware & Marion Electric Company has recently completed the installation of three automatic railway substations which operate in conjunction with the manually operated station at the Scioto power plant and the Marion City substation.

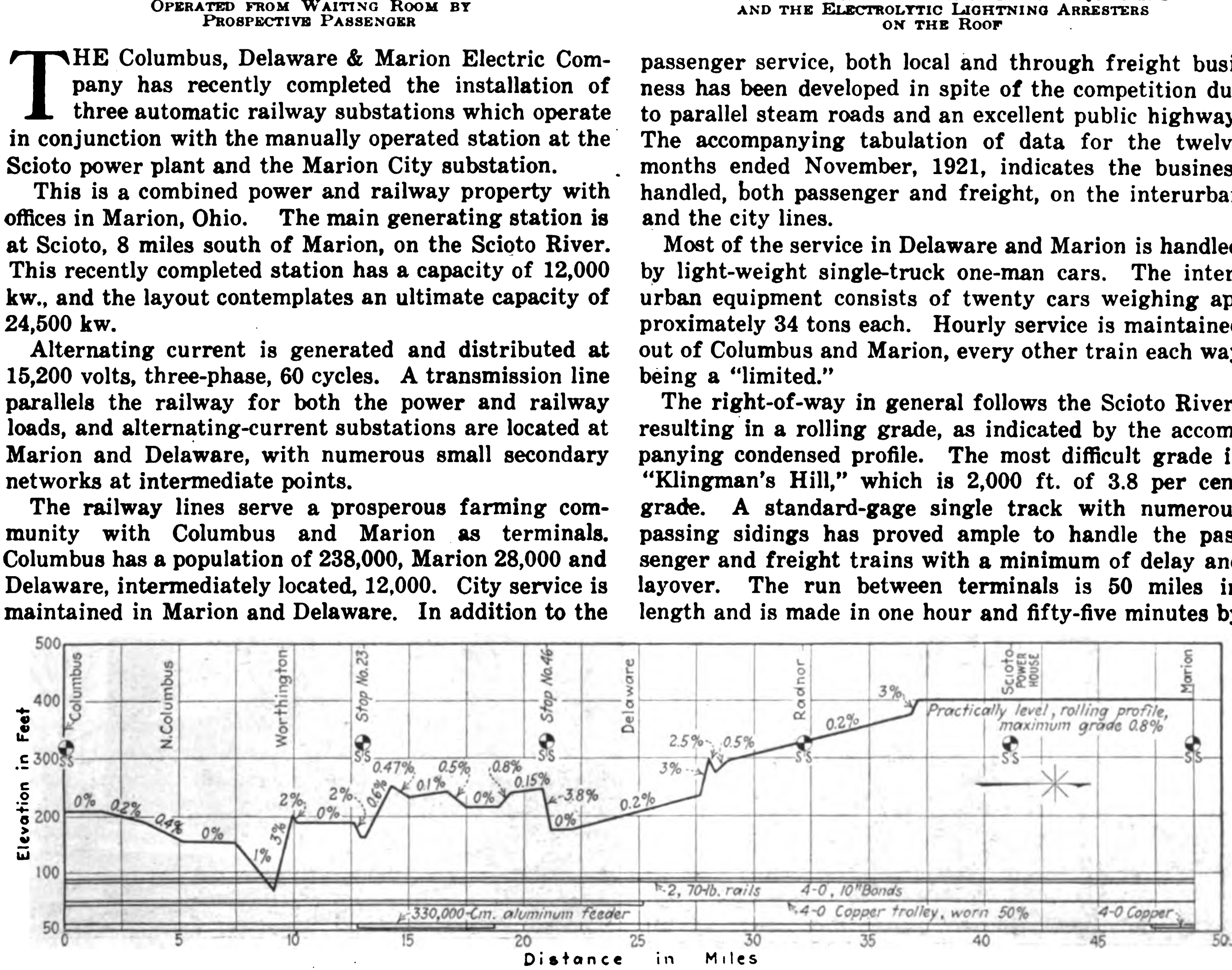
This is a combined power and railway property with offices in Marion, Ohio. The main generating station is at Scioto, 8 miles south of Marion, on the Scioto River. This recently completed station has a capacity of 12,000 kw., and the layout contemplates an ultimate capacity of 24,500 kw.

Alternating current is generated and distributed at 15,200 volts, three-phase, 60 cycles. A transmission line parallels the railway for both the power and railway loads, and alternating-current substations are located at Marion and Delaware, with numerous small secondary networks at intermediate points.

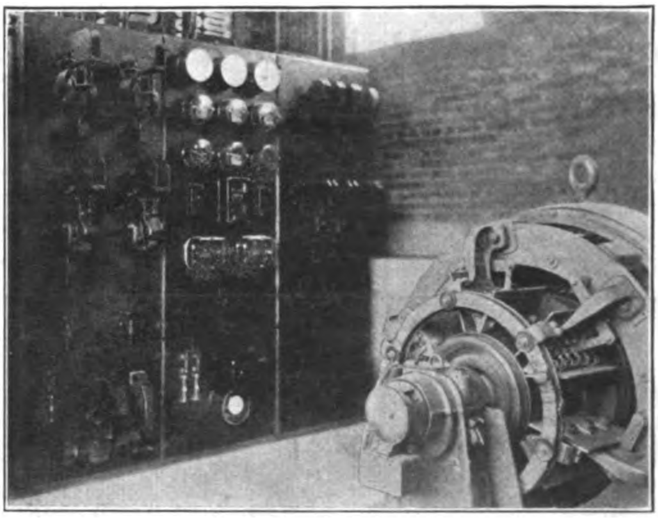
The railway lines serve a prosperous farming community with Columbus and Marion as terminals. Columbus has a population of 238,000, Marion 28,000 and Delaware, intermediately located, 12,000. City service is maintained in Marion and Delaware. In addition to the passenger service, both local and through freight business has been developed in spite of the competition due to parallel steam roads and an excellent public highway. The accompanying tabulation of data for the twelve months ended November, 1921, indicates the business handled, both passenger and freight, on the interurban and the city lines.

Most of the service in Delaware and Marion is handled by light-weight single-truck one-man cars. The interurban equipment consists of twenty cars weighing approximately 34 tons each. Hourly service is maintained out of Columbus and Marion, every other train each way being a "limited."

The right-of-way in general follows the Scioto River, resulting in a rolling grade, as indicated by the accompanying condensed profile. The most difficult grade is "Klingman's Hill," which is 2,000 ft. of 3.8 per cent grade. A standard-gage single track with numerous passing sidings has proved ample to handle the passenger and freight trains with a minimum of delay and layover. The run between terminals is 50 miles in length and is made in one hour and fifty-five minutes by



PROFILE, SUBSTATION LOCATIONS AND FEEDER LAYOUT ON THE COLUMBUS, DELAWARE & MARION LINES



Interior of Columbus, Delaware & Marion Automatic Substation, Showing Switchboard and Converter

the limiteds and in two hours and twenty-five minutes by the locals. Five miles of this run is in Columbus proper and represents a half hour of the running time.

The portion of this mileage which is under automatic substation control includes all of the trackage south of the Scioto power plant, exclusive of the portion in Columbus, which is fed by the Columbus Railway & Light Company, over whose tracks the Columbus, Delaware & Marion operates. An interchange of power is effected near Stop No. 3, the trolley wire not being sectionalized for the present operation.

The map profile shows also the general layout with substation locations and copper distribution. In locating the stations, with regard to voltage regulation and copper economy, it was found that the locations thus determined could be made to serve as stops for the local trains. Accordingly it was decided to provide a waiting room in the same structure, by extending the building lengthwise to provide additional space 6 ft. x 12 ft. for this purpose.

By reference to the plan view of the station it will be seen that the only openings between the station and the waiting room are two louvers. The louvers are 2 ft. x 4 ft., one being placed near the floor and the other near the ceiling. By means of these openings an air circulation is obtained, the heat given off by the machine passing into the waiting room through the top louver and back into the station through the lower one. The absence of other openings, except the small open doorway, causes the temperature of the waiting room to be several degrees higher than the outside air, by means of this natural circulation. The small difference in temperature is quite apparent, and the idea has worked out very well.

It will also be noted that louvers have been placed in the back of the building. These are for the purpose of providing better circulation in summer. They are provided with sheet-iron box covers located inside and so constructed that the quantity of air can be regulated. In winter the covers prevent the sifting in of snow and rain.

The equipment in each of the three stations is identical and consists of a standard Westinghouse 500-kw. synchronous converter and a three-panel automatic switchboard on which is mounted all the metering and switching equipment except the alternating-current oil circuit breaker. The direct-current lightning arrester is also inside the building and is mounted on a wall bracket at the right of the board, as shown in plan.

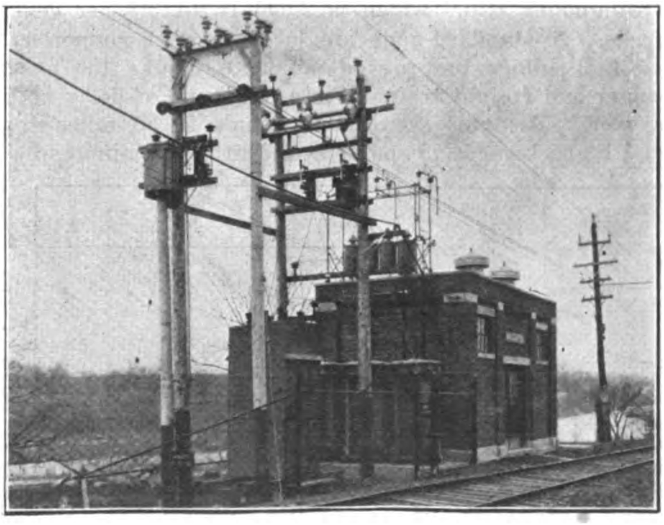
All of the high-tension alternating-current equipment was placed out of doors. This not only reduced the fire and other risks to a minimum but lessened the cost and size of the building.

The transformers were swung from a flat car directly into position with the company's locomotive crane, as was the switch house. Should a transformer failure occur, the transformer can be replaced with a spare with a minimum of time and labor. The transformers rest on rails laid on a concrete platform, built as a continuation of the station floor.

The switch house is a sheet-iron cabinet which protects the automatic oil circuit breaker and the alternating-current metering equipment. The front and back of

OPERATING DATA FOR FISCAL YEAR ENDED NOVEMBER, 1921, COLUMBUS, MARION & DELAWARE ELECTRIC COMPANY

Main Line	
Passenger car-miles	818,042
Freight car-miles	152,166
Passengers, revenue	2,069,208
Passengers, transfer	247,478
Delaware City	
Car-miles	195,861
Passengers	486,500
Marion City	
Car-miles	451,902
Passengers	2,667,585



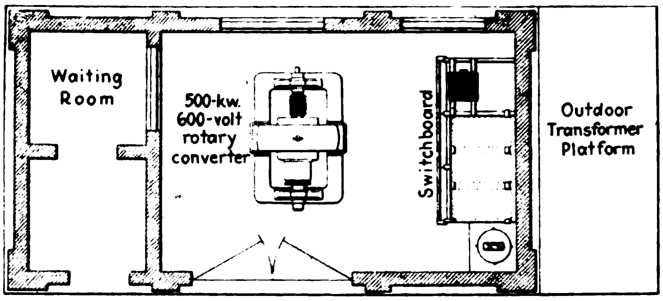
Another Type of Automatic Substation with Waiting Room Entrance at Side. Located at Stratford

Another View of Stratford Station Showing Waiting Room Entrance and Signal for Car this house are hinged and can readily be thrown open for inspection.

Two types of pole structure were used in the line construction. The four-pole type is preferred, as the "disconnects," choke coils, operating transformer, etc., are less crowded than with the two-pole type. More room is available for guying the poles, also, and the general appearance is more pleasing.

The small transformer shown on the switch-house patform is the potential transformer for the alternating-current metering apparatus. The operating transformer is mounted on the pole structure. Electrolytic lightning arresters, which require charging once a week, are mounted on the substation roof. A high wire fence protects the outside equipment and prevents possible injury to passers-by.

Another feature which may be mentioned is the signal lamp operated by a passenger waiting for a local car. The circuit is controlled by a push-button in the waiting room and lights a blue lamp notifying the motorman to stop for passengers. Another is a small lamp mounted over the substation window. This lamp is lighted when the station is in operation. In the event the station failed to start, the motorman of a passing car would notify the train dispatcher by means of a telephone located in the waiting room.


Waiting Room
500-kw. 600-volt rotary converter
Switchboard
Outdoor Transformer Platform

PLAN OF TYPICAL AUTOMATIC SUBSTATION WITH WAITING ROOM IN ONE END

From the operating point of view these stations have proved highly successful in maintaining an over-all efficiency of approximately 85 per cent. A careful inspection of each station is made once each week, at which time the lightning arresters are charged. The stations were designed and erected by the Columbus, Delaware & Marion Electric Company.

How Accidents to Employees Are Being Reduced on Chicago "L"

Influence of Officers and Management an Important Part in Results Obtained—How Employees' Observations of Accident Breeding Conditions Are Habitually Turned to Corrective Measures Is Told

BY B. J. FALLON
General Manager Chicago Elevated Railroads

WITH the reorganization of the safety work on the Chicago Elevated Railroads in January, 1920, a safety department was instituted and a safety engineer placed in charge of the work. The company had been doing safety work for a number of years, and in the reorganization it was the idea of President Britton I. Budd that the work of accident prevention should be intensified and that it should be in charge of one man whose sole duty would be to carry on a comprehensive safety campaign 365 days a year.

The foundation of the Chicago Elevated Railroads' plan for accident prevention is the development of the powers of observation of the employees of the company to such a point that their attention is immediately attracted by any condition or practice that is hazardous or likely to become so. By this plan it becomes a habit for them to be constantly on the alert for these conditions and either to take steps to correct the condition or to report it to the proper authorities and to see that the condition or practice is corrected before an accident happens.

The employees are impressed with the idea that their co-operation is sought to prevent accidents to themselves and to others by keeping safety always in mind. They are brought to realize that the prevention of accidents is alike a moral, a humane and a public duty owed by all.

A system of employees' safety committees was installed in 1920, and we have at present fourteen of these committees holding meetings twice a month for the consideration of safety suggestions and accident prevention in their several departments. These committees are selected from the rank and file of the men and none of the supervisory force is a member of any of these fourteen committees nor does any member of this force, other than the safety engineer, meet with these committees.

There are five division safety committees, one on each of the divisions of the elevated lines, made up of the superintendent, master mechanic, general foreman, electrical foreman and the claim adjuster for the division. These committees hold meetings twice a month on the days following the meetings of the employees' safety committees. A central committee of five members, the assistant general superintendent of transportation, the engineer maintenance of way, the superintendent of shops and equipment, the electrical engineer and the safety engineer, hold meetings monthly or oftener if necessary.

Safety suggestion cards are provided and placed in all shops and at all terminals for the use of employees in making suggestions. These cards are sent to the chairman of the employees' safety committee of the department that is directly concerned in the proposed change and this committee acts on these suggestions at its meeting, either approving or disapproving each suggestion and giving the reasons for the action taken. The suggestion then goes to the division safety committee at its next meeting and is acted on in the same manner.

In this latter committee are the heads of the several departments on the particular division and in all cases involving an expenditure of less than $100 an approved suggestion can be immediately carried out. In cases involving an expenditure of over this amount or where a change in the policy or method of operation is involved the suggestion goes to the central safety committee for final action.

After suggestions have been acted upon by the employees' and division safety committees, they are sent to the office of the safety engineer. Immediately on receipt of this suggestion in this office an acknowledgment form is filled in and mailed directly to the proposer of the suggestion advising him of its receipt and stating that he will be advised as soon as possible of what is done with it. When a suggestion is finally disposed of the proposer receives a letter from the safety engineer telling him of the disposition made. If it has been disapproved the proposer is told why and invited again to take the matter up personally or by letter with the safety engineer if he is not satisfied with the reasons for the disapproval.

In this way we have succeeded in securing the co-operation of the employees because they feel that their ideas receive the recognition due them. In some cases where the employee was skeptical of the actual intent of the company in the safety work, we have succeeded in convincing the man of the real worth to the company of his ideas as well as the benefit to be derived from them by himself and his fellow employees.

The suggestion plan has been successful not only in securing a large number of good safety ideas, but it has taken hold of the employees to such an extent that they are constantly reporting conditions or practices that need immediate attention to their superiors or the safety engineer without waiting for a meeting of the safety committees. In this way a great many small accidents are avoided and the shops, roadway and equipment are under constant inspection by a large number of employees, each considering it his personal business to see that conditions or practices that are likely to cause accidents are taken care of immediately.

The question of the value of the average suggestion received is answered by the following figures, covering the years 1920 and 1921:

Total number of suggestions received.	3.515
Number of suggestions approved.....	2,390 or 68 per cent
Number of suggestions disapproved...	984 or 28 per cent
Number of suggestions now pending..	141 or 4 per cent

During the year 1921, 427 safety committee meetings were held in addition to the monthly meetings of the several departments for their own employees. Two hundred and forty employees each served four months on the safety committees during the past year and these, together with the 242 employees who served during the preceding year, have received a liberal safety education and are assisting in the education of their fellow employees in accident prevention and first aid.

In September, 1921, the plan of giving instruction in first aid to the members of the employees' safety committees was adopted and is now in operation.* Each employee serving on a safety committee receives detailed instruction in first aid work including the Schaefer prone method of resuscitation. As a result of this plan it will be but a short time until there will be several men in every gang of workmen, and at least one man on every train, that is a trained first aid man, able to give instant aid in any kind of an accident.

A uniformed first aid team has been trained and aids in the instruction of the employees as well as giving demonstrations in public. A training school for first aid men has been established and classes of twenty men receive two hours instruction a week for eight weeks and at the end of this period are given an examination by the American Red Cross and receive a certificate as a first aid instructor in the Red Cross.

Over two hundred first aid stations are maintained on the elevated property and at thirty places a stretcher and blanket are kept in a weather proof container.

The number of cases of infection resulting from the neglect of small injuries has been materially reduced by the first aid instruction and the propaganda in the form of notices regarding immediate treatment of all injuries, no matter how slight, at a first aid station.

Every accident reported on the elevated lines is closely investigated and steps are immediately taken to prevent the recurrence of an accident of a like nature. The results are shown in the accompanying table.

Over 200 of the employees attended the foremen's safety instruction course and the safety supervisors' schools held by the Chicago Safety Council during the past six months and of this number 117 received certificates of graduation for attending at least 75 per cent of the meetings. All of these council meetings are held in the evening and the men attend them on their own time and of their own volition. The company safety meetings are held on company time.

CHICAGO ELEVATED RAILROADS, COMPARATIVE STATEMENT OF LOST-TIME ACCIDENTS TO EMPLOYEES, JANUARY TO JUNE, 1921 AND 1922.

	1921	1922	Per Cent Inc.	Per Cent Dec.
Average number of employees in service (monthly)	5,396	5,288	.....	2.00
Total revenue car-miles	16,898,794	17,575,630	4.00	....
Total revenue passengers	61,820,938	61,435,300	.....	0.62
Total number of lost-time accidents to employees	73	56	.....	23.30
Total number of days lost account of accidents	572	346	.....	37.70
Car mileage per lost-time accident (to employees)	231,490	313,851	35.40	.....
Passengers carried per lost-time accident to employees	833,163	1,097,059	31.70	.....

In the tabulation of the number of accidents shown below, the lost time accidents are those of sufficient seriousness to incapacitate the employee for work for eight hours or longer.

To educate the employees we have found it is necessary to have the active co-operation of the supervisory force and the officials, for in safety work as well as in the other phases of industry the attitude of the employees but reflects the attitude of the employer. On the elevated lines the officials and supervisors consider that they are responsible for the protection of employees from injury and accidental loss of life. To see that they are properly cared for when injured, to investigate the cause of injury and to take steps to prevent further injuries of a like nature are considered just as much a part of official duty as is the efficient operation of a department of this railway.

To obtain the employees' co-operation in accident prevention, the supervisory men have shown the employees that their superiors are behind the work, heart and soul. Any recommendations that employees may make that will tend to reduce the hazards and increase the safety of working conditions are closely investigated and if found practicable are carried out with the least possible delay. A budget allowance of $50,000 a year for carrying out safety suggestions has been provided this year and last.

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*See also paper by Britton I. Budd in *Electric Railway Journal* for March 4, 1922, page 364.—EDS.

Good Results from Safety Campaign

Safety Committees Have Been Organized, Competition for Accident Reduction Is Keen and a Bonus Is Offered for the Best Records

By W. Auten Brown
Supervisor of Schedules Nashville Railway & Light Company

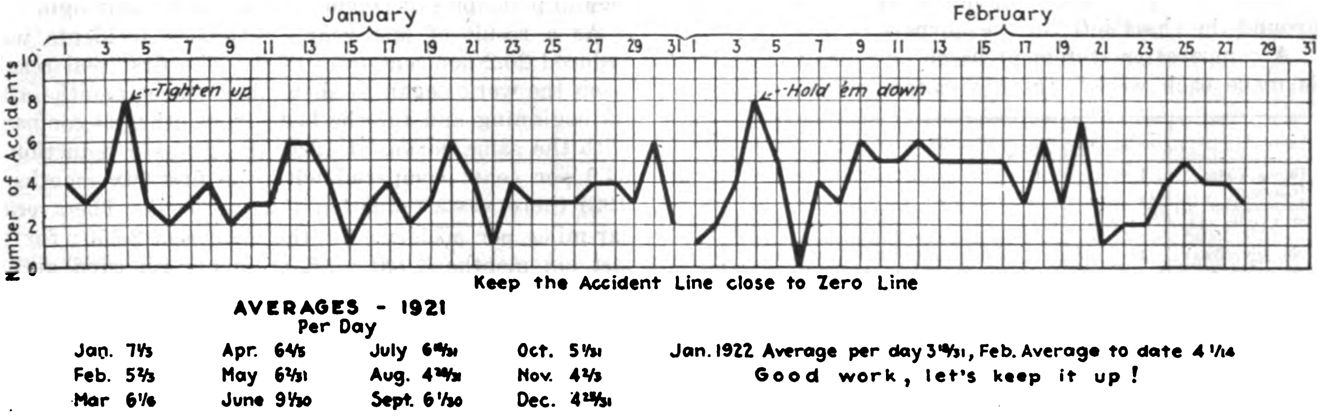
THE initial efforts of what proved to be a very successful campaign for the prevention of accidents on the property of the Nashville Railway & Light Company were made about March 1 of last year.

There were conditions on the property that had had the effect of greatly increasing accidents during the latter part of 1919 and the first eight months of 1920. In August, 1920, a strike took place, and it became necessary to replace about 60 per cent of the platform men. Naturally with the unsettled conditions that followed and with a large number of inexperienced men, accidents continued to increase during the next few months. It was this, coupled with the high cost per accident—occasioned by circumstances common in varying degrees to our industry—that brought about the necessity for some action.

A meeting of all employees, called by H. A. Davis, superintendent of the railway department, for a discussion on how to reduce accidents was the first real move. Charts showing accident records had been posted, but up to this time had not been very effective. At this meeting, which took place on March 29, Mr. Davis made it clear that something had to be done to reduce accidents. At the same time, he pointed out the advantages which would accrue to both employees and the company by avoiding accidents and saving money. Other speakers at this meeting were the master mechanic, the barn foreman, a schedule man, a motorman and a conductor. Each briefly discussed from his point of view the prevention of accidents.

Other meetings followed, under the guidance of Mr. Davis. Men from various branches of the operating department were the speakers. There would always be two meetings, one at 1 p.m. for the night crews just before going on duty, the other at 3 p.m., for day men. An effort was made to have an experienced motorman and a conductor on the program at every meeting, and though sometimes lacking in certain of the essentials of oratory they got their ideas across in a way understood and appreciated by their fellow workers. Some excellent speakers were discovered, among them the present supervisor of safety, J. S. Patrick, who was then a member of the claim department. Probably one of the best results of this manner of meeting was that when a man once spoke on the platform he immediately became an ardent safety man and seldom afterward had a serious accident.

These meetings are still being held. They have become an institution to which the men look forward eagerly. They are made interesting from the employees' point of view—and to quote another writer on this subject, they are "Snappy and not overdone." Cigars and refreshments are sometimes served to add to the attractiveness.



Sample Chart of Accident Record as Drawn on Bulletin Board

After the appointment of the safety supervisor in August, 1920, the movement began to take more definite form. Two safety committees were formed from each division of the system, one from among the day crews and the other from the night crews. A motorman or conductor from each line of the division represented makes up the personnel. These committees serve for a period of two months and meet twice each month with the supervisor.

The duties of the committees are: (1) To investigate and study any unusual or serious accident occurring on their division, (2) to consider and pass upon safety suggestions received, and (3) to make memoranda of any unsafe practices, defective equipment or track, and report them at once to the supervisor, who takes them up with the proper officials or department.

Some valuable suggestions have come from these men, who are in constant contact with the equipment, track, the public and other members of the "hazard" family, that must be closely watched to bring accidents to a minimum. Every suggestion, regardless of its degree of importance, receives careful consideration. Credit is given or notice is taken of those whose suggestions are found useful or who render good service. This is done in a manner benefiting the individual case and with a view of encouraging further endeavors.

The supervisor has an opportunity in these meetings effectively to educate and bring the men to an appreciation of the importance of safety.

The term of service on the committees is made as short as is consistent with the possibility of developing the interest of each member and giving him an opportunity to accomplish something. With this procedure the committees are kept active with new blood, and every two months forty keen advocates of safety are turned out.

Another method of engaging the interest of the men is by the use of a chart somewhat similar to that shown on page 157. On this chart, which is painted on a blackboard 9 x 4 ft., conspicuously located, the accidents of the preceding day are recorded by a line which goes up or down with their fluctuations. After solving the "mystery," the novelty of being able to read the thing made it all the more interesting to some of the men. It is watched with keen interest, and when the line goes up it has the effect with many of them of producing extra precaution. Comparisons of previous months and pertinent comments are made on space around the chart left for the purpose.

A comparative statement based on miles per accident is made each week. In this statement the records of divisions are compared. Copies furnished to the division superintendents are also posted on the bulletin boards. Much friendly rivalry has been created and the superintendents and their men take much pride in making a good showing for their respective divisions. As interest grew and competition became keen, there was added another board with a table, showing the lines grouped by divisions. On this is kept a daily record of the number of accidents occurring on each line. By the use of two colors of chalk, the day and night shift accidents are also shown separately.

Lines	S	M	Tu	W	Th	F	S	Month	Year
Buena Vista....	1	...	1	...	...	...	1	4	10
Jefferson........	...	...	...	...	...	...	...	3	12
Jo Johnston....	...	...	...	...	...	...	...	3	6
St. Cecilia......	...	...	...	...	...	...	...	2	4
No. Div. Total..	1	0	1	0	0	0	1	12	32
Fath-Shelby....	...	1	...	...	1	...	...	2	6
First St.........	...	1	...	...	...	...	1	7	12
Meridian........	...	...	...	...	...	...	1	3	9
Main St.........	...	...	...	...	...	...	...	0	0
Woodland......	...	...	...	...	1	...	...	6	14
East Div. Total	0	2	0	0	2	0	2	18	41
4th Av-Radnor..	...	2	...	...	...	1	...	11	21
Fairfield........	...	1	...	...	...	...	1	7	15
So. High St.....	...	...	...	...	...	...	...	1	4
Wharf Av.......	...	...	...	...	...	...	...	2	4
So. Div. Total..	0	3	0	0	0	1	1	21	44
Broadway......	...	...	...	1	...	...	...	9	16
Belmont........	...	...	...	...	...	2	1	6	13
Hillsboro.......	1	...	...	...	...	...	...	7	15
Kayne Av......	...	...	...	...	...	...	...	1	1
Glendale........	...	11	...	...	...	...	...	8	11
So.W.Div.Total.	1	2	0	1	0	2	1	31	46
Cedar St........	1	...	...	...	...	...	...	2	6
W. Nashville....	...	...	...	1	...	1	...	16	32
West Div. Total	1	0	0	1	0	1	0	18	38
Grand Total..	3	7	1	2	2	4	5	100	211

TABLE OF ACCIDENTS BY DAYS AND ROUTES POSTED ON BULLETIN BOARD

To show their appreciation of the good records made and as an additional incentive to continue them, the management last September offered, as a prize, a turkey to each man having a perfect record from Oct. 1 to Dec. 23. The only accidents not chargeable against this prize were those where a vehicle or other object came in contact with the car three or more feet behind the front doors or one with which the car had no connection though occurring near it. At the end of two months about ninety men had been eliminated. A great many of these accidents had been of such trivial nature, however, and many of them not the fault of the car men, that, with the consent of those who had clear records, "the slate was wiped clean" and a new start was made with about thirty days to go. At the expiration of this time only five men had chargeable accidents. They were "forgiven" and every man received a turkey. These three months proved the best of the year.

The public was not forgotten in the campaign and was told of the work through the usual publicity channels. We believe that one result was a reduction of accidents of "auto coming out of the pocket" type. No doubt other accidents were also avoided. Those that do not happen are intangible, and it would be difficult to determine just what prevented them. We believe that educating the public is one of the fundamental principles of conducting a safety campaign.

As a result of last year's activities accidents were reduced 20.2 per cent over 1920. The first real results from the work began to show about three months after its beginning and for the last six months, as compared with the same period of 1920, there was a reduction of 34.9 per cent; compared with the first six months of 1921 there was a reduction of 21 per cent. The average car-miles per accident for the year was 2,350; for the last six months 3,049. All accidents reported are included in these averages, as well as derailments, with or without damage or injury. All classes of accidents decreased, excepting boarding and alighting. These showed a slight increase, offering more food for thought. There was only one fatility in the railway department, as compared with five for the year 1920.

While a great record was made last year, especially during the last six months, the first month of this year has shown more improvement—in fact, was the best month on record. There were more than 4,000 car-miles per accident and only 111 accidents, as compared with 225 last year. To effect further savings, a "profit or dividend" sharing contest has been organized. The platform and carhouse men have been divided into four teams with a captain and three lieutenants for each. The captains selected their teams by drawing the names one by one from four groups, namely, operator (one-man cars), motormen, conductor and carhouse men. The contest will continue through the year but will be divided into four periods of three months each. New captains and teams will be selected at the end of each period.

The company has offered a bonus of $10 for each unit of accident decrease this year. This bonus is paid irrespective of the class of accident. To illustrate: The total number of accidents for the first three months last year was 585. If the total this year is 335, the bonus found will be $2,500, which will be divided among the teams as follows: Winning team, 50 per cent; second team, 25 per cent; third team, 15 per cent, and the last team 10 per cent. Each member will receive an equal share of the amount due his team.

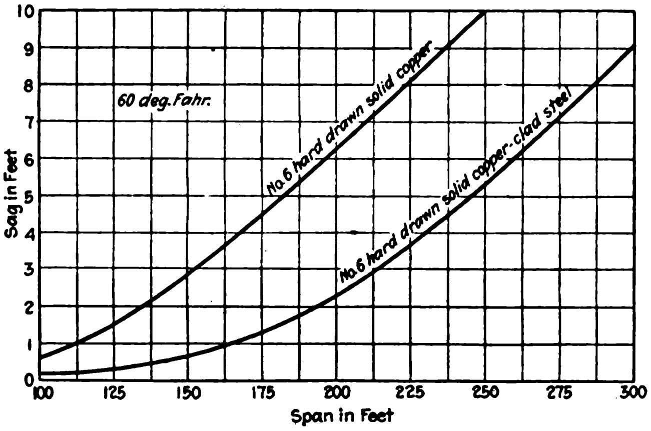
From a humanitarian standpoint, the value of accident prevention cannot be estimated. With the big dividends it pays in money and good will, when properly directed, it is good business.

Copper-Clad Steel Wire Advocated

The Non-Corrosive Qualities, Great Strength and Low Cost of Copper-Clad Steel Wire Make It Useful for Long Spans and Rural Lines Where Wind and Sleet Loads Are Severe

AN ARTICLE giving considerable data in regard to the use of copper-clad steel wire appeared in the *Electrical World* for July 22, 1922, over the signature of B. C. Dennison of the Carnegie Institute of Technology. The following information is taken from this article:

Normal copper-clad steel wire is about 8 per cent lighter than copper and has a breaking strength exceeding that of copper by an amount varying from 20 per cent for the larger sizes (No. 4/0) to 55 per cent for No. 12. Stranded cables of copper-clad steel may be expected to be at least 50 per cent stronger than the corresponding cables of hard-drawn copper. A so-called "extra-high-tensile" copper-clad steel wire now on the market has a tensile strength 150 per cent greater than copper owing to the use of a high-carbon steel core.



COMPARISON OF SAGS FOR VARIOUS SPAN LENGTHS. THE GRAPHS ARE BASED ON ½-IN. ICE LOAD AND 8 LB. PER SQUARE FOOT WIND LOAD

Obviously, copper-clad steel wire cannot always be substituted for copper to advantage. Its general field of usefulness is in those applications where the size of wire is determined by requirements of mechanical strength rather than conductivity, or where galvanized wire is subject to corrosion and depreciation.

For long spans where the strength of hard-drawn copper is insufficient the copper-clad steel wire finds a ready application. Compared with silicon-bronze or phosphor-bronze wire, copper-clad steel has about the same strength and conductivity with materially lower first cost. Extra-high tensile-strength copper-clad steel adds to the advantage of lower cost a strength twice that of bronze.

In the support of telephone and signal cables, in carrying trolley feeders over streams and rights-of-way, and in general for carrying the weight of wires which require messengers, the copper-clad messenger strand has an advantage over galvanized-steel cable in that it is free from rust and deterioration. In railway tunnels or other places where corrosive gases are present this advantage is especially pronounced. Another use for such messengers is in the support of trolley wires in catenary construction.

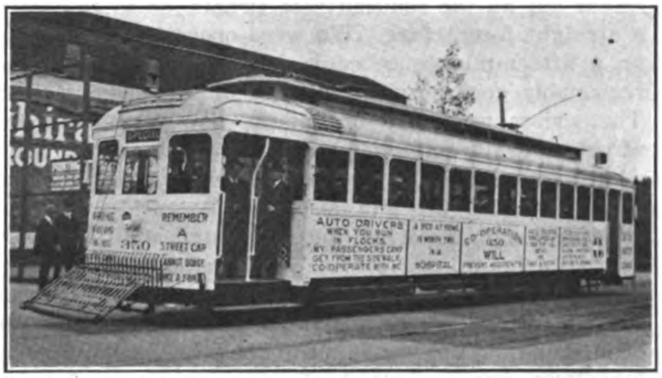
The size of conductor for rural lines is frequently determined by considerations of safety from breakage due to wind and sleet loads rather than by conductivity. Thus, compared with solid copper wire, No. 6 copper-clad might frequently replace No. 6 hard-drawn copper with a saving of 30 per cent of the poles and insulators because of the use of longer spans, although strung with the same sag and possessing equal safety. Some saving in the cost of the conductor would also result because only 92 per cent as great a weight of wire would be used and the cost per pound would be less. The accompanying graphs show a comparison of sags in No. 6 conductors with various span lengths.

In high-tension distribution in city streets the necessity for safety makes possible the use of copper-clad steel conductors. In street-lighting circuits, for example, the current could be transmitted by a very small copper wire, yet safety requirements may force the use of No. 6 wire. A No. 8 copper-clad steel wire would give the same mechanical strength, give satisfactory conductivity and cost less.

In his *Electrical World* article Professor Dennison gives data referring particularly to the copper-clad steel wire made by the molten method by the Copper-Clad Steel Company of Rankin, Pa. In this method, after the steel ingot has been brought to a welding temperature within a graphite mold, molten electrolytic copper is poured around the steel, and as the two metals cool a composite cylinder of copper firmly welded to the steel core results. Three general grades are produced, 40 per cent conductivity, 30 per cent conductivity and mechanical grade. As suggested by the name, 40 per cent conductivity grade has 40 per cent the conductivity of pure copper of the same gage number. Mechanical grade has no guaranteed conductivity, but corresponds to a conductivity of about 25 per cent. An interesting development is a composite cable made of strands of pure copper and copper-clad steel wire. This makes a cable which has high conductivity and great strength which fills in the gap in conductivity between the 40 per cent copper-clad steel and copper.

Safety Advertised in Oakland

THE activity of the San Francisco-Oakland Terminal Railways, through a local organization known as the East Bay Safety Council and in other ways, has already been mentioned in these columns. The East Bay Safety Council was organized on April 28, as mentioned in the issue of this paper for June 24, and its activities were launched by a parade of Boy Scouts on May 27. A practical contribution of the railway company to the accident prevention cause is the special car illustrated. This car has on its sides and end panels a series of safety injunctions and is being operated in the regular service on the various lines of the company.


REMEMBER A STREET CAR
AUTO DRIVERS WHEN YOU RUN IN FLOCKS MY PASSENGERS CAN'T GET FROM THE SIDEWALK CO-OPERATE WITH ME
IS WORTH TWO IN A HOSPITAL
CO-OPERATION WILL PREVENT ACCIDENTS

CAR WITH SAFETY MOTTOES IN OAKLAND

Getting Rid of Paving

How a Wisconsin Company Proved to a Municipality That This Obsolete Tax Was an Impediment to Good Service and Got It Removed

By N. C. Rasmussen
Superintendent Wisconsin Valley Electric Company, Wausau, Wis.

THE paving of streets and portions of streets by electric railways is a serious burden under our present franchise system. As everybody knows, this obligation is a relic of the old horse car days. When horses were used there may have been some justification for it, but since the advent of electricity as a motive power, this charge should not any longer be carried by the electric railways.

From 1910 to 1914, which were the worst years in the history of our company, considerable paving was done by the city in which we operate, and our company had to bear its share of the cost and upkeep of this paving, although it was being used by the automobiles, which were taking away passengers from our cars. Naturally things looked rather gloomy to us.

During 1915 we decided that something would have to be done, and we looked around for a remedy. We finally decided to try operating our cars with one man, and we rebuilt some old equipment for one-man operation, and in November, 1915, we started to operate our city cars with one man. The result was so gratifying that on Jan. 1, 1916, we began one-man operation of our suburban cars during the light hours of the day, using two men during rush hours on these suburban cars. For four years the interurban cars have been operated successfully in this way.

In January, 1920, our city administration asked us to build two extensions, each about one-half mile in length. We realized that these extensions should have been built before and several petitions had been presented to us for their construction, but we were unable to see where we could realize any return on the investment and therefore had been obliged to decline. When the city administration finally asked us to make these extensions, the management of the company instructed the writer to try to find a solution. At that time, which was about a year after the armistice had been signed, we were enjoying a good patronage on our cars, to some extent probably because we had not made any material increase in fare. The only change made was to cut out all the reduced rate tickets, so as to charge a straight 5-cent fare. We were operating in the city on a fifteen-minute schedule which would seem to be reasonably good service in a city of 20,000 population. The writer was very optimistic, however, about the street railways coming into their own again and made a recommendation to the management to build the extensions asked for and also double track 1 mile of existing single track and put on enough additional cars to give a ten-minute service in the city instead of one every fifteen minutes, and a twenty-minute suburban service instead of one every thirty minutes as we had been doing. This would mean that we would have to buy four new cars, and of course material for the extensions and rebuild this 1 mile track at peak prices.

At first this seemed a startling proposal but after it had been thoroughly examined the company decided to adopt it provided the city would consent to relieve us of the paving burden. The proposition was placed before the Mayor, who finally decided to submit the matter to the Council. The writer attended the Council meeting at which the plan was presented, and after thoroughly explaining it agreed for the company to hold the fare as low as we could but not binding ourselves to any certain fare. In the vote which followed only two out of the eighteen aldermen cast their vote against the adoption of the amendment to our franchise in the form in which we put it before the Council.

HOW OPPOSITION WAS OVERCOME

There was, of course, considerable agitation against this action of the Council from the socialists and labor unions, and the writer was the center of much discussion when the city election was held that spring. The opposing parties spread a good deal of propaganda that after we got rid of the old franchise and fulfilled our promise to the city of building the extensions and putting on additional service, we would increase the fare. On hearing this I went into the enemy's camp and had a heart to heart talk with some of the leaders, and very little was said about the matter after that. Finally when election day was over, we found that although several socialists were elected, the two aldermen who had voted against us were the only two of the old Council who were defeated, and now after more than one year of operation under this new arrangement there is a great deal of favorable comment on the service rendered and also the fact that we have not raised the fare above 5 cents.

We have also been commended by the labor element in the city, as we have not followed the practice general in other industries of cutting wages to a great extent. In fact, we have not cut any of our regular men, either on the cars or in other departments. Our motormen are being paid higher wages than in many cities larger than ours and are contented. This is proved by the fact that we have not changed a single trainman in the last year, and of all the old men who were with us before the new system was inaugurated, not one has left the service. When the new system was put into effect we had to engage eight or ten new men, but since November, 1920, after we got them broken in, we have lost only one man and he had been with us only a short time.

During the first year's operation under the new arrangement traffic has increased in proportion to the additional service put on, and although the railway department is making only a moderate return on the investment we feel the present arrangement is more satisfactory than the former under which we were obliged to pay for all new paving and maintenance of old paving in the track area. The feeling between the company and the public is better than it has ever been, and what this article is intended particularly to bring out is that when the facts are properly placed before the public and the cards put on the table face up, the American public will be fair. The writer holds the same opinion as E. M. Walker, that a car in sight at all times in the solution of the elimination of the jitney, and people who would walk if no car were in sight will now ride.

It might be well to say that our suburban cars which now operate on a twenty-minute schedule as against thirty minutes under the old arrangement are double-truck cars, which were changed over for either one or two-man operation, are now entirely operated by one man and are working out very satisfactorily.

Douglas Fir Invades the East

Representative of West Coast Lumbermen Explains the Status of the Timber Which Is an Increasingly Close Competitor of Southern Pine—The Vast Resources of the Pacific Coast in This Valuable Wood Are One of Its Greatest Assets

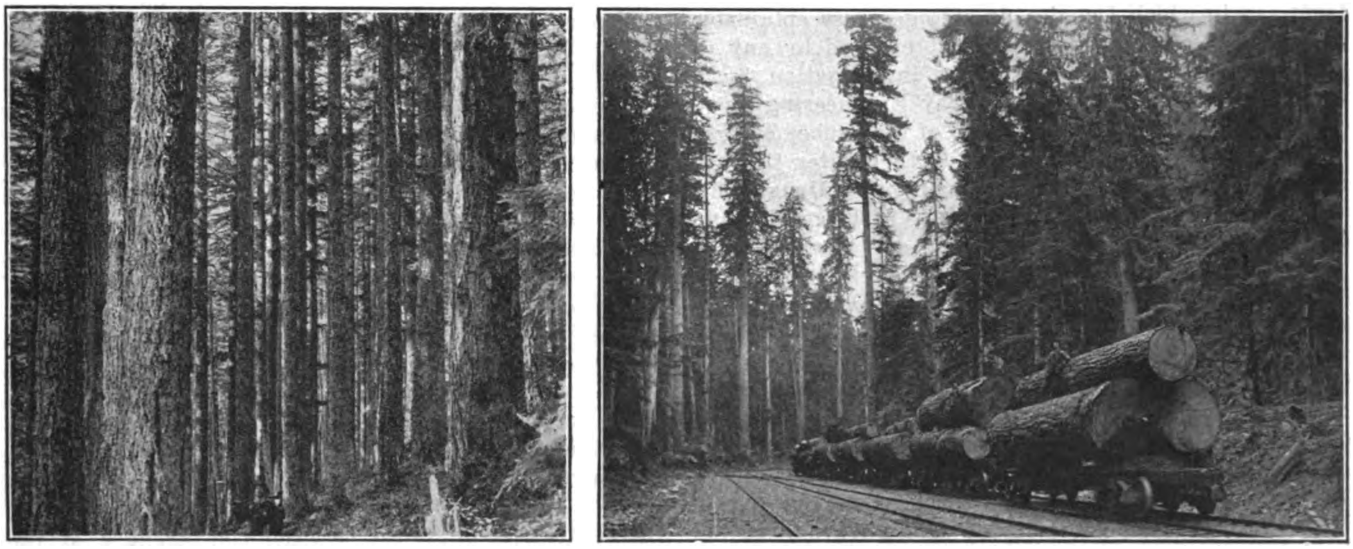
By C. J. Hogue
Manager West Coast Forest Products Bureau, Seattle, Wash.

In VIEW of the increasing interest of electric railway men in Douglas fir as a structural and tie timber, the editors of the *Electric Railway Journal* have asked me to explain its characteristics from the lumberman's standpoint. I am pleased to do this, because I feel that in some parts of the country the position of Douglas fir with respect to other woods available for the same classes of work is not clearly understood.

Douglas fir suffers, as compared with Southern pine in particular, because the different grades are not clearly established and hence because the most suitable grade of fir is not always selected for a given class of work. Southern pine is marketed in the three types: long leaf, short leaf and loblolly, there being fortunately three species of trees which lend themselves well to this grading. Douglas fir trees, on the other hand, while producing grades of timber over as wide a range as those of the three types of pine mentioned, produce simply Douglas fir. As will be explained later, the Western lumbermen are endeavoring to establish grades which will conduce to more intelligent application of this important natural resource.

Douglas fir is suitable for a wide range of uses. It is suitable for 80 to 90 per cent of all the uses to which softwood lumber is put, and with the inclusion of spruce, hemlock and cedar, which are also found on the West Coast, the lumberman in that region can offer materials for satisfactory use in 100 per cent of all the uses for which all the soft woods and most of the softer hard woods are required.

As Dr. Harry C. Brown, wood technologist of the New York State College of Forestry, Syracuse, N. Y., recently put the situation regarding Douglas fir: "This wood is the chief competitor of the Southern yellow pines. The tree reaches much larger dimensions than any Southern pine. Timbers 18 in. square and from 120 to 140 ft. long can be obtained at any time, sizes not to be had from any of the Southern pines. There is no great difference between the strength equivalent of pine and Douglas fir. Small pieces in green or air-dried condition seem to give Southern pine a slight preference, but tests of stringers of structural sizes indicate that Douglas fir is the stronger and stiffer wood when used in these sizes. Douglas fir can be put to the same uses as yellow pine. It makes excellent bridge and trestle timbers. It is largely used in car construction, especially for car sills, for sidings, framing, flooring and roofing, working easier than the Southern pine."



The Douglas Fir in Its Native Habitat, a Characteristic View in the Heart of the Fir Forest

As the writer explained before a meeting of Massachusetts lumbermen recently, the Douglas fir forest region is 100 to 150 miles wide, extending from the shore line of the Pacific Ocean to the crest of the Cascade Mountains, and 500 to 600 miles long from northern California through Oregon and Washington into southern British Columbia. It contains nearly one-third of the standing timber in the United States. That this small area can contain so much timber is due to the density of the timber stand, often as much as 100,000 to 150,000 ft. to the acre being found. The average stand per acre is four times as much as the average for the forests of the country as a whole.

The Douglas fir is the principal species of the region, forming about 70 per cent of the stand, and the Douglas fir alone represents about one-fourth of our remaining standing timber.

The suitability of the wood for various uses is associated largely with its rate of growth. In a large old-growth tree the grain is quite coarse at the center, the rate of growth becoming increasingly slower as the tree becomes older. The fine grainwood of the outer part of the tree is soft, of uniform texture, and it works easily with tools. The wood of medium or normal rate of growth is hard, tough and strong, and is the structural type. The coarse-grained wood of the heart of the tree is suitable for general use for boards, studding, joists and other purposes.

In smaller trees the rate of growth is more uniform, being sometimes of the structural type throughout and sometimes, in fast-growing trees, of the coarser type.

The question is frequently asked as to the difference between red fir and yellow fir. Color seems to be associated mainly with rate of growth. Fast-growing wood is red; slow-growing wood is yellow. Both colors will be found in the big old trees, the coarse-grained wood of the center being red and the color gradually changing to yellow as the grain becomes finer. No difference in strength can be noticed between red fir and yellow fir of otherwise equivalent character.

THE ONLY WOOD AVAILABLE FOR LARGE STRINGERS

Electric railway men are particularly interested in Douglas fir as bridge material and for use in ties. For the former use the large sizes comparatively free from sap in which Douglas fir stringers are obtainable give this species an advantage not enjoyed by any of the competing woods. A recent investigation by a committee of the American Railway Engineering Association showed that over one-third of the timber bridges of the country has stringers of depth greater than 16 in., which means that these stringers were Douglas fir.

The greater demand for stringers of large size and the availability of Douglas fir in all markets have brought it into extensive use for bridge material.

As tie timber, the service records of Douglas fir are based on the experience of Northwestern roads. These roads use a poor grade of fir for ties, both because of the necessity for keeping down the initial cost in their development work and because local ties of low grade can be used economically. Hence the records are not directly comparable with those of long-leaf yellow pine ties used by the railroads of the East, where ties of this latter species were generally of as high grade as the bridge material. It was only during the war that Douglas fir ties of this higher grade material made their appearance and their use is of too recent a date to provide evidence of their worth. The large order of fir ties recently furnished to the Philadelphia Rapid Transit Company consisted of high-grade ties. The results of the use of these ties in Philadelphia will undoubtedly be followed with great interest by electric railway men, particularly those in the East.

In this connection it will be of interest to note that H. S. Betts, of the United States Forest Service, in his book on "Timber; Its Strength, Seasoning and Grading," lists the average life of untreated ties properly tie-plated as follows:

Black locust	20 years or more
Port Orford cedar, Northern white cedar, redwood and cypress	10 to 12 years
Douglas fir, white oak, long-leaf yellow pine and red spruce	6 to 8 years
Hemlock, loblolly pine, birch and maple	3 to 5 years

A recent report by a committee of the American Wood Preservers' Association listed all completed tests, i.e., tests where all ties in the test tracks had been removed, and the results on untreated ties showed an average life of Coast Douglas fir ties varying from 7.3 as a minimum average to 8.4 years as a maximum. Long-leaf yellow pine showed a variation in average life of from 3.5 years to 12.5 years. Of the eleven long-leaf yellow pine tests seven showed an average length of life lower than the Douglas fir average minimum, and this inspite of the fact as noted above, that the Douglas fir was of the low-grade type used until lately by the Western railroads and not of the type directly comparable with long-leaf pine. White oak also showed a variation in averages from 4.5 years to 12.9 years, with two of the six tests showing an average lower than the Douglas fir minimum average.

The United States Forest Service credits treated Douglas fir ties with a life of fifteen years. From the experience of the C. B. & Q. Railroad, with 3,200 Douglas fir ties treated with zinc chloride, of which only 48 per cent have been removed after twenty years, and from the experience of the O. W. R.R. & N. Company with Douglas fir ties treated with creosote oil and laid in a four-mile test track where an average life of sixteen years resulted, it would appear that fifteen years is a conservative estimate. With present track fastenings the mechanical life of the tie is about fifteen years, so that treatment to resist decay for that period is sufficient.

DOUGLAS FIR WILL TAKE PRESERVATIVES

The question is frequently asked as to the extent to which Douglas fir responds to preservative treatment. It must be granted that it is refractive to treatment with creosote and can be injured by too great heat and pressure. Success in treatment results from longer time and lower temperatures and pressures and much use is made of the vacuum in reducing temperatures at which boiling and vaporization takes place.

Western railroads have successfully applied preservative treatment to Douglas fir bridge timbers and piling. In rainy localities creosote has generally been used, while in arid regions both creosote and zinc chloride have been found effective.

In a recent technical note the Forest Products Laboratory of the United States Forest Service stated that there is little difference between the strength of the Southern pines from that of Douglas fir from the Pacific Northwest. True long-leaf pine averages heavier, stronger and tougher than Douglas fir. True short-leaf averages heavier and tougher than the fir, but is about equal to it in the strength as a beam or post. Loblolly pine, although averaging heavier than the fir, is somewhat weaker.

The difference in strength between any of these pines and fir, however, is not so great but that low-density pieces of the one species are weaker than the average of the other species. As far as strength properties are concerned, the choice between any two lots of Southern pine and Douglas fir will depend upon the grade and density of the timber composing each lot. The Rocky Mountain type of Douglas fir averages considerably weaker than the Pacific Coast type.

In a table of working stresses permissible for structural timber, prepared by the Forest Products Laboratory, the following figures are given for three grades of Douglas fir respectively, No. 1 structural, No. 2 structural, and Rocky Mountain region: Allowable bending stress in extreme fiber, for damp locations, 1,100 lb. per sq.in., 900 lb. and 700 lb.; same for use outside not in contact with soil, 1,400, 1,100 and 900; same under shelter in a dry location, 1,600, 1,300 and 1,100; allowable horizontal shear stress in all locations, 100, 90 and 85; allowable compression stress parallel to the grain in short columns, in wet locations, 900, 800 and 700; same in outside location, 1,100, 900 and 800; same in dry location, 1,200, 1,000 and 800; allowable compression stress perpendicular to grain, in wet locations, 225, 200 and 200; same in outside location, 250, 225 and 225; same in inside location, 350, 300 and 275.

The West Coast Lumbermen's Association has issued under date of Jan. 2, 1922, its standard classifications, and grading and dressing rules for Douglas fir and other West Coast timber woods. This gives the characteristics required for all classes of service to which the several woods are applicable. On the subject of Douglas fir ties, the standard classification* says:

Heart ties shall be of sound timber of medium rate of growth to average not less than five annual growth rings per inch; well manufactured. Must be free from decay; wane; heart stain; splits; shake or large knots where the rails lie. Shall not have sap more than 2 in. wide on the top of the tie between 20 in. and 40 in. from the middle.

No. 1 ties shall be sound timber, well manufactured and free from decay; shake; splits; large pitch seams; unsound knots; large knots where the rails lie; wane on corners reducing face width more than 1 in. Very coarse grained pieces to be excluded.

No. 2 ties must be free from rot. Will allow a small amount of fine shake; large knots; sap stain and/or heart stain; pitch pockets; wane on one corner that does not reduce the face width more than 2 in. or the equivalent on two or more corners; variation in sawing ½ in. over or under in thickness, and/or, width or 2 in. over or under in length. Must be suitable for side-track purposes.

Ties for treating purposes shall be of the same quality as foregoing grades except that sap will not be considered a defect.

As was suggested earlier, the West Coast Lumbermen are endeavoring to apply modern methods of grading to their product and it is to be hoped that the three grades in the Forest Products Laboratory table quoted above will soon be generally recognized.

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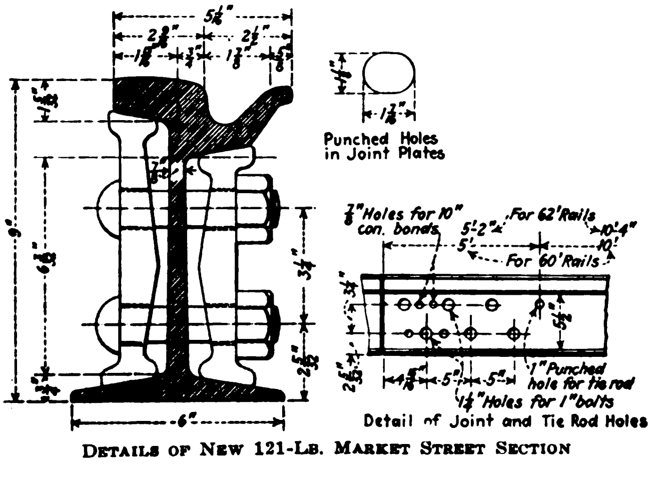
*The conclusion should not be drawn that, by this classification, the West Coast Lumbermen's Association urges its grading rules in place of the A. R. E. A. grade, which contains a density provision, while the W. C. L. A. best grade contains only a rate-of growth provision. The W. C. L. A. members cut many ties of the A. R. E. A. grade and state their belief that ties on a class 1 road should be of this grade. Their purpose, in offering tie grades, is to suggest grades for smaller roads and minor lines not in position, or when they consider it not necessary, to buy the high grade tie of the A. R. E. A. specification.

A New 121-Lb. "Market Street Rail" for San Francisco

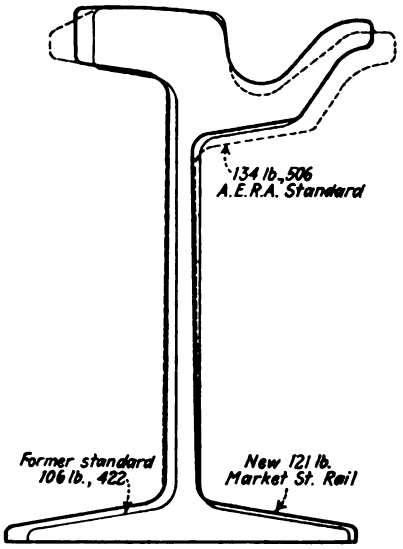
IN PLANNING the renewal of rails on heavily traveled lines of the Market Street Railway, in San Francisco, a modification of the present standard 9-in. girder rail section was found to be economical and an order was placed with the Lorain Steel Company for 1,000 tons of rail rolled to a new section. Delivery in San Francisco is to be made within three months and renewal of rails in Market Street tracks is to be commenced at once beginning at the Ferry terminal.



Detail of Joint and Tie Rod Holes

DETAILS OF NEW 121-LB. MARKET STREET SECTION

The present headway on Market Street is as low as twenty seconds during rush hours; and the cars average 27½ tons weight, empty. The rail which has been standard on this system for several years is the 106-lb. Lorain section. It happens that the rail on Market Street is not this standard, but has a 141-lb. section, and was rolled from low-carbon steel made by the Bessemer process. This rail, which is very soft and has a comparatively short life, now requires to be renewed. To replace it open-hearth steel of higher carbon content is specified. A heavier rail was also thought to be desirable, but the next heavier girder rail, the 134-lb. A. E. R. A. standard, however, was believed to be unnecessarily heavy and involves several features not suited to service on this system. ¶It was therefore decided to design a new section incorporating in it the desirable features of both the 106 and 134-lb. sections. This was done under the direction of B. P. Legare, chief engineer, maintenance of way and structures, Market Street Railway.



COMPARISON OF 106-LB., 121-LB. AND 134-LB. SECTIONS

Chief advantages of the new design are that (1) a rail sufficiently heavier than the 106-lb. section is secured, (2) the same fishplates that were used on the 106-lb. section fit the new rail, (3) the metal in the new rail is enough less than the next heavier standard section (the 134-lb. rail) to effect a saving of about $1,000 per mile of single track.

In the 134-lb. rail the head is wider than required by the wheel tread of the San Francisco equipment, and hence the new head is patterned somewhat after the 106-lb. section but has a slightly wider head and a curved upper surface to conform with the A. E. R. A. section. The taper on the back of the head of the 134-lb. rail is omitted in the new section because the San Francisco practice now is to omit header blocks along the rails and to abut the asphalt surfacing against the rail head itself. This construction makes it preferable to avoid any difference in level between rail head and adjoining pavement that would introduce impact.

The depth of groove and the flange of the new rail are the same as in the 106-lb. section. This was necessary in order that fishplates would be interchangeable between the 106 and the 121-lb. sections, and it is entirely satisfactory because there is no objection to the flange of the 106-lb. section. As an evidence of this it is pointed out that by the time the railhead has worn down to such an extent that the ⅝-in. wheel flange begins to wear the floor of the groove, the rail would require renewal anyway because of wear in the head.

Mr. Twining on Philadelphia Valuation

WILLIAM S. TWINING, director of the Department of City Transit, Philadelphia, has contributed an article to the July issue of the *Manufacturer* on the valuations of the Philadelphia Rapid Transit System as made by the company and the city. He points out that of the ten valuations put on the property, there is a difference between the highest and the lowest of more than $200,000,000. On the basis of the 1921 statistics, with an allowance of 4 per cent on the company's valuation of $290,000,000, the charge per passenger would have to be 6¼ cents, whereas with the lowest figure submitted by the city, i.e., that representing the original cost (new) of the existing property after depreciation had been deducted, a rate of 7 per cent would have been earned with the 5-cent fare. For an 8 per cent return on the company's basis, the payment for the use of the company's property would be equivalent to 3½ cents per revenue passenger, whereas on a 4 per cent basis and the lowest valuation the rate would be only 1 cent per revenue passenger. The actual rental necessary to support the company and its subsidiaries as now existing and financed is approximately 1¾ cents per revenue passenger.

In view of this wide range, Mr. Twining believes that any decision by the commission will be contested by either the company or the city and there is no probability of a final determination in the near future.

B. C. Electric Cautions Automobilists

OWING to the absence of any safety organization of a city-wide nature, most of the safety work in Vancouver, B. C., has had to be done by the British Columbia Electric Railway. While the company has carried this work on for many years, it made a determined effort to eliminate street accidents last December in connection with the change in the rule of the road from left to right. Details of the publicity campaign conducted by the B. C. Electric Railway then were published on page 409 of the *Electric Railway Journal* of March 11.

Briefly, the object of the company then was to awaken the public to a sense of danger when the traffic should change to the opposite direction, to make them visualize crossing the streets, boarding cars, etc., under the changed conditions and generally to make them think. The news interest of the change was sufficient to achieve the first object, and the publicity of the company was then directed to concrete suggestions covering all possible situations.

Thus in one of the numbers of *The Buzzer*, the company's publication in the cars, pictures and diagrams were reproduced showing the new way to do things. In a leaflet sent to all automobile owners in the province, printed by the company and distributed by the government, eight pictures were shown concerning possible accidents. In a booklet issued to 1,600 school teachers, concrete ideas for teaching children the rudiments of safety were set out. Generalities were used only to a minor degree.

That this campaign was successful there is no doubt, for accidents from the usual causes dropped to zero during the first few weeks of the new rule of the road. Had it not been for the fact that cars were without gates for the first few weeks of 1922, thus allowing an increase in step accidents, the record would on the whole have been far below normal.

Since the change, the B. C. Electric has been endeavoring to keep the public up to the same standard of regard for safety. Use has been made of newspapers, car cards and the company's publication in the cars. The local automobile club's safety committee has given recognition to the company's propaganda and is proposing to organize a safety campaign among its members.

The traffic department of the company follows up all publicity with bulletins to the car crews and works in close co-operation in suggesting lines of action. One of these bulletins reads:

> *Safety First*
>
> CURB SIGNALS
>
> May 22, 1922.
>
> Attention is directed to company's advertisements appearing in local newspapers in the interests of Safety First.
>
> Below is an advertisement appearing in this morning's paper, advising people not to leave the curb to board cars earlier than is necessary.
>
> Auto traffic on the streets has taken immense jumps of late, and the danger to pedestrians—unless they exercise extreme caution—has increased accordingly.
>
> The point in connection with this advertisement and advice is that *Motormen must at all times be on the lookout for curb signals from passengers*, as we naturally do not want people to take our advice and then have them passed up.
>
> W. H. DINSMORE,
> Traffic Superintendent.

Automobile Drivers

May we have your co-operation in making Vancouver's streets safe?

In this space for the next few weeks we intend to publish some suggestions whereby accidents may be avoided.

We will be glad to receive suggestions from automobile drivers and pedestrians to further the Safety First Movement in Vancouver.

Let's start today individually to help avoid accidents.

SAFETY FIRST

In the Interests of Safety.
No. 2

Some Safety Suggestions for Automobile Drivers

Please don't pull away from curb in front of street car without a warning.

Please don't try to pass between a moving street car and a standing vehicle or the truss of a bridge.

Please don't cut in sharply in front of a moving street car, such as at intersections.

Please don't follow a street car too closely, as the motorman may have to stop suddenly.

Remember a street car can't dodge.

SAFETY FIRST

In the Interests of Safety.
No. 3

How the Pedestrian May Help

Last week we pointed out the danger of automobiles passing standing street cars.

To the pedestrian we suggest that he do not leave the curb to board the approaching street car earlier than necessary.

In most cases if he signals the street car in plenty of time a second will suffice for him to reach the car gates.

It is not necessary to stand in the middle of the street when the street car is half a block away.

Please be fair with the automobile driver and he will be fair with you.

SAFETY FIRST

In the Interests of Safety.
No. 6

Automobile Drivers, Don't Turn in Front of Street Cars

An automobile and a street car travel alongside of each other. Suddenly the automobile driver puts out his left arm indicating a left turn and shoots across the tracks.

He assumed that the street car was going to stop and thereby risked an accident.

An accident of this kind did occur on Main Street recently; the street car did not stop for the waiting passengers, because it was going to the barns a few blocks away. There was a collision and both car and auto were damaged.

First be sure you're right—then go ahead.

SAFETY FIRST

THE B. C. ELECTRIC COMPANY MADE A DIRECT APPEAL TO THE AUTOMOBILISTS THROUGH NEWSPAPER ADVERTISEMENTS

Electric Railway Publicity

Devoted to How to Tell the Story

Photoplay Projected Publicity Plan of Pacific Electric Railway

AN INNOVATION in projecting its publicity has been undertaken by the Pacific Electric Railway by having Joseph Mattingly, producer, produce and release a two-reel photoplay which exploits the wonders and beauties of Southern California. The story is entitled "The Land of Golden Dreams." Most of the land shown in the picture lies along the Pacific Electric Railway System. In the production of the film the company gave every assistance possible. The film covers all points of interest reached via the Pacific Electric lines from the mountains to the sea. It is produced in natural colors.

The film is 1,961 ft. in length. It is novel and humorous in its projection on the screen. As each scene is projected onto the screen a description of the location is given in the sub-title, then this sub-title is built up with a description of the particular scene or town brought out on the screen. This tends to remove the deadening effect that is apparent in so many scenic publicity films.

The film was released through usual booking exchange on April 24. It has been shown at one of the high-class moving picture theaters in Los Angeles, while thirty prints were immediately released and distributed by one of the largest photoplay distributing corporations in New York for projection on the screen throughout the United States.

Through this most modern of all advertising projects, the medium of the motion picture, the Pacific Electric Lines, in projecting this two-reel comedy-scenic, is heralding to the world the beauties of the picturesque section of Southern California. The picture takes a person back to the year 1780, showing the early days of California's famous old missions. Also, taking one back to those carefree days when kindly California nurtured a romantic race—the old Spanish days of the Dons and their environments. With a short bit of film the camera shows the elapse of time.

Then the story on the film is brought to the year 1922, and scene after scene depicts the principal beach and mountain resorts. Included in the scenes is the trip to Alpine Tavern on Mt. Lowe. All of these places are reached by the company's interurban lines. After the beautiful scenes are shown of the snow-covered Mt. Lowe line of the Pacific Electric to Alpine Tavern, the other extreme is shown in the valleys a mile below where countless orange groves and semi-tropic gardens abound.

The film further carries one among the oil fields, to the country clubs and golf courses, then to the beach resorts, where year-round bathing prevails. In the foot hill and valley towns one is carried through the many beautiful citrus groves, the film closing with a view of a beautiful mountain scene.

The photoplay is in short a message to the world so presented as to entertain, instruct and inspire and likewise to make California better known wherever the film is shown.

"Hello, Jones, C'mon Over Here!"

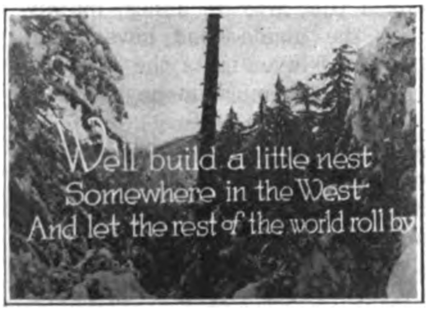
And Jones Is "Coming on Over"—So Are Smith and Brown—So Are the Mesdames Jones, Smith and Brown, Their Close Relations, Friends and Neighbors, Too.

BY W. P. STRANDBORG

Publicity Agent Portland Railway, Light & Power Company,
Portland, Ore.

THERE are many ways of looking at this wonderful, fascinating, inspiring idea of "Customer Ownership" now sweeping the nation fro mborder to border and ocean to ocean. The slants from which you may look at it are as varied and interesting as are the methods used in putting the idea into practical operation. It is, however, not the thought of the writer to engage in a discussion of the general subject, but rather to take a single phase of it, and, now and then, refer to some of the experiences we have had with it within our own company and the numerous communities in which we operate.

Below—The concluding scene or fade-out appearing in the film.
At Right—One of the scenes, photographing the Arroyo and Vista from Mount Rubidoux near the town of Riverside, Cal.


We'll build a little nest
Somewhere in the West
And let the rest of the world roll by

At Left—A view up the Mount Lowe line in winter on the way to Alpine Tavern.
Below—Out where the Heat-Devils play on the desert in Southern California.

SCENES TAKEN FROM THE PHOTOPLAY "THE LAND OF GOLDEN DREAMS"

Of course, the one great, big, dominant proposition involved is that of selling what is, perhaps, the most profoundly important idea the electric railway industry and public utilities as a whole have ever tried or had to offer to the public. Many learned articles have been written about that underlying principle of it all. Much has been written about the subject as a new and wholly practical plan of financing. Others have dwelt on the "Home Industry" phase of it; some have stressed it as a straight out and out and greatly desirable investment proposition; others emphasize the "good will" element, and so on down the line for "Customer Ownership" possesses many sturdy pegs on which you may hang your coat.

The writer likes to think of the whole problem of "Public Relations" as being best visualized in the form of a public street or thoroughfare—the whole urban population for which the utilities provide useful and necessary public service, living on one side of the street, and the electric railways and other utilities living on the other; the main street running from, we shall say, Portland, Ore., to New York, with arterial branches ramifying the entire country and hooking up every community that boasts of public service of any kind.

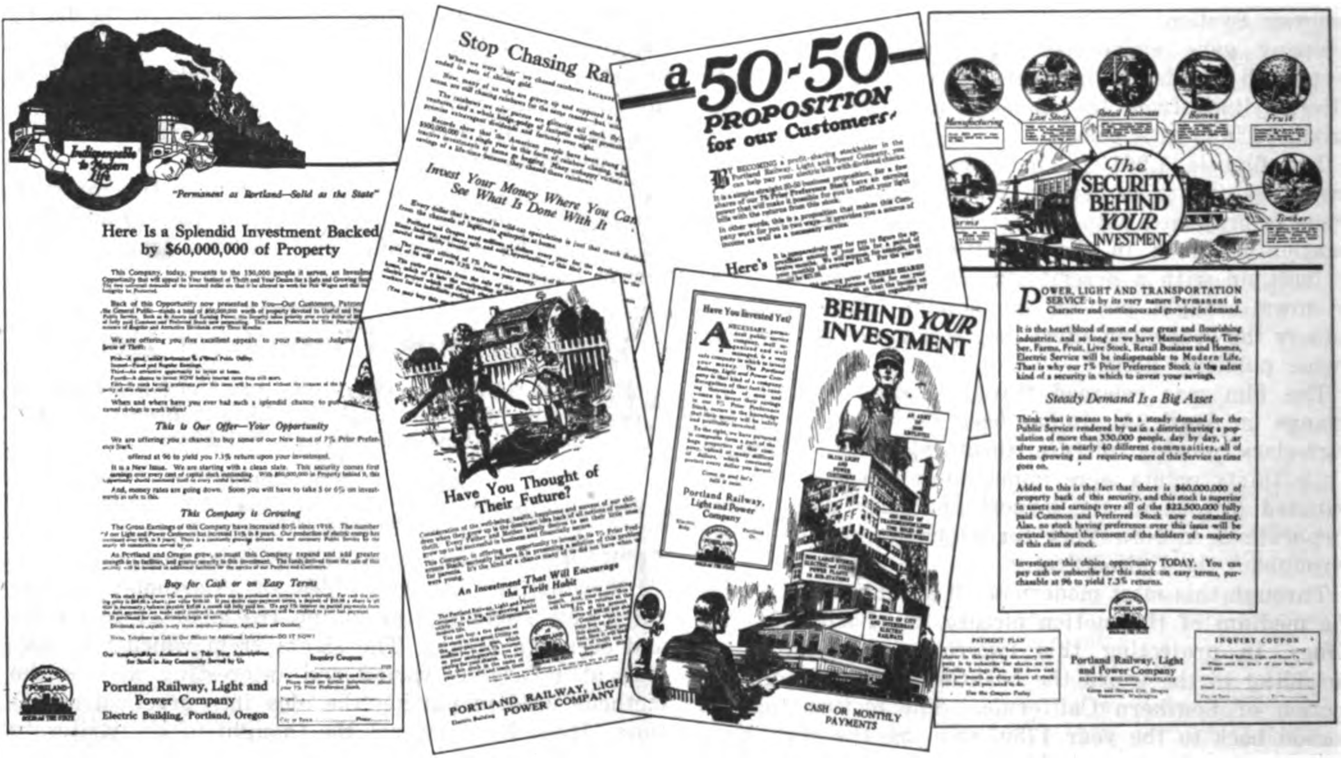
So, here we have the picture. Jones and Smith and Brown, representing the whole public, live and do business on one side of the street. The electric railways and kindred utilities, light and power, gas, telephones, etc., live and do business across the way. Moreover, until "Customer Ownership" really took hold, there had been—and in many places there now is—"a great gulf fixed" between them.

We, the electric railways, never crossed the street except to collect revenues from Jones, or to raise his rates, usually; though, sometimes, we have lowered them, or else, perhaps, to make some changes in his service so that we would be able to derive greater revenue from them. Jones never knew us save as a bill collector, a great impersonal thing grinding and squeezing the daily pence in the form of car fare or the monthly tribute in the form of service bills.

And, as for Jones, he rarely if ever crossed the street except to pay a bill or kick about the service. We never knew each other in the real sense of neighbors living on the same street, and there never seemed to be any proper channel of introduction that would lead to closer friendship and association.

We had our repair shops, our power stations, our carhouses, our substations, our transmission lines, our whole production and distribution systems over here on our side of the street; we strung lines and installed the lights in Jones's home; we erected our arcs along the street for Jones to pay for; we ran our street cars down the middle of the street for Jones to ride on and pay us car fare for the privilege.

That's as close as we ever got to Jones and as close as Jones ever got to us. Jones sometimes grumbled and kicked because he thought we were making too much money and weren't treating him right, and sometimes we had to go to the trouble of telling Jones he was wrong; that we weren't making a mint full of money; that we were treating him right and so it went along.


Indispensable to Modern Life
"Permanent as Portland—Solid as the State"
Here Is a Splendid Investment Backed by $60,000,000 of Property
This Is Our Offer—Your Opportunity
This Company is Growing
Buy for Cash or on Easy Terms
Inquiry Coupon
Portland Railway, Light and Power Company
Electric Building, Portland, Oregon
Stop Chasing Ra
Invest Your Money Where You Can See What Is Done With It
Have You Thought of Their Future?
An Investment That Will Encourage the Thrift Habit
PORTLAND RAILWAY, LIGH POWER COMPANY
a 50-50 PROPOSITION for our Customers
Here's
Have You Invested Yet?
Portland Railway, Light and Power Company
BEHIND YOUR INVESTMENT
CASH OR MONTHLY PAYMENTS
Manufacturing
Live Stock
Retail Business
Homes
Fruit
Farms
Timber
The SECURITY BEHIND YOUR INVESTMENT
PAYMENT PLAN
Portland Railway, Light and Power Company
INQUIRY COUPON

POWER, LIGHT AND TRANSPORTATION SERVICE is by its very nature Permanent in Character and continuous and growing in demand.

It is the heart blood of most of our great and flourishing industries, and so long as we have Manufacturing, Timber, Farms, Fruit, Live Stock, Retail Business and Homes, Electric Service will be indispensable to Modern Life. That is why our 7% Prior Preference Stock is the safest kind of a security in which to invest your savings.

Steady Demand Is a Big Asset

Think what it means to have a steady demand for the Public Service rendered by us in a district having a population of more than 330,000 people, day by day, year after year, in nearly 40 different communities, all of them growing and requiring more of this Service as time goes on.

Added to this is the fact that there is $60,000,000 of property back of this security, and this stock is superior in assets and earnings over all of the $22,500,000 fully paid Common and Preferred Stock now outstanding. Also, no stock having preference over this issue will be created without the consent of the holders of a majority of this class of stock.

Investigate this choice opportunity TODAY. You can pay cash or subscribe for this stock on easy terms, purchasable at 96 to yield 7.3% returns.

A GROUP OF ADS TYPICAL OF THOSE THAT MADE A SUCCESS OF THE PORTLAND CAMPAIGN

Light bills and gas bills every month, and car fare every day. It looked like a frightfully one-sided bargain—that is, it looked that way to Jones, mainly so because he wasn't on the inside—had never been across the street to study and investigate the mysterious giants and ogres that took so much money to feed.

Then enters "Customer Ownership."

Now, it can't be said exactly that we were philanthropists, and that, out of sheer love for Jones, we started a new order of things. Nor can we say either that we figured it would be a splendid thing from the standpoint of gaining greater public "good will" that we adopted this new idea. Those elements obtruded, but they did not dominate.

Our own financial difficulties led and hurried us on. We were stagnating. We couldn't keep stride with the progress of our communities. Our physical properties were deteriorating, and we couldn't make enough out of operating earnings to keep them in shape: we couldn't borrow the money in the open market. Yet, we had to do something, and that something was "customer ownership," conceived and developed originally to solve our financial problems.

The other contingent ideas came later; they lent themselves so easily to the new situation that foresighted public utility men were amazed and astounded that they hadn't thought of them before. The ideas in all their economic complexity developed hand in hand until today it would be quite difficult for any man to say that the mere financing feature, or the good-will feature or the investment feature was of itself, the most important and permanently valuable one for the best interests of the community life involved.

So, we, to express it rather provincially, have come out and stood on our own front doorsteps, with broad inviting smiles on our faces, waved our hands across the way and shouted, like genial hosts:

"Hello, Jones, c'mon over here!"

And, as we said at the beginning, Jones and Smith and Brown are all coming over, bringing their friends and neighbors with them.

7 CAN THE CAN 7

AND PUT YOUR MONEY TO WORK

MONEY in a Tin Can or an Old Sock gets you Nothing.

THE WISE MAN makes *HIS* money work for *HIM*, and the more money he puts into *Good Investments* and the harder he makes it work, the less *HE* will have to worry about *old age* and *disability*.

Ask any of our employes about *Our 7 per cent Prior Preference Stock.* It will give your idle money or your savings a good steady job.

INVESTMENT DEPARTMENT
Portland Railway, Light and Power Co.
ELECTRIC BUILDING

7 INVEST AT HOME 7

WATCH YOUR SAVINGS GROW!

If you can save 34 cents a day you can become a profit sharer in this big and growing Public Utility.

Your money will earn over 7 per cent a year.

This investment is backed by $60,000,000 of property.

Dividends are payable every three months.

This stock has priority over all of the $22,500,000 Common and Preferred Stock now outstanding.

No stock having preference over this issue will be created without the consent of the holders of a majority of this class of stock.

CALL AT ELECTRIC BUILDING FOR FULL INFORMATION

INVESTMENT DEPARTMENT
Portland Railway, Light and Power Co.

7 LOOKS GOOD 7

YOU CAN GET 7.3 PER CENT

Buy a Few Shares of OUR 7 PER CENT PRIOR PREFERENCE STOCK at 96 and Your Money Will Earn You 7.3 per cent.

Dividends Are Payable Every Three Months.

This is a Good, Sound Investment, and our Easy-Payment Plan enables you to get 7 per cent Interest on your Savings while you are paying for your shares.

Investigate this Splendid Opportunity. Do It Now—Today!

Get 7.3 per cent on Your Money While You Can.

INVESTMENT DEPARTMENT
Portland Railway, Light and Power Co.
ELECTRIC BUILDING

ADS THAT EMPHASIZED THE THRIFT APPEAL

Furthermore, Jones, since he has become "one of us," does not stoop down and pick up a brick or rock and shy it at the "damn street car company," when anything goes wrong. No, he tucks his thumbs in the armholes of his vest, swells out his chest and remarks: "That is my company, and if there is anything wrong with it, I guess I'll stroll over across the street and find out what it is."

What a wonderful change in the psychology of the public.

Again, when any outsider starts picking on the company in the hearing of Neighbor Jones, the outsider has got to settle with Jones, the new stockholder in the company, before he has any chance to take his quarrel to the company itself. More psychology.

Now then, the manner in which the different companies have succeeded in bringing Jones across the street and converting him from a rank disbeliever into an inside public utility expert and financier, is another story. It varies greatly with each locality. In the main, the "selling" methods have been strikingly similar.

In a recent able article by E. B. Atchley, of the Northern Ohio Traction & Light Company, in the *Electric Railway Journal*, the general publicity methods employed were graphically and interestingly set forth. Here in Portland, we adopted methods somewhat like those used by the Akron company, but we had different local conditions to meet and we had to meet them in our own way.

Here is one element we had to contend with. We were the third and last local utility to get into the investment field. A competing light and power company had been selling stock ever since July, 1921. The local gas company had been selling quietly for nearly two years, and warmed up into an intensive campaign early in last December. The Portland Railway, Light & Power Company did not start its "customer ownership" campaign till late in January of this year.

It is quite a remarkable coincidence, however, that each of the three local companies has disposed of virtually the same volume of securities. The latest official figures in each case amounting approximately to $600,000.

This is, of course, very gratifying for our company, for we have been in the game only about three months, as this story is being written, and the two other companies had been combing the territory pretty carefully even before we got a good start. We have added a total of 2,500 new shareholders, and have averaged approximately thirty-three sales and eighty shares for each working day of our campaign.

The security which this company is offering is a 7 per cent prior preference stock, per value $100, offered to the public at $96, to yield 7.3 per cent on the investment. It is being sold for cash or on easy payments, $10 a share down and 10 per cent a month, with the partial payments drawing 7 per cent interest till the contract is completed. The dividends are payable quarterly—January, April, July and Oct. 1, each year.

We are the first electric railway in the Far West to attempt the "customer ownership" plan. This is mentioned because it has been somewhat of a handicap in the development of sales arguments in that we have not had an unbroken dividend record like the other utilities have enjoyed, but the sales have gone splendidly in spite of that drawback.

Again, here in Oregon, we have a very rigid "blue sky law," and every scratch of publicity and advertising material produced has had to pass the censorship of the State Corporation Commissioner before it could be used. We have had to be measured by the same unfeeling standard applied to the wildest of wild cat oil or mining stock promotion scheme. But, on the whole, that has been a mighty good thing. It has enabled us to use some powerful selling arguments about "home investment" and "home industry" that we would not have available if the ubiquitous "wild catters" were not eternally scratching at the public door.

There was one factor that contributed considerably to our success. Last year we disposed of $1,000,000 of 8 per cent, five-year gold notes through a sharp, intensive advertising drive, the issue being heavily oversubscribed in twelve working days. We believe this is a record that has not been surpassed by any company in our line of business in the country.

We used employee-salesmen exclusively for the gold notes and we had that organization ready for the campaign when we started selling 7 per cent stock. We had used our best high-power educational and good-will advertising material in last year's campaign, and the influence that is still being felt. We used informative articles in our house organ *Watts Watt* continually for months before we launched our present drive. And, while we started out at a very poor time of the year and when business depression was an element to be considered, we fought all the harder and the results have been eminently satisfactory.

Here are some things the Portland Railway, Light & Power Company capitalized heavily in its advertising.

1. The payment of interest on our 8 per cent gold notes on March 1.

2. The publication of our company's annual statement to the stockholders on March 15. This report showed our company to be in the best physical and financial condition it had been in for years.

3. The payment of our first quarterly dividend on these 7 per cent prior preference shares on April 1.

4. The plans of our company to spend approximately $500,000 this year on betterments, renewals, etc., on our city car lines.

5. The plan to spend a total of close to $2,000,000 on our entire property.

6. The plans for constructing the huge $10,000,000 hydro-electric development on the Upper Clackamas River, which will eventually give us an additional 100,000 hp.

7. The fact that the number of light and power customers of the company is increasing at the rate of about 5,000 a year. The increase in the last year has been more than 5,000.

Special inducements were made to our employees. They were allowed to purchase the stock at 93 for cash and 94 on time. They participate in a series of cash prizes and bonuses distributed each month, and they are allowed to "split" commissions with the high-speed salesmen who close the deal on prospects which the other employees have turned in.

Our selling staff and investment department were organized and developed almost along the same lines as outlined by Mr. Atchley in his article of a few weeks ago. We laid great stress on having our president make frequent addresses to our employees, and on the elaborate and frequent series of "pep" letters issued by the investment department. We issued a series of five little pamphlets containing human-interest "sales helps" and we issued an "Employees' Handbook" that answered every conceivable question that a prospect might ask about the securities or the company.

The whole educational work among the employees in this campaign is, I think, one of the most valuable things we have ever done. Our employees now know more about the ins and outs of our company than they ever did before, and the effect of this is reacting beneficially every day on the public.

In our advertising, we "broadcasted" like a radio station. We overlooked no medium that we felt had any value toward getting our company story over.

We used, so far, a total of sixteen large display newspaper advertisements, starting with a 5 in. x 19 in., then a 5 in. x 18 in., and the other fourteen were all uniform at 4 in. x 12 in. We used our district and suburban newspapers generously. Every issue of our house organ contained something. We covered every car in regular service with dash signs, changing them about every ten days. We used inside "window newspapers." We used attractive posters or cards in our elevators; we used counter and window posters and signs in our general offices, around all of our buildings, changing them frequently.

One very effective piece of publicity was an "industrial educational" film of 2,000 ft., entitled "The Romance of the Raindrop." We filmed everything from the cloud in the sky, the glaciers on the snow-capped peaks, the mountain torrents and so on down, right through the various stages of energy production, transmission, distribution and utilization, with many interesting pictures covering every activity, department, plant feature and equipment of our system.

In this film, we used no advertising material whatever, either in pictorial form or in the titles, and in no place did our company name appear save perhaps on some building or on a street car, but it was easily identified as the pictorial story of our company.

We had no difficulty getting it booked at the leading movie houses in the downtown district, and from there it went to scores of the neighborhood and suburban houses; later we used it in special district campaigns.

We used a great volume of direct mail advertising, for we had available a splendid mailing list of more than 58,000 of our own light and power customers.

It would take too much space to comment on the character of all of the various media and pieces of advertising literature used, but we have given the public, including our own 3,000 employees, our 58,000 light and power customers, our 250,000 daily street car patrons, the most comprehensive, complete, carefully prepared educational campaign conducted in Portland.

Was it worth while? It was. We have discontinued our advertising efforts almost entirely, yet the sale of stock is progressing nicely and the writer is confident that the securities will continue to sell in a satisfactory manner for months to come. If sales do begin to lag, we will "warm it up" again. Our employees are doing splendid teamwork. They have been brought closer together and closer to our company management through this campaign than through anything else we have ever done, and the writer has frequently said that even if the advertising and the educational work which has been conducted in this "customer ownership" campaign had not resulted in sale of a single share of stock, the $15,000 it cost would have been well expended.

Just one or two more little side-lights.

This stock selling campaign has served to stabilize the market of our 8 per cent gold notes sold last year. Before we started selling the stock, some of the gold notes were being "hawked" around at from 80 to 95, but since this new security campaign has been under way, the market has advanced till you can't buy a gold note under par, and I have heard of cases where a premium has been offered.

Essentials of Urban Electric Railway Tracks*

With General as Well as Local Conditions in Mind, the Author Explains Why "Good Enough Is Best" in Track Construction.

By E. J. McIlraith
Formerly Superintendent of Way,
Now Superintendent of Rolling-Stock and Buildings,
Philadelphia Rapid Transit Company.

THE principal purpose of street railway track structure is to transmit the loads due to the passage of cars or vehicles through the rails and ties to the soil in such a way that the unit load on the soil is well within its bearing power, even if the soil is moist.

In steam-railroad practice, rail is chosen of such stiffness that with the usual depth of ballast the load is transmitted to the sub-grade in such distribution that the latter is able to carry it without yielding. The sub-grade is built so as to shed the water that comes through the ballast. As the wheel loads are intense, some flexibility is desirable in the track structure. In street railway practice, however, the same intensity of load is not found. A much stiffer rail is usually used and a monolithic paving must be maintained. The sub-grade conditions are not so nearly perfect because public utilities other than the railways run ditches under the track; broken water mains are apt to develop, and breaks in the paving permit water to run into the sub-grade, where it is confined.

Vertical movement of street-railway rail cannot be permitted, but so long as the structure is able to distribute the load to give a sufficiently low intensity per square foot of area of sub-soil, the simplest and cheapest type of structure should be sufficient. Excessive stiffness or rigidity of structure, that causes the track to act as an anvil to the hammer blows coming from cars and vehicles, is likely to produce a shorter life than would be obtained with less rigid, cheaper construction. It develops a vibration in the rail like that of a piano string. The rigid track is also more expensive to remove when rebuilding becomes necessary.

In street paving of the modern type a concrete slab of sufficient thickness is placed over the soil so as to distribute wheels loads over an area sufficiently wide to reduce the intensity of loading to within the safe carrying power of the soil.

As long as this condition prevails, even when a reasonable amount of moisture is present, street or track paving can be easily maintained and the track will give good service.

BALLASTED TRACK IS USUAL IN PHILADELPHIA

The two general classes into which street railway track structures may be divided are: (1) Track supported on ballast or natural soil; (2) track supported on a solid concrete slab. In Philadelphia and in several other eastern cities the first type prevails.

In Philadelphia, 9-in. 141-lb. girder rail laid on 5-in x 9-in. x 8-ft. ties, spaced 22 in. on centers, is usual. The rail has more than twice the stiffness of the 7-in. 122-lb. American Association section, and therefore spreads the load over a correspondingly greater number of ties. The rail, in fact, is so stiff a girder that with a load of 30,000 lb. placed in the middle of a 72-in. span the deflection will be less than 0.05 in. Each tie has a bearing area on the soil of 6 sq.ft.

We may assume that the cars in Philadelphia weigh loaded approximately 26 tons, each truck carrying 13 tons and having a wheelbase of about 5 ft. Assume that five ties of 22-in. spacing are carrying a load of one truck, there would then be 30 sq.ft. supporting 13 tons. A fairly sandy soil, such as exists in Philadelphia, should carry from four to six tons per square foot. In other words, the safe load for a structure here carrying 13 tons would be approximately 150 tons. It is obvious, therefore, that a safe margin of loading exists and that the installation of a structure more expensive to install, maintain or remove, for the purpose of still further spreading the load would not be economical.

There are soils, however, some of them being found in Philadelphia, where the moisture content is high and where the bearing power at certain seasons of the year may be as low as one ton per square foot. The drainage of this sub-soil is usually cared for as well by the city sewers as if additional drainage was supplied by the railway. The sewer keeps the water level in the soil at a level at least as low as itself, and the water coming in through the paving to the sub-soil is not easily collected in a drain when the soil is of a soft clay type.

A better method of preventing trouble is to provide a layer of porous material between the track structure and the soil. Then the water will not localize, nor will the track structure have the opportunity to puddle the soft soil by vertical movement at points where slight settlement or springiness has developed. The water is contained in a non-puddling material and will spread until absorbed. When a concrete slab under the track is directly in contact with such a soft soil, the hydraulic pressure developed at points where slight settlement of a ditch has occurred carries some of the soft soil from under the slab to the surface of the street. This produces a greater void, causing greater settlement and sluicing action. In fact, considerable difficulty has been found in maintaining concrete-supported track over soft clay soil without a layer of porous material between the slab and the clay. This material may be hard fine cinders, fine gravel, coarse sand or some other material which thoroughly blankets the soil. Coarse crushed rock or its equivalent should not be used.

The same result is obtained if a sufficiently deep layer of porous, but not open, ballast is placed between the bottom of the ties and the top of the clay.

When a crushed rock ballast of say 1-in. or 1½-in. size is used in track construction, it does not serve as well as a much finer ballast would. There is a tendency for soft soil to squeeze up into the voids of the rock, permitting settlement of the track. If, however, a porous material is used, which blankets the soil and gives full surface bearing to the tie, the squeezing of the soil and the accompanying cutting of the tie do not exist. If there is no squeezing up of the soil, then the soil in itself has such bearing power as to support the tie without crushed-rock ballast; the addition of this is a waste of money. Further, if the ties are not being cut by coarse ballast, they are either of expensive hard wood or the loads are light for the size of tie used. Hence economy would result from the use of a softer wood.

In constructing new paving on a street it is important that the track be uniformly supported by uniform tamping or packing of the sub-grade, and also that the soil under the track and the balance of the street be uniformly damp at the time the concrete slab is poured.

It frequently happens, however, that the track strip is concreted before the section between the track and the curb, and after a soaking rain when the top 8 or 10 in. of the soil is thoroughly wet the contractor places the slab between the track and the curb. The result is that the sub-soil under the track has no tendency to shrink, while that under the balance of the street may shrink a half inch or more in depth. This will create a break along the joint next to the track strip.

THERE IS NO ONE BEST TYPE OF PAVING

There is little choice in type of paving for track in busy streets. Granite block is preferable under heavy service. For use under iron-tired vehicle wheels, cement-grout filler is preferable. Brick may be successful in districts where good repressed vitrified brick is available, or where the iron-tired travel is a minimum. Monolithic concrete will have a long life with a stiff track structure under light travel. Sheet asphalt or bitulithic paving, with granite running courses on each side of the rail, has its place also.

With a light rail or light structure, where some vertical movement is likely to develop or where the side stiffness of the rail is not adequate, cement-grout filler or granite block is highly desirable. Where the rail is heavy,

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*Abstract of paper read at meeting of Engineers Club of Philadelphia. Full text of the paper will appear in the issue of *Engineers and Engineering*, published by the club, for July, 1922.

stiff and well supported, asphalt filler, or better a mixture of good bitumen filler and sand, will serve well, as it is easier to repair or to remove for track repairs. It does not, however, provide a better watershed than the cement-grout filler.

The cushion under block paving should be laid damp, of a cement-sand mixture that will set up hard, to give monolithic support to the monolithic top paving. The use of sand alone is not desirable. Wood block is not a good paving material around street railway tracks.

Paving breaks down more rapidly around special trackwork and at street intersections than along straight track. This is in many cases due to the fact that the hammer blow from cars passing over flangeway intersections is received by a structure rigidly supported on solid concrete. The resultant vibrations produce seams into which the water penetrates, but the most serious cause of breakdown is the contour of the streets. Municipal authorities prefer to have street intersections as flat as possible, resulting in the lodging of water around the tracks. If streets were so graded that water running along straight track would be carried off before it reached street intersections, the paving would have a longer life.

Further, frequently manholes for sewers or water valves, etc., are placed in special trackwork layout. The resultant track construction must be a makeshift. It is highly desirable that municipal authorities co-operate with the railways to remove the present handicap to good construction at intersections.

In Philadelphia, a new type of special trackwork is being introduced, consisting of cast, weldable nickel-chrome steel with flange bearing throughout. This should be more readily maintained than construction in which full flange bearing is not given and where the material is not weldable so that it can be maintained in nearly its original condition. This construction, together with the use of a foundation which deadens vibration yet distributes without puddling the moisture which penetrates to it, should result in longer life. It is important, however, that better drainage conditions should be provided by the municipality here as elsewhere, and that manholes should be located away from track crossings.

Finally, complete sympathy and co-operation must exist between a railway and the municipal authority, if a type of construction is to be used in which the cost is minimum, the conditions satisfactory during the life of the structure and the design suited to the particular conditions to be met. Details in a specification should not be insisted upon merely because a large number of prominent companies or municipalities are using that specification. Standard specifications can be utilized as standards in various localities, but it is important that the right standards for a given set of conditions be chosen.

Benefits of Safety Campaigns*

How the Safety Movement, Originating in 1912, Has Grown to Great Proportions —Results Being Obtained by National Safety Council

BY H. G. WINSOR
Superintendent of Investigation and Adjustments
Tacoma Railway & Power Company, Tacoma, Wash.

THE impelling reason for safety campaigns is the saving of human life, so we may consider that any real effort for saving the lives of our fellow men is worth every ounce of energy, every sacrifice which individually or collectively we can offer as our contribution in such a service.

The best definition which I know of the word "campaign" is this: "A connected series of operations to bring about a desired result." Remember that an intermittent interest, without a definite goal, cannot in any way be interpreted as worthy of the name campaign.

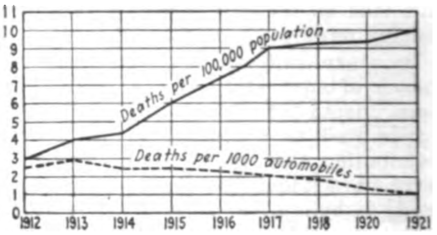
In the industrial field we have a concrete example of a nation wide campaign for safety as planned and carried on year after year by the National Safety Council, and before we consider the much more complex problem of public safety let us review the rapid progress, results obtained and benefits derived from this organized effort in the industrial life of our nation.

While the law of self-preservation had influenced a desultory effort for many years to safeguard the lives of individuals, organized work was initiated by the passage of industrial insurance laws in several states, and the consequent realization by every employer that the double duty of protecting his enterprise in an economic way and his employees from the humanitarian standpoint called for careful consideration, efficient organization and persistent effort.

The first movement for industrial safety, which claimed and received national consideration was launched in September, 1912, by Lew R. Palmer, at that time chairman of the accident prevention committee of the Association of Iron and Steel Electrical Engineers, convened at Milwaukee. A resolution was passed at that meeting which in my judgment should be classed with the most important documents of our time. The resolution was as follows:

> *Resolved*, That the president of the association of Iron and Steel Electrical Engineers be requested to take the first steps toward the formation of a national organization for the promotion of safety to human life in the industries of the United States; this committee to have authority to call future congresses of safety, increase its membership, if it so desires, and to do such other acts as will promote the object for which it is established.

As a result of this action the National Council for Industrial Safety (now called the National Safety Council) was organized and the greatest campaign for accident prevention the world has ever known was formally inaugurated. The movement has grown marvelously during the less than ten years of its existence, having at the present time a membership of nearly 4,000 industrial concerns, including many of the largest in the world.



DEATHS FROM AUTOMOBILE ACCIDENTS IN THE REGISTRATION AREA, 1912-1920

The results obtained by persistent work on the part of the first and succeeding officers of the National Council are well known, and today this organization is regarded as one of the most successful and beneficial which deals with industrial and civic betterment.

With the record of success which has attended the safety campaign in industry, it certainly cannot be unreasonable to assume that while the problem of public safety work is much more difficult on account of the many phases involved, satisfactory progress and results can or should be secured through organization and co-ordination of effort.

If time and space permitted I would like very much to record in detail the published accomplishments of a number of safety campaigns which have been followed with interest, each having much merit both as to mission and result. For the sake of brevity however I can only point out the general scope of each and a few of the excellent results. In doing this permit me to first call your attention to the greatest of all hazards in public safety, the motor vehicle, and to express the belief that regardless of the fact that such vehicles cause a very large percentage of public accidents reliable statistics show a remarkable progress in accident reduction per 1,000 vehicles used as is evidenced by the accompanying chart. We know that most of our serious accidents are due to traffic congestion, that regulation of traffic has and will control this to a great extent and education will also help materially to solve the problem.

The public safety section of the National Safety Council has made rapid progress during the past year in an attempt to promote safety throughout the country. Its campaign is of vast importance. Many other organizations and hundreds of communities are becoming interested in this work which appeals to the heart of everyone. Our one great need is to know just what is the best way to proceed. This is a question which must be answered by experience, with education as the guiding influence.

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*Abstract of paper presented at the annual meeting of the Pacific Claim Agents' Association, Los Angeles, Cal., June 7-9, 1922.

Program to Be Followed

The promotion of safety through the medium of our schools is generally conceded to be of universal importance. The school boys of today will be the drivers of many motor vehicles within a very few years, and the impressions made upon their minds during their school period is sure to influence their future actions. After the experience of a ten year safety campaign in the public schools of our city I can testify that no more effective work in the interests of accident prevention can be undertaken.

Finally, one of the most beneficial safety campaigns which I know of is the persistent effort followed by this association. Since safety organization was first thought of there has never been a time when interest or effort has waned. Many have said that the problem of accident prevention was almost too great to contemplate and the working out of safety standards and universal safe practices impossible of accomplishment. But while it may take a long time and there may be many disappointments and some failures, the saving of human life is of sufficient importance to assure ultimate success.

Medical Testimony in Litigated Cases*

Where Liability Is Admitted, Medica Testimony Is Often Imperative, but Where Liability Is Denied, Extended Medical Testimony by the Defense Often Confuses the Jury as to the Issues Which Are Involved

By Thomas G. Aston
Claim Agent Washington Water Power Company, Spokane, Wash.

PROBABLY there are as many views on this subject as there are claim agents or as there are cases where this kind of testimony may be used. Nearly every case presents new problems. There are cases where liability is admitted and where the only question involved would be the extent of the injuries of the plaintiff. In this kind of case it is almost imperative that the defendant should use medical testimony.

But this does not always follow, as has been proved by our own experience. We have had cases where we admitted liability, where we have had the privilege of making a physical examination of the plaintiff, and where the physicians and surgeons appearing as witnesses for the plaintiff have been so fair in their testimony that we decided it was best not to use any medical testimony in the defendant's behalf. On the other hand, we have had cases where we have had the privilege of making a physical examination of the plaintiff by physicians and surgeons, where there has been so great a divergence of opinion between those called by the plaintiff and those called by the defendant, that it seemed improbable that two people belonging to the medical fraternity and coming from the same school of surgery and medicine could differ so widely in the opinions as to the actual physical condition of the plaintiff.

Sometimes we question the integrity of the witnesses called by the plaintiff, and sometimes, we regret to say, we question the integrity of the physicians called by ourselves. Of course, we make due allowance for the fact that these witnesses become advocates, more or less, for the side which calls them, but this is an unfortunate circumstance, for physicians and surgeons can do much harm to the side which calls them by too great zeal to make out a strong case for their client.

In cases where liability is denied by the defendant, a different problem presents itself. We have found in this case it is better for the defendant to devote almost all his time and attention to the question of liability and laying as little stress on the injuries as possible.

There was a time when attorneys and litigants in our vicinity thought it of great importance to have an array of prominent physicians and surgeons on the side of the defendant in this class of cases, and this resolved itself into a struggle between the attorneys for the plaintiff and the attorneys for the defendant to enlist the services of prominent and well-known physicians and surgeons on the respective sides. There have been cases where as many as five and six physicians and surgeons were on each side, where the question of liability was very doubtful. The result of this was that it became a contest between the physicians and surgeons, and the court and jury and apparently everybody else lost sight of the question of whether or not there was any liability on the part of the defendant. After listening to days and days of medical testimony the jury have gone to the jury room with nothing in their minds but the question of how badly the plaintiff was injured, and upon arriving in the jury room have immediately begun to figure on how much they should allow the plaintiff, and it does not seem to occur to them that there may be no liability on the part of the defendant. Attorneys for the plaintiff undoubtedly welcomed this situation, and undoubtedly it has often happened that they have created or tried to create just such a situation. It was to their advantage to do so because it carried them over the only real question in the case and assured them of a favorable verdict of some kind.

Until about 1915 this condition existed, and it was a most unusual thing up to that time in the vicinity of Spokane for a jury to return a verdict for the defendant, but the attorneys with whom I have worked and myself conceived the notion that too much attention was given to the medical testimony in this class of cases, to the detriment of the other features of the trial. So we started to experiment, and one of the first cases we had was that of a woman plaintiff who was about seventy-two or seventy-three years of age. She was a genteel, kindly looking old lady, and claimed that she had been thrown from the steps of a street car when she was alighting therefrom. According to our investigation, she was not thrown from the car but had alighted therefrom and had gone almost to the curb of the sidewalk when she fell, and even then the street car had not started. We had about three fair-looking, honest-appearing witnesses who would testify to those facts, but the plaintiff claimed she was injured, claimed a nervous shock and injury to her back and spine and sued for $15,000. We had an examination by one physician and we were fortunate in picking out as this physician a kindly, serious-minded old family physician, who under our instructions treated the plaintiff with the greatest possible dignity and consideration in the examination of her and also in giving testimony about her, with the result that the jury paid little or no attention to the injuries which plaintiff claimed, but devoted their time to the question of whether or not there was any liability, and found for the defendant.

Urge Physicians Not to Become Biased

From then on it has been our policy in respect to medical testimony first to study the plaintiff, considering the character of injuries claimed, age, sex and station in life, and if we are so fortunate as to be able to select our own physician to make the physical examination, we try to pick out a physician or perhaps two for the purpose of giving us the facts of the situation, and also to state them on the witness stand. We try to impress on these physicians and surgeons the importance of not becoming too biased in our behalf, nor too vigorous in their manner of testifying, the whole idea being that we want to show dignified consideration of the claims and physical condition of the plaintiff. For instance, if we have as plaintiff a woman, whether old or young, we try to get a reputable woman physician to make the examination and give testimony, or if a woman physician is not available, to get some well-established family physician. If the plaintiff is an elderly man, we try to get an elderly physician to make the examination. With a younger man we do not pay so much attention to that feature.

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*Abstract of paper read at the annual meeting of the Pacific Claim Agents' Association, Los Angeles, Cal., June 7, 1922.

Since we began this policy in 1915, the amount of verdicts, where there have been any against us, has been low, and the number of verdicts for the defendant has been exceedingly gratifying. We are led to believe from this experience, that a defendant can have a physician and surgeon as a witness with too big a reputation. Prior to 1915, it was the policy of most defendants in this class of cases to enlist the services of physicians and surgeons who had wide reputations in this community in their particular line of business and were clever in handling themselves upon the witness stand. But this method worked against the defendant many times. The jury would apparently think that these physicians were smarter than those on the other side and resolve all doubts in favor of the plaintiff. In the same way it frequently happens that a lawyer with a big reputation stands little show before a jury when representing a defendant in this class of cases.

I would not have you conclude from the foregoing that the defendant must steer clear of capable, high-class physicians and surgeons in selecting them as witnesses in this class of cases, but the idea I wish to impress upon you is that if you do have one who is high-class he must give his testimony so that it will not go over the heads of the jury; in other words, so that he will not appear to be too smart.

I have said that we sometimes use two physicians, but we do not do that unless there is occasion to use specialists as witnesses. For instance, if a person claims an injury say to the spine, nervous shock and things of that character, and also claims an ear injury or an eye injury, we would try to have an examination by a physician who has some knowledge of nervous disorders and also by another who specialized on the eye or ear, as the case may be. In bone injuries we try to get a physician who specializes in orthopedic surgery. At this point I might state that Spokane and vicinity is extremely fortunate in having a very high-class orthopedic surgeon whose demeanor on the witness stand is unsurpassed by any physician we have ever had the opportunity to observe. His fairness is apparent from the beginning, and it frequently happens that when he is under the employ of the plaintiff in a personal injury case, the defendant is willing to take his testimony as gospel.

SIMULATION MAY DECEIVE

Of course, we all know that even the best physicians will honestly err in making a diagnosis or in forming an opinion as to the extent of injuries a person may sustain. The subject of the examination by the physician or surgeon may simulate the extent of his injuries, and when this is done the physicians of both plaintiff and defendant may be deceived. It is only by some unusual circumstance that this simulation can be discovered. I recall a case where some of the best physicians and surgeons in our community testified on behalf of the plaintiff that he had a complete ankylosis of the shoulder and could not raise his arm from his side. Physicians and surgeons of equal standing testified on behalf of the defendant that the man had a partial ankylosis of the shoulder and that he could raise the arm half way if he tried. During the trial of the case when the plaintiff had been cornered by the attorney for the defendant on cross-examination about some matter relative to the facts surrounding the accident, the plaintiff became quite excited and arose from the witness chair and while in a standing position moved his hand high in the air, trying to explain himself out of the difficulty in which he had gotten himself. The hand which the plaintiff moved was attached to this arm which was supposed to have complete ankylosis of the shoulder. This happened to be a case where the liability was admitted and we were only trying the question of the plaintiff's injury. After this demonstration in court the jury evidently was of the opinion that none of the doctors knew what they were talking about and rendered a verdict for the defendant.

Of course, we realize the difficulty that physicians and surgeons have when handling a case where simulation and malingering enter into it, but it so often happens that there is no apparent evidence of the injury which the plaintiff claims. The physicians and surgeons for the plaintiff can only take the plaintiff's word for the pain and suffering he may be undergoing, and it is only fair to them to rely upon the history of the case as the subject will give it to them. This gives them occasion for testifying that the plaintiff is suffering from these alleged injuries although there are no objective symptoms of these ailments. Of course there is just as much ground for the physicians and surgeons for the defendants in such cases to be of the opinion that the plaintiff is not suffering as he says he is.

Medical testimony may be of benefit in litigated cases where it is purely a question of injury, but in cases where the facts are disputed, medical testimony cannot, from my viewpoint, be of any benefit other than to discredit the testimony of the plaintiff, in other words, for the purpose of getting the thought of the jury that if plaintiff will perjure himself relative to the injury, he cannot be relied upon to tell the truth relative to the facts surrounding the accident. The attorneys can say in their argument to the jury under the court's instruction that if the jury finds that the witness has been untruthful as to any material fact, they have the right to disregard all testimony unless supported by other creditable witnesses. Other than for this reason I cannot see wherein medical testimony can be of assistance in a case where the company relies upon the facts for a verdict. If the doctors get to debating as to the extent of the injury, the jury is apt to find there is some injury even if they do not feel the company is at fault for the injury. If a salesman gets a customer to debating as to which one of two kinds of an article is better, he is almost sure to make a sale, where, if he is endeavoring to sell one article there is a good chance that the customer will decide not to buy. If the same principles are applied to damage suits, success will more often come. In either case "psychology" reigns.

This was brought to my attention most forcibly in a case wherein a man claimed he was thrown off of a street car and suffered an injury. Our doctors diagnosed the case as locomotor ataxia. All medical text books agree that the primary cause of this disease is syphilis. We had four witnesses other than the conductor and motorman, who testified that the man ran after the car after it was in motion and the door was closed and was thrown, so the company was not responsible for the accident. Four doctors were called for the defendant, including a pathologist who testified that the blood test showed syphilis. Five doctors for the plaintiff testified that he did not have locomotor ataxia, that he did not have syphilis, but that it was a paralysis.

In discussing this case with some members of the jury afterwards, I learned that some of them were incensed by our efforts to prove the cause of his injury and that the only question considered in the jury room was whether or not the man had syphilis and the facts about the accident were not touched upon. This case is only one of many where the facts connected with the accident have been clouded and overshadowed by medical testimony.

COURT IN WASHINGTON HAS POWER TO APPOINT A PHYSICIAN

In the courts of the State of Washington the defendant may make application to the court for an order appointing a physician or physicians and surgeons to make a physical examination and to testify as to the physical condition of the plaintiff. This rule does not obtain in the Federal Court, and it is my understanding that it does not obtain in some state courts.

One difficulty about this system is that while it is most desirable to have a physical examination by presumably disinterested physicians and surgeons, it is liable to happen that when you make a motion for an order of court appointing a physician, the court will not take the situation very seriously and will appoint physicians and surgeons the names of whom first come to his mind, and the result of this is that we have foisted upon us some very undesirable witnesses. We find, however, that the attorneys for the plaintiff object to the court making an order appointing a physician because it gives such physicians the character of being officially appointed by the court. The practical result is that in most cases the attorneys for the plaintiff will say to our attorneys that our attorneys may select such physicians as they want. The idea the attorneys for the plaintiff have in this offer is that they can talk to the jury about the physicians and surgeons of the defendant. We have frequently gotten around that in this way. We make the motion for the court to make an order appointing and when the attorney for the plaintiff suggests that we may select our own physician, we suggest that our motion be denied by the court on condition that we may select such physicians and surgeons as we may choose. Then, if there is any comment about these physicians being those of the defendant, objection is made on the grounds that the consent was given by the attorneys for the plaintiff to such selection, and frequently we call attention to the order of the court, denying our motion for the appointment on conditions above stated.

It frequently happens that we will have an examination made of the plaintiff by physicians either appointed by the court or selected by us in the manner described above. We have them all ready to testify but do not call them unless the plaintiff attempts to magnify his injuries. If the plaintiff's doctors make a fair statement of the injury, we feel there is nothing to be gained by presenting additional testimony. It only is liable to give the jury the impression that the injury is the sole question in the case. Further, we run the risk of having our own witness make a statement on cross-examination which will be quite harmful to the defendant's part of the case.

Another question which arises in this class of cases is whether the defendant should use the physicians and surgeons employed regularly by the company. We are inclined to think that it is bad business to call these people, although there are exceptional instances where we feel that it will not injure our case. There is always the danger, under these conditions, of the jury getting the idea that the physician or surgeon is earning his meal ticket and would not dare to give testimony contrary to the notions of the defendant company. In my opinion the testimony of a company physician or surgeon regarding the injury to a plaintiff, unsupported by other medical testimony, is of no more benefit to the defendant than would be the testimony of the motorman about the facts of the case if it be given unsupported by other testimony. The most beneficial use of company physicians and surgeons is to render first aid in case of accident and make examinations at the earliest possible time and keep us advised as to the progress of the injured party. But we have not found them useful as witnesses.

The argument has been advanced that the ideal way of handling the medical end of this class of cases is to have the court appoint a physician or surgeon and fix the fee, giving said person at least a quasi-official character in the case. In many instances this probably would be true, but there is always the chance of some political doctor getting these appointments. Such a doctor might be a very undesirable witness or take insufficient interest in the case to ascertain the true physical condition of the plaintiff. Like many other persons holding an official job, which depends upon politics, the person holding it will not give it the time and attention it really deserves. For that reason I am not in favor of this method of appointing physicians and surgeons in this class of cases.

Summer Meeting of Wisconsin Railway Men

THE railway division of the Wisconsin Utilities Association will hold a two-day meeting at Green Bay on Aug. 17 and 18. Subjects which are to be included in the program are: Maintenance and lubrication of railway bearings; maintenance of brakes and brake rigging; regulation of service and schedules; safety first practices, etc. There will be an inspection trip over the properties of the Wisconsin Public Service Company and a demonstration of tie work and of welding. A banquet and entertainment is being planned for the evening of Aug. 17. Open discussion will be conducted on methods of developing traffic, collection of fares on one-man cars, both city and suburban, and steel ties versus wood ties.

Benefit Association Finances Many Homes

REPORTS showing substantial growth of the organization since its founding two years ago were features of a recent dinner given by the Utilities Mutual Benefit Association, composed of officers and employees of the West Virginia Utilities Company of Morgantown, W. Va. The association was organized two years ago by the company for the purpose of creating a special fund from which employees could finance the building of homes. Enjoyment of the benefits of the association is entirely mutual but is also based to a limited extent upon the term of service of the employees with the company. Employees of the company deposit a certain per cent of their salaries and wages with the association, which sum is duplicated in the form of a bonus from the corporation. From this fund, loans are made for home building to the employees and the earnings from such money are shared mutually by all the stockholders of the association, limited to company employees. The company has no control or authority whatever over the association or any of its resources.

The report made showed the association now had resources of over $5,000, with earnings of approximately 10 per cent since the organization was established. During this period, several homes have been financed.

General Manager Joseph K. Buchanan reviewed briefly the history of the organization and what it had accomplished. He also read a letter from high officials of the company expressing their inability to be present but assuring the association members of the complete co-operation of the company in the plan and purpose of the organization and promising that it would fulfill its part faithfully.

Judge Frank Cox congratulated the employees on the strength of their organization, on the loyalty and faithfulness which had marked their continued connection with the company, and expressed appreciation of their efforts in the biggest public service in the city.

Central Electric Railway Accountants' Association

THE next meeting of the Central Electric Railway Accountants' Association will be held at the Hotel Spaulding, Michigan City, Indiana, on Aug. 25 and 26. The program for Aug. 25 follows:

10:00 a.m.—Meeting of executive committee.
11:00 a.m.—Business session and report of executive committee.
2:00 p.m.—Paper: "Is freight operation of electric railways a paying proposition?" by L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company.
7:00 p.m.—Dinner.

American Association News

Engineering Subjects Committee at Work

THE committee on subjects of the American Electric Railway Engineering Association appointed by President Kimball for the year 1922-1923 has been organized. The first step taken by the committee was to obtain from the chairmen of all standing committees in the Engineering Association a complete list of all subjects recommended for further study by next year's committees, together with a list of such new subjects as the chairmen feel should be taken up. Upon receipt of this information the committee will then be in a position to proceed with its work and prepare a list of assignments for the standing committees for the coming year.

The personnel of the committee on subjects is as follows: H. H. Johnson, chairman; R. C. Cram, C. R. Harte, L. C. Datz and H. H. Norris.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Court Reverses Decision

Service-at-Cost Franchise of the Findlay Property Proclaimed Valid—Improvements Now Possible

The Third Ohio District Court of Appeals, which on May 22 last, declared illegal the year-old-service-at-cost franchise of the Toledo-Bowling Green & Southern Traction Company, Findlay, Ohio, recently reversed its own decision. This action was taken by the court, after the city solicitor of Findlay, called the judge's attention to an amended law, which provides that a municipality and a corporation can modify a contract by mutual agreement. After this point had been thoroughly discussed, Attorney George Phelps of Findlay, who started the litigation in 1921, by filing a suit to test the validity of the company's franchise of 1915 after it had been modified in 1921, withdrew from the case.

In filing his suit in the Common Pleas Court at Findlay, Mr. Phelps contended that a municipality could not under the law modify a contract with a corporation. Despite his contention the court ruled against him. Mr. Phelps appealed his case to the Appellate Court which reversed the lower court's decision. The Court of Appeals in handing down its decision was divided in the matter. Judge Philip Crow filed a dissenting opinion in the case.

Under the terms of the modified franchise the traction company is exempt from paying for the paving and maintenance of the street between its tracks.

Had not the Court of Appeals reversed its decision, the company would have been put to an enormous expense this year, as the city of Findlay is contemplating the improvement of a number of its thoroughfares. These improvements were held up pending a final decision on the validity of the modified franchise.

The exemption of the traction company from paying for the paving between its roadways was incorporated in the modified franchise as an incentive for the company to continue operation in Findlay. At the time the 1915 franchise was modified the Findlay operation of the Toledo, Bowling Green & Southern Traction Company was losing $30,000 a year. The modified franchise required the Mayor to recommend to the City Council six reputable citizens, three to be chosen to serve as a rate-making body. This was done and the result was that the fare was increased from 5 to 8 cents. The revenue from this charge was not enough to meet the operating expenses of the company and after three months time the fare was increased to 10 cents, which charge is still in effect. While 10 cents is the cash fare, the company sells seven tickets for 50 cents.

The controversy between Attorney Phelps and the city of Findlay and the Toledo, Bowling Green & Southern Traction Company has extended over a period of almost eighteen months. It has now been ended by the Appellate Court's action.

Railway Asks Time Extension on Reorganization

In a communication sent to the City Council of Pittsburgh by C. K. Robinson, special city counsel of public utilities legislation it is stated that the reorganization of the Pittsburgh (Pa.) Railways will not be completed until about Nov. 1. Under a previous agreement entered into by the city, the railway company and the Philadelphia Company it was planned that the reorganization would be completed by Sept. 1.

Mr. Robinson also sent to the Council a copy of a petition submitted to the Public Service Commission by the railways company, requesting an extension of time. He advises that the city join in the company's request, but adds that the city "should insist that every possible step be taken to accomplish the reorganization at the earliest possible date."

In its petition the company states that considerable time has been consumed in acquiring the outstanding general mortgage bonds of the company. After negotiations conducted with bankers in Pittsburgh, New York, Baltimore and Philadelphia a sufficient number of holders did not accept the offer and negotiations had to be started all over again. The petitioner also states that many meetings have been held, but that it doesn't seem as if any plans could be perfected within the next few weeks because so many persons actively interested in the affairs of the railways company will be away a large part of the time between now and Sept. 1.

The letter refers to the negotiations being conducted with the municipalities and states that many municipalities will still be undecided by Sept. 1.

Under the contract which the commission approved the Pittsburgh Railways and the Philadelphia Company agreed to try to raise $5,000,000 for the purpose of reorganization. The original agreement called for the appointment of an industrial conference board to be named not later than June 1. The date was extended with the approval of the Public Service Commission until Aug. 1 and it is now announced that the industrial conference board will not be named.

Wages Reduced

A Compromise Agreement Retroactive to June 30 Is Accepted by Employees at Cincinnati

The wage controversy between the Cincinnati (Ohio) Traction Company and its employees has been settled. The employees have accepted a compromise proposal on a wage scale that provides a 4 per cent reduction in their wages. The new scale reduces the wage of motormen and conductors from 45 cents an hour to 43 cents during the first three months of service; from 48 to 46 cents an hour during the next three months, and from 50 cents to 48 cents an hour thereafter.

The new terms also provide that if one-man cars are introduced men operating such cars shall receive 5 cents an hour additional compensation. Electric shovel operators will receive 50 cents an hour, car tenders, 32 cents; watchmen, 30 cents; incline gatemen, 35 cents; curve cleaners, 32 cents. The pay of carhouse men also is cut 4 per cent under the agreed schedule. In return for the concession made by the men the traction company is conceding time and a half pay for overtime, instead of straight time pay, as in the contract in force heretofore.

The traction company had asked the men to accept a wage cut of 10 per cent with the expiration of the old contract on June 30. The men refused to consider this and when a deadlock developed each side appointed an arbitrator. These arbitrators were: Attorney Frank Dinsmore for the traction company and Attorney J. H. Vahey of Boston, Mass., for the employees. These two conferred and without selecting a third member decided on the 4 per cent reduction. Both sides had agreed to accept the arbitrators' report. A reduction in the cost of living was taken as a basis for the new terms. The new wage scale will be retroactive and will be operative for one year beginning on June 30.

Accepts Commission's Order

The Brooklyn (N. Y.) Rapid Transit Company will accept the service order recently issued by the New York Transit Commission—the terms of the order will be obeyed on the understanding that substituting fifty new all-steel cars for the sixty-five partially wooden elevated line cars is for the purpose of eliminating this type of car in Centre Street loop and not as an indication of a general policy to retire this kind of equipment. Also that the new steel cars will be financed by funds provided through the retirement of elevated line cars according to contract No. 4.

Night Service Started in Buffalo

Strikers Coming Into Company's Fold—Sympathizers Indulge in Disorder—Union Labor Said to Be Engaged in Organized Attack on Principles Which Govern the Mitten Men and Management Plan

NORMAL day service has been restored on all local lines of the International Railway Company in Buffalo and night cars are being operated over several lines. First day cars leave the barns at 5:30 a.m. and service over all lines is continuous until 9 p.m., when most of the cars are withdrawn. After that hour only a few cars are operated on West Side lines. No attempt has been made by the International up until Wednesday to operate local cars in Niagara Falls or Lockport or interurban cars on any of the western New York divisions.

Since the arrival of about 250 members of the New York state constabulary under Major George F. Chandler in command of the troopers, there have been few signs of disorder although an attempt was made to destroy the Cold Springs carhouse of the company where more than 900 Philadelphia trainmen are being housed. Two bombs were thrown but only a small section of the roof was torn away.

STRIKERS DESERT AMALGAMATED

Herbert G. Tulley, president of the International, feels that the strike has been broken and that little trouble will be experienced by the company in operating cars under the protection of the state troopers. Many of the strikers have withdrawn from the Amalgamated Association and have agreed to support the company. Some of them are now operating cars but the major part of the trainmen being used by the International are from Philadelphia.

The next move on the part of the International will be to prevent the operating of jitney and bus lines within the city of Buffalo. Few passengers are being carried on the cars but the jitney lines are always crowded. The legal department of the International already has announced its intention of applying to the courts for an injunction which would restrain the operation of jitney and bus lines within the city until such time as they secure the necessary certificate of convenience and necessity from the Public Service Commission. The municipal authorities already have granted permits to jitney drivers and have legalized their operation within the city so far as the city ordinances are concerned.

At a meeting of the strikers this resolution was unanimously adopted:

> Whereas, the so-called Mitten plan of operation was thoroughly discussed, and
>
> Whereas, this plan is simply a one-man autocracy that compels men to lose their citizenship rights, and denies them the right of voluntary association with their fellow workers, and the right of collective bargaining and arbitration of industrial disputes, and
>
> Whereas, so-called Mitten plan of cooperation men from the Philadelphia Rapid Transit Company have come to the city of Buffalo to act as strikebreakers and assist in destroying the rights of Buffalo street car men, therefore be it
>
> Resolved, that we unanimously repudiate the so-called Mitten plan of operation on the International Railway Company and do solemnly pledge that we will never operate the cars of the International Railway Company under any such un-American system that denies to men the right of free assemblage and free speech.

The International Railway and the Chamber of Commerce have rejected a proposal of Mayor Frank X. Schwab to appoint a committee to inquire into the causes of the strike so that a public report could be made. It had been proposed that the International appoint three investigators, the Chamber of Commerce, three, the Mayor three and a member of the City Council would also sit as a member. The Mayor says he will go on with the investigation without the help of the Chamber of Commerce or railway company. It is the contention of the Chamber of Commerce that nothing could be gained by conducting a public investigation as the sole reason for the strike is the question of an open or closed shop and that is not a question for arbitration.

It has been informally announced that the Buffalo street railway strike is an open attack on Mr. Mitten personally by the American Federation of Labor in co-operation with interests unfriendly with Mr. Mitten in Philadelphia.

William D. Mahon, the president of the Amalgamated, is fifth vice president of the American Federation of Labor, and it is declared that the Buffalo street railway men will have unlimited support in their fight against Mitten Management, Inc.

The Buffalo *Express*, an independent Republican morning newspaper, has been printing a series of articles tending to discredit members of the state constabulary in Buffalo. Reported attacks on women and children, the driving of horses into stores, etc., have been published with the result that the Buffalo Central Labor Council has adopted a resolution asking Governor Nathan L. Miller to order the withdrawal of the troops from Buffalo. The resolution asks the withdrawal of the troops because "of their many cruelties to the citizens of Buffalo without any justification."

Regarding the criticism of the newspapers against the troopers, Police Chief Burfeind said:

> The troopers are here against my will and have seriously complicated matters, so that it is very difficult for me to quell strike outbreaks. I have taken care of all trouble without violence to the people. The city is not under martial law. If I see an unwarranted assault upon any citizen, or if a trooper commits assault or murder, and a warrant is taken out, the people may rest assured that it will be duly served, as a city officer has a right to arrest a tropper in such cases.

About 900 experienced trainmen from Philadelphia and other cities are being housed by the International Railway, Buffalo, N. Y., in the Cold Springs carhouse of the company. White iron beds have been set up and there is every facility for the entertainment of the loyal employees who are operating cars on the local lines of the company. The men are being paid 75 cents an hour at the rate of time and a half for a 10-hour day and in addition they receive their uniforms and lodging. Moving picture entertainments are held every night and in addition there are card games, dominoes and other games for employees.

Many of the office employees of the company have been living in the general executive offices of the company since the outbreak of the strike July 1. Beds have been placed in many of the offices, shower baths have been installed and meals are provided. All the officers of the company are armed and private detectives from the Henry J. Girvin Agency accompany them in their travels around the city.

All the car houses of the company are under heavy guard and flood lights have been installed on all the company's property. Armed guards also are stationed on the roofs of many of the car houses and a high barbed wire fence has been placed in the rear of the Cold Springs carhouse where the trainmen are housed. Each carhouse has been equipped with a complete first aid kit and physicians and nurses are available at any minute in case of serious trouble.

"Mitten Men and Management" Tells Story

To instruct the public further on the Mitten Co-operative plan, thousands of copies of a forty-eight page booklet, "Mitten Men and Management," were recently distributed in Philadelphia and Buffalo by the Philadelphia (Pa.) Rapid Transit Company. The booklet starts in with an explanation of the Mitten plan and then gives a series of articles from various papers and magazines describing the co-operative idea with some remarks about Mr. Mitten's personality in the scheme. Articles are reprinted from the New York *World*, Brooklyn *Eagle*, *The Outlook*, *Trade Winds*, *World's Work*, *Progressive Labor World* and *Printers Ink*. In the last mentioned magazine the writer sums up the Mitten story by saying "It looks as though Thomas E. Mitten and his 10,000 men were writing what might be called a new Co-operative Declaration of Independence in the realm of industrial relations."

Seeks Injunction

Dayton City Railway Charges County Tax Commission With Illegal Action —Opposed to Tax Assessments

The City Railway, Dayton, Ohio, has applied to the United States District Court of the Southern District of Ohio for an injunction to prevent the treasurer of Montgomery County from collecting a tax levied in the year 1920. The plaintiff in its bill of complaint charges that the tax commission in making the assessment did not proceed upon any proper principle of valuation and adopted an improper mode of fixing the value of the railway property in that it did not apply the same rules and principles in estimating its valuation as were adopted and used with respect to other property in the state and county.

It is further charged by the railway that for many years past there has been in the county a systematic general under-valuation of real estate for purposes of taxation, the average tax valuation not exceeding 60 per cent of its true value; that no re-appraisement of real estate in the county has been made since 1910; that as a result of such failure to adopt and follow a uniform rule in assessing the City Railway's property the tax rate in 1920 is much higher than would have been required to produce the same revenue had the real estate been assessed on the average as its true money value. The company further alleges that if the treasurer is permitted to seize the railway property and enforce the collection of the tax, its operation as a public utility will be hampered to its irreparable damage, the embarrassment of the public, and without any remedy at law.

The City Railway prior to March 1, 1920, filed with the tax commission its annual report. The commission fixed a tentative value of $2,970,220, but later reduced it to $2,938,850. A subsequent rehearing was had, and a further reduction in assessable value was refused. The county auditor charged against the city railway's personal property taxes to the amount of $74,521 and on its real estate not used in the daily operation of its business $388. In the following December the railway paid $37,454 as the first semi-annual installment of the tax charged against it.

The defendant in the matter says that the railway did not in the County Court of Common Pleas institute proceedings to reverse the action of the tax commission, but paid the first half of the tax charged and sought no remedy until the other half became due, at which time the proper municipal and school authorities of the city of Dayton and the county of Montgomery had contracted large obligations on the faith of the tax duplicate. Also that the railway had an adequate remedy in the due course of law which it failed to pursue.

Judge Sater, who presided at the preliminary hearing, determined all the legal questions involved in the issue. The matter has been referred to a master to take testimony. This hearing will commence on Aug. 28.

Recently the railway filed suit in the United States District Court at Cincinnati against the Montgomery County treasurer and the Ohio State Tax Commission to restrain the collection of $43,590 in taxes for the last half of 1921. The company contends that it is being assessed on a 100 per cent valuation fixed by the Ohio State Tax Commission, although owners of property in the counties are paying on a 60 to 70 per cent valuation. Judge John Weld Peck set the case for hearing on Aug. 7.

Two Branches for National Transportation Institute

Formal organization of the National Transportation Institute will be effected before Sept. 1, it is believed. The organization is to be divided into two branches. The educational branch will be conducted under the immediate direction of a board of governors, of which Edgar E. Clark, former member of the Interstate Commerce Commission, will be chairman. The business side of the organization will be conducted by a board of directors. Its personnel has not been selected, as yet. It will be made up of representatives of the different interests concerned with transportation. Representative Sidney Anderson, of Minnesota, under whose direction the agricultural inquiry was made, has accepted the appointment of vice-chairman of the board of governors.

Wants Issue Put to Voters

Since the City Council of San Diego has denied the San Diego (Cal.) Electric Railway's application for a franchise to construct and operate a line on Sixteenth Street, between Broadway and Market Street, the traction company will carry its fight to the people of the city, it has been announced. An initiative ordinance granting the Sixteenth Street franchise is being circulated, and upon the securing of sufficient names, as required by the charter, the proposed law will be submitted to a vote at a special election. Citizens will be asked to bring about the abolition of charges against the corporation for paving between the car tracks where new work is ordered by the City Council.

The matter of relief from paving costs also is contained in another initiative petition to be circulated. This proposition must be an amendment to the charter. The railway company is willing to submit such an amendment to the people in order to get an expression regarding relief from the burden of paving costs that hereinafter might be imposed by new street improvements.

No local issue in San Diego in several years has aroused the interest that attaches to the railway company's efforts to extend its lines over Sixteenth Street. The company contends this link is necessary in its progrgam of giving San Diego a superior street car service, while the City Council, by a vote of 4 to 1, decided the extension was not warranted at this time. The Council has been petitioned by the business interests to reopen the hearings, but declined. The company's decision to put the question to the people followed.

Will Spend $5,000,000 on Improvements

Fifty-three public utility companies in Indiana will spend about $5,000,000 between now and the end of the year on new equipment and plant extensions, according to Charles L. Henry, president of the Indiana Public Utility Association. This was disclosed in replies to questionnaires submitted only to members of the state association. Only seven of the companies questioned replied that they planned no such work.

The Indianapolis & Cincinnati Traction, of which Mr. Henry is president, is preparing to extend its line from Rushville to Cincinnati, a project mentioned previously in the *Journal*, but this work is not included in the estimate of the company's expenditures for the next six months. Indianapolis public utilities will spend approximately $2,280,000 on extensions and new equipment in the next six months, the association's figures show.

Companies operating in more than one city will be active and their estimates also are large. The Interstate Public Service Company, Harry Reid president, will expend about $500,000 and the Indiana Service Corporation, Fort Wayne, Sam W. Greenland president, reported, has some $300,000 worth of work that must be done before the end of the year. Work already is getting under way for a new $500,000 artificial gas plant at Kokomo, Ind.

Philadelphia Wage Base Cities Changed

In connection with the wage issue at Buffalo, N. Y., the following statement was issued on July 18 from the office of the Philadelphia (Pa.) Rapid Transit Company.

> At a meeting of the General Committees for collective bargaining under P. R. T. Co-operative Plan, held this day, it was agreed by the representatives of Men and Management in view of the unsettled conditions existing at Chicago and Buffalo, two of the cities upon which P. R. T. wages are based, that the wages now paid here shall remain undisturbed until after the 1923 wage adjustments are made effective at Cleveland, Detroit or Chicago; it being agreed that Buffalo, under Mitten Management, should be no longer included as a basis for determining wages at Philadelphia.
>
> President Tulley's statement describing the introduction of the Co-operative Plan at Buffalo, and the use of the volunteer P. R. T. employees now on vacation, to temporarily operate Buffalo cars, in order to hold open runs for the old Buffalo employees desiring to return, met with warm approval; and his description of this method of winning over the striking employees by the missionary work of the P. R. T. men on Buffalo cars established an added feeling of confidence and a greater appreciation of what the Mitten Co-operative Plan can be expected to accomplish under the most adverse circumstances.

600,000 Passengers Discommoded by Power Failure

Interrupted Power Supply Stalls Brooklyn Subway, Elevated Trains and Surface Cars at Height of Rush-Hour Period—Passengers Discharged Safely from Stalled Trains and Cars

THE various emergency devices provided for the safety of passengers in New York City's subway system were given a severe test last Tuesday evening and everything worked as intended. The entire transportation system in Brooklyn, consisting of subways, elevated and surface lines, was completely tied up due to a blow-out in a high-tension compartment of the main switchboard in the Williamsburg power house. This is the main generating station of the entire Brooklyn system and feeds power to twenty-six substations in Brooklyn and Queens. The blow-out occurred at 5:15 p.m. Tuesday, and it was nearly an hour before any of the stalled cars were able to move. Officials of the railway estimated that fully 600,000 passengers were homeward bound at the time.

The immediate cause of the trouble was a short circuit in a 66,000-volt three-phase oil switch connecting a 10,000-kw. generator to the switchboard busbars. A serious fire resulted which spread to the construction work on the switch cells. It was necessary to use water to suppress the flames as the insulation of the overhead cables took fire and intense heat was generated by the oil flames. The trouble occurred on the fourth floor of the power house and the water penetrated to the floors below. This necessitated a complete shut-down of the 180,000-kw. station, which was supplying 100,000 kw. at the time. No damage was sustained by the generator connected to the oil switch.

When power was shut off there were five trains in the Brooklyn bound tunnel under the East River, which connects the stations of Whitehall Street in New York with Court Street in Brooklyn. There were no trains in the New York bound tunnel. This tunnel is equipped with spacing signals and the various trains were forced to come to an immediate stop through the action of automatic trips which went into operation through the discontinuance of the power supply. The current for operating trains through the tunnel is regularly supplied from two sources. Power for the Brooklyn end comes from the Williamsburg power house, which supply was cut off, while the power for the Manhattan end of the tunnel is supplied by the Interborough Rapid Transit Company's power house. There were two trains in the New York end of the tunnel, from which power was not shut off.

As soon as it was evident that the power supply would be interrupted for a considerable period, employees of the transportation department walked through the tunnels from the Brooklyn end and explained to the motormen, guards and passengers the cause for the delay and reassured them that exits from the tunnel could be immediately obtained by walking along the duct bench to the nearest exit. The first train at the Brooklyn end of the tunnel was stalled with its head car only a short distance from the Court Street station platform. The various doors in the train were immediately opened and passengers walked on the concrete duct bench to this station, where emergency tickets for additional rides on the Brooklyn Rapid Transit system were issued.

An emergency exit from the tunnel is provided at Furman Street on the Brooklyn side, and the passengers from the second and third stalled trains on the Brooklyn side walked to this emergency exit and so to the surface. The two trains that were in the Manhattan end of the tube were backed up to the Whitehall Street station.

At other points in the subway where the power supply was interrupted motormen were enabled to coast with their trains for a considerable distance, as these sections were not equipped with safety signals and automatic stops. In many cases the trains coasted to the next station and discharged their passengers. Where trains were stalled before reaching the station, the motormen immediately communicated with the dispatcher's office through emergency telephones which are located at convenient intervals in the tunnel. They were thus advised immediately as to the cause for the interruptions and were given instructions for bringing passengers to the nearest exit point.

In addition to the emergency telephones which proved a great convenience, the emergency lighting circuits throughout the tunnel and in the cars worked entirely satisfactorily. The cars have emergency lights which are operated from a storage battery and are automatically turned on as soon as the power supply fails. The tunnel lighting is supplied from sources separate from the third rail, and the supply for the Montague Street tunnel was from the New York Edison Company, which was not interfered with. The emergency lights are also automatically turned on in the tunnel whenever the regular power supply fails.

Some of the stalled trains were of the new type, where a single operator controls the doors for three cars. In these trains the guard opened the doors at the ends of the cars so as to provide a passage and he then assured passengers in the other parts of the train that there was no danger and that full information would be given them as soon as it was obtained.

The same method of taking care of passengers on the various elevated lines was used as that for the subway. Motormen coasted with their trains as close to stations as possible and then communicated with the dispatchers by telephone. As soon as they received their instructions, assistance was given passengers so that they could alight from the trains and walk to the nearest station.

An emergency power supply was obtained from the New York Edison power house as soon as possible, and the cars and trains were moved slowly toward their terminals. For a time no additional passengers were accepted but regular service was again resumed after approximately an hour's interruption.

Despite the magnitude of the tie-up and the protracted period over which traffic was suspended, there was no excessive anxiety or panic reported at any point and there was not a single accident on the transportation system.

Fire Extinguishers Not the Cause of Poisonous Fumes

In a report to the New York Transit Commission in regard to the fire in the Interborough subway as given in these columns in the issue for July 8, Gen. Lincoln C. Andrews, chief executive officers of the Transit Commission, recommended the continuance of the use of Pyrene fire extinguishers for this service. The report states that there is no evidence that poisonous gas was generated through the application of carbon tetrachloride. The smoke and fumes generated by the fire were principally from burning insulation, copper, paint and other substances. A thorough search was made for a suitable substitute for carbon tetrachloride as a fire extinguisher in similar circumstances, but this as yet has disclosed none as good or better.

The Underwriters' Laboratories in New York, which are established and maintained by the National Board of Fire Underwriters, has made public a statement by Dana Pierce, vice-president. In this statement Mr. Pierce said that an extinguisher of the Pyrene type is the only one known which does not involve serious hazard of electrical shock to the operator who might attempt to use this on an electrical fire in a steel car, and that the use of sand and shovels to put out fires in railroad cars is impracticable.

Gen. Andrews' report recommends that the Transit Commission direct the Interborough Rapid Transit Company to resume the use of the tetrachloride fire extinguishers for use in case of short circuit fires.

Chicago Matter Unsettled

Men and Management Still Dickering—Surface Company Has Bettered Its Wage Offer

The strike on surface and elevated lines in Chicago still threatens. President Henry A. Blair of the Surface Lines took a positive stand for a maximum 65-cent wage and a nine-hour day on July 24 at a conference attended by International President Mahon and local officials of the street car men's union. Arrangements were then made for a similar conference to be held with President Budd of the Elevated Roads.

President Mahon announced that the question of a strike depended on the solution of four points:

1. The proposed wage cut.
2. The extension of the eight-hour day to nine hours.
3. The thirty-day clause in the proposed new contract.
4. The sale of tickets by conductors.

Tickets have been sold on the cars at the rate of three for 20 cents, since June 15, by order of the United States District Court. While the percentage of ticket passengers is more than 40 per cent the conductors have complained bitterly about this added duty. It was explained to the union chiefs that the company would willingly abandon the use of tickets, but this was a condition fixed by the Federal Court when the 6-cent order of the Illinois Commerce Commission was enjoined. It was hinted that the union men would appeal to the commission and the court to have the rate of fare fixed at 7 cents without tickets, or to have tickets sold by outside agencies and not by the conductors on the cars.

The "30-day" clause objected to by the men is one which President Blair said would be necessary. In short, the management is unwilling to tie itself up with a long-term contract with its employees when its revenue might be seriously affected by another order of the commission.

Following the conference with the Surface Lines' management, President Mahon gave out a statement, in which he said:

> We tried to the best of our ability to point out to them the unfairness of their position in wanting to reduce the wages of our members and take from them their eight-hour day, but after all our arguments we could not change them. They still stand on their original proposition. We brought the conference to a close with the understanding that if we desired they would meet us again.
>
> We have asked Mr. Budd to meet us in conference either tomorrow morning or afternoon for the purpose of taking up the same proposition, namely, that of wages and hours for the elevated employees, and we will leave matters rest in abeyance as far as the surface lines are concerned until after our conference with Mr. Budd.
>
> This is purely a wage dispute. The companies have been making money. They have been required by the court to make a reduction temporarily until the court can investigate and determine what the rate of fares shall be, but they would not wait until the court acted.

The final proposition of the Surface Lines was contained in a letter written to the union officials by President Blair on July 18. This raised the offer from 60 cents to 65 cents, instead of the present 80-cent maximum rate per hour. It also provided that working conditions would remain unchanged, except that the present bonus provision for paying time and one-half after eight hours would not apply until after nine hours. Mr. Blair stated:

> This reduction in fares has reduced our receipts by about $8,000,000 a year, and the continuance of our present wage scales would make it impossible for the companies even to meet our obligations. The wage scales offered will reduce the net earnings of the companies to a point below which they cannot fall unless their ability to serve the public is materially impaired.
>
> In offering a wage scale of 65 cents an hour for trainmen, we did so knowing that such a scale was as high or higher than like wage scales paid in other large cities of this country.
>
> The working conditions in effect on the Surface Lines are, as regards time allowance, more liberal than those of most cities. It was with this in mind that we have requested a change in the bonus time allowance after 8 hours in our present contract.

He also renewed his offer of arbitration in the event that an agreement could not be reached, and said the present offer is not to be used in arbitration if it is not accepted.

The union and the company recently rejected the offer of assistance made by the State Board of Arbitration. After President Mahon arrived in Chicago, he issued a statement in which he said he would be glad to have the help of anyone who could prevent trouble.

Following the meeting on July 25 between the employees' committee and the officials of the Chicago Elevated Lines negotiations will be continued in an attempt to settle wages and working conditions. At the same time the committee representing the employees of the Surface Lines has asked for another conference with Henry A. Blair, president of the Surface Lines. The possibility of the strike has been postponed for at least several days with the announcement of W. D. Mahon, president Amalgamated Association, that Mr. Blair's 65-cent wage offer and any other offer which may be made by Britton I. Budd of the Elevated governing committee would both have to be submitted to a referendum before a strike could be ordered.

Plans for Extension Halted

The decision of the Ohio Supreme Court recently in the Cincinnati (Ohio) Water Works funds case has placed an obstacle in the way of the proposed extension of the Cincinnati, Lawrenceburg Aurora Electric Street Railroad from Anderson's Ferry to the Dixie Terminal, Cincinnati, a distance of approximately 6 miles. In ruling that the city of Cincinnati had no legal authority to transfer water works revenues to any other department the court held that the city's home rule charter had enacted as part of the city all State laws in existence at the time that the charter was adopted. One of the statutes then in force was the Schmidlapp law, which provided that the city could not make a new grant to a utility company unless the rate of fare is fixed not to exceed 5 cents. S. Shaffer, secretary of the company, said:

> We have legal opinions that such is the effect of the Ohio Supreme Court decision. That is a serious obstacle in our path. We were ready to proceed with the extension when this was put in our way; we had the project practically financed and all our plans completed ready to submit to City Council, but we cannot go about it if we are limited at the outset to a 5-cent fare.

Mr. Shaffer recently appeared before the Council committee on street railways to urge the passage of an ordinance which would continue for two more years the 7-cent fare now in force on the Cincinnati, Lawrenceburg & Aurora from Anderson's Ferry to the western limits of Fernbank (Ohio). He stated that the interurban company had barely come out even under this rate of fare during the past year. The matter has been taken under advisement.

News Notes

Employees Sign Agreement.—An agreement has been reached between the Interborough Rapid Transit Company, New York, N. Y., and its employees whereby the present agreement both as to wages and working conditions will continue in force for another year. The expiration date will be June 30, 1923.

Employees Make Record for Home-Buying.—Since Jan. 1, 1922 the employees Mutual Savings, Building and Loan Association of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has made mortgage loans to 175 members for the purpose of buying homes. The total of the loans exceeds $400,000. Since the eight years of the association up to June 1 last, a total of $3,747,241 has been given out in loans to 1,500 members.

Cut Withdrawn.—Employees of the Hamburg Railway, Buffalo, N. Y., an interurban line operating between the Buffalo city line and Hamburg, went on strike on June 30 in protest against a wage cut of 2½ cents an hour in the maximum pay. After a conference between the men and the company, the wage cut was withdrawn and the men returned to work. The strike continued less than twenty-four hours. The wage scale is 40 cents an hour for the first three months; 45 cents for the next nine months, 50 cents an hour thereafter and recognition of the union.

Riders Pay for Paving.—More than $1,000,000 every year is being contributed by the riders on the lines of the Public Service Railway, Newark, N. J., towards the cost of paving streets. "*Whys and Other Whys*," published by the railway, puts it another way—every year, the cost of furnishing electric railway service, which is paid by the car rider, is increased by $1,000,000 to furnish paving, which the cars do not wear out and which in no way adds to the comfort and convenience of the rider. The company has already paid for pavement more than $7,100,000.

Financial and Corporate

Indianapolis Properties Report

Decreased Revenue in 1921—Bus, Jitney and Business Depression Important Factors

The annual meetings of the stockholders of the Indianapolis (Ind.) Street Railway and the Terre Haute, Indianapolis & Eastern Traction Company were held recently, with the officers and directors of both companies being reelected. According to the reports submitted both companies showed a falling off in revenues, though the Terre Haute, Indianapolis & Eastern property finished the year 1921 with a balance of $92,187. A deficit of $242,137 was the 1921 result for the Indianapolis Street Railway. Neither railway paid dividends in 1921. In commenting on their financial condition both companies referred to the general business depression and emphasized the serious loss of revenues resulting from jitney and motor bus competition. The need of higher fare and more equipment was stressed in outlining the necessities of the Indianapolis Street Railway.

A comparison of the Indianapolis Street Railway operation in 1921 and 1920 with respect to gross earnings, maintenance, taxes, etc., follows:

	1921	1920
Passenger receipts—City lines	$4,387,087	$4,801,130
Transfer receipts—City lines	307,724	7,398
Miscellaneous earnings—Track rentals, etc	538,515	559,406
Gross earnings	$5,233,327	$5,367,936
Maintenance of ways and structures	548,878	501,235
Maintenance of equipment	550,120	626,031
Operation of power plant	877,212	958,225
Operation of cars	1,565,814	1,564,501
General expenses	420,417	417,889
Total operation expenses	$3,962,443	$4,067,883
Net earnings	$1,270,883	$1,300,053
Less taxes	437,952	509,471
Net earnings, less taxes	$832,930	$790,582

From the net earnings of $832,930 deductions of $645,068 were subtracted, leaving a surplus of $187,863, from which deductions of $430,000 were made, leaving a deficit of $242,137.

The statement of earnings of the Terre Haute, Indianapolis & Eastern Traction Company for 1921 follows:

	1921
Gross earnings from operation	$5,130,124
Operating expenses	3,734,957
Net earnings	$1,395,166
Taxes	333,819
Earnings from operation, less operating expenses and taxes	$1,061,346
Other income	
Rental of Kentucky Avenue freight terminal	$12,499
Dividends on stocks owned	139,800
Interest, etc	24,353
Sales of power, West Tenth Street power plant	119,550
	$296,204
Earnings from all sources, less operating expenses and taxes	$1,357,551

After deductions and rentals totaling $1,056,033 a surplus remained of $301,518. From this sum $209,331 was subtracted as a sinking fund amount. A balance remained of $92,187.

Railway & Power Companies Have Bond Issues Approved

The Tennessee Railroad & Public Utilities Commission has authorized the Nashville Railway & Light Company to issue bonds in the sum of $1,000,000 to cover expenditures and improvements which have been made upon the property since the commission's last valuation.

The Tennessee Electric Power Company also was allowed to issue approximately $16,900,000 in bonds which will replace bonds in its constituent companies, the Chattanooga Railway & Light Company, the Chattanooga & Tennessee River Power Company and the Tennessee Power Company. The bond issue by the Tennessee Electric Power Company will replace bonds of more than $20,000,000 issued by the constituent companies and will thereby reduce the indebtedness of the Tennessee Electric Power Company by nearly $4,000,000.

Estimate for 1923 Offers $14,000 Reduction

Superintendent George F. Russell, of the Department of Public Utilities, Seattle, which department operates the Municipal Street Railway System, recently submitted to the City Council a budget estimate for 1923 which, he asserts, offers a $14,000 reduction from the allowance of 1922. Interest has been increased in the estimates because of the effort to cut expenses in order to obtain a 5-cent fare. The grand total of 1923 expenditures asked for is $6,866,102 compared with $6,879,357 according to the budget estimate.

The reduction would be much larger were it not for $624,460, estimated cost of track replacements and removals proposed for the railway during the next year, Superintendent Russell states. Mr. Russell claims that this outlay of expense is necessary, saying "there is danger of collapse of the whole railway system unless it is properly maintained."

The decrease in the salaries of the transportation department is $503,160, in the equipment division $2,870 and in the accounting division $11,980. A decrease of $23,350 is shown in the fixed charges. These include interest and redemption of bonds.

Gross revenues of the city of Seattle for 1923, from sources other than taxes, have been estimated by City Comptroller Harry W. Carroll at more than $12,000,000. This figure includes $3,000,000 for the light department, $1,250,000 for the water department and $6,500,000 for the street railway department, contingent on the maintenance of the 8½-cent fare. The comptroller also figured for the City Council the sums necessary to be levied in 1923 for interest and redemption on general bonds. The interest item is $807,254 and the redemption $217,500.

Line To Be Sold.—The holdings of the North Alabama Traction Company, Albany, Ala., including real estate and franchises, will be offered for sale to the highest bidder on August 11 by A. A. Hardage, special master, under orders of the United States District Court.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	July 1922 **7.04**	June 1922 **7.04**	July 1921 **7.21**	May 1921 **7.24**	**4.84**
Street Railway Materials*	June 1922 **172**	May 1922 **166**	June 1921 **167**	Sept. 1920 **247**	**100**
Street Railway Wages*	July 1922 **211**	June 1922 **212**	July 1921 **221**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	June 30 1922 **5.64**	May 31 1922 **5.25**	June 30 1921 **5.12**	Apr. 30 1917 **12.18**	**5.91**
U.S. Bank Clearings Outside N. Y. City (Billions)	June 1922 **12.88**	May 1922 **12.50**	June 1921 **11.47**	March 1920 **18.54**	Av. Mo. 1913 **6.12**
Business Failures Number Liabilities (millions)	June 1922 **1,656** **38.41**	May 1922 **1,803** **48.16**	June 1921 **1,388** **51.62**	Jan. 1922 **2,722** **105.7**	Av. Mo. 1913 **1,213** **24.04**

Conspectus of Indexes for July, 1922

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
Eng. News-Record Construction costs	July 1922 **169.7**	June 1922 **166.6**	July 1921 **203.8**	June 1920 **273.8**	**100**
U.S. Bur. Lab. Stat. Wholesale Commodities	June 1922 **150†**	May 1922 **148†**	June 1921 **142†**	May 1920 **247†**	**100**
Bradstreet's Wholesale Commodities	July 1 1922 **12.11**	June 1 1922 **11.90**	July 1 1921 **10.73**	Feb. 1 1920 **20.87**	**9.21**
Dun's Wholesale Commodities	July 1 1922 **173.7**	June 1 1922 **170.6**	July 1 1921 **159.6**	May 1 1920 **283.3**	**120.9**
U.S. Bur. Lab. Stat. Retail food	June 1922 **141**	May 1922 **139**	June 1921 **144**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	June 1922 **155.4**	May 1922 **154.9**	June 1921 **161.9**	July 1920 **204.5**	(1914) **100**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over, except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on street and interurban railways in the United States. †Revised weighting.

Municipal Officials Pleased at Detroit Showing

Detroit Street Railways Realize Net Income of $227,422 for Forty-Seven Days' Operation—Service Improved, Says Mayer

THE first financial statement giving conditions of the Detroit Municipal Street Railway System since the Department of Street Railways took over the Detroit United lines on May 15 shows that a surplus of $508,850 remained after all legitimate charges and charter requirements have been met, including interest and sinking fund charges. Of this amount $227,422 has been accumulated since May 15. The detailed report shows that a surplus was added to even during the month of June, when rehabilitation of the old Detroit United Railway lines was fully under way. The beginning of operations of the Department of Street Railways was taken as Feb. 1, 1921, shortly after the first municipally-built line was opened.

CITY OF DETROIT, DEPARTMENT OF STREET RAILWAYS

	1922 June (30 days)	1922 May (17 days)	Accumulative May and June (47 days)
Operating revenue.			
Revenue from transportation			
Passenger revenue	$1,480,978	$312,002	$2,292,979
Parlor chair and special car	246	187	433
Total revenue from transportation	$1,481,224	$812,188	$2,293,412
Operating expenses			
Way and structures	159,952	40,225	200,177
Equipment	117,078	72,174	189,252
Power	138,433	58,531	196,964
Conducting transportation	559,588	297,655	857,243
Traffic	Cr. 1	8	7
General and miscellaneous	105,681	50,855	156,538
Total operating expenses	$1,080,731	$519,448	$1,600,179
Net revenue railway operations	400,493	292,740	693,233
Operating ratio	73%	64%	....
Net revenue auxiliary operations	97,305	50,325	147,631
Taxes assignable to railway operation	60,000	34,000	94,000
Miscellaneous rents	1,280	....	1,280
Net operating income	$436,518	$309,066	$745,583
Total non-operating income	4,791	125	4,916
Gross income	$441,309	$309,191	$750,500
Deductions			
Interest on notes payable	11,507	7,389	18,896
Sinking fund const. bonds	37,748	18,874	56,621
Sinking fund purchase continued	142,015	74,611	216,626
Interest fund const. bonds	65,895	31,246	97,141
Interest fund purchase continued	85,400	48,393	133,793
Total deductions	$342,565	$180,512	$523,077
Net income	$98,744	$128,678	$227,422

In a statement made public by Mayor Couzens it is pointed out that the net income for the month of June was $98,744, remaining after providing for the pro rata amount of interest and sinking fund on the $13,050,000 public utility bonds outstanding; interest on the loan of $4,120,000 at the bank rate of 3¾ per cent., interest on the deferred purchase plan of the Detroit United Railway; provision for the $500,000 payment due the Detroit United Railway, Dec. 1, 1922, and provision for the payment of the final balance of $7.580,000 due in 1931.

The Mayor further stated that the revenue accruing through the rental of tracks to the Detroit United Railway for its interurban service is estimated for the reason that no agreement has been reached with the company. The rates paid in the city of Toledo, namely, 36 cents per mile for motor cars and 24 cents for trailers, have been used as an example in computing this earning.

No agreement with the company has been reached as to the price of material taken over at the time of the purchase; therefore the best available market figures have been used. In the main, however, they are prices furnished by the Detroit United Railway purchasing department. No bill from the Detroit Edison Company has been received and the cost of power has been estimated.

The amount of taxes chargeable against the property is estimated because the total amount of taxes for city, state and county purposes has not been definitely segregated.

On June 30, 1922, the street railway department had cash in the bank totaling $1,728,722, out of which the street railway loan has been reduced $333,000. This loan was made in lieu of selling public utility bonds.

A reserve in an amount equal to $504,182 has been set aside in a separate account called "Purchase Sinking Fund." The railway is earning on its cash balance 3½ per cent on the average daily balance up to $1,000,000 and 3 per cent above $1,000,000.

The Mayor further pointed out that an operation and maintenance balance of $142,233 has been accumulated to cover the cost of some of the rehabilitation work in the past month.

The interest on public utility bonds issued prior to the taking over of the Detroit United Railway and the sinking fund provision were properly charged to the construction cost in accordance with the Interstate Commerce Commission ruling, and for the further reason that up to May 15, 1922, the street railway system was not complete as outlined to the people when they voted the $15,000,000 bond issue in April, 1920.

This statement is not made in any boastful spirit, the Mayor stated, because it is realized that there is much room for improvement in the service. He continued:

> We naturally have to feel our way so as to live within our income. The showing we are making does show that there is possible an improvement in service, which is always our aim. Every reasonable person will understand that we had to have experience in operating the railroad to ascertain just what was necessary to give the best possible service at a reasonable fare.

The daily service schedules in the city system in June averaged 3,000 car-miles per day over the old Detroit United Railway schedules, which in itself indicated that service is constantly being improved. In keeping with the promises for increased service, the city has extended the one-fare zone to the city limits on Grand River, Van Dyke and to the farthest possible terminal on Woodward Avenue. The entire city is now within the one-fare zone.

In conclusion the Mayor pointed out that since taking over the Detroit United Railway, the city has lived up to its statements with regard to cost of operating and the possible earning per car-mile. For instance, it was estimated the cost of operation would be 30 cents per car-mile and the figures show 28 cents. Earnings show for the month of June 38 cents per car-mile. The relation of operating expenses to income shows 73 per cent, while it was estimated at 76 per cent.

According to the financial report, $57,815 was spent in June for track and road labor, as compared with $9,124 in the seventeen days of operation during May. Paving between tracks cost $16,457 in June and $3,694 in May.

Conductors and motormen were paid $442,494 in June and $244,735 in May. Car-house employees were paid $64,484 in June as against $23,274 in May. The cost per car-mile for the two months averaged 26.7 cents.

The reserve fund includes $75,007 for injuries and damages, $56,621 for sinking fund construction bonds, $216,626 for sinking fund purchase contract, $97,141 for interest on construction bond and $132,793 for interest on the purchase contract, making a total of $579,188 and making a surplus of $508,850.

Six Months' Earnings Reported

The operating revenue of the Philadelphia (Pa.) Rapid Transit Company for the six months ended June 30, 1922 was $435,251 less than it was in the same period a year ago. The operating expenses and taxes, however, decreased from $15,858,606 to $15,169,953 for the six months of 1922. The net income for the 1922 period was $1,299,707 against $1,016,408. The passenger statistics for this same six months' period shows a revenue of $20,681,618 against $21,090,749 in 1921. The total passengers carried in January-June, 1922 were 420,345,082 against 424,720,699 in 1921.

Reorganization Effected

Stockholders of the Cincinnati, Georgetown and Portsmouth (Ohio), Traction Company effected a reorganization recently with a view to rehabilitating the property. The line operates from Carrell Street in Cincinnati to Russellville, Ohio, with branches at Coney Island, Batavia and from Bethel to Felicity, Ohio.

The new officers are: L. G. Van Ness, Cincinnati, president, to succeed Henry A. Haigh, Detroit; Thomas Elliott, Cincinnati, vice-president, succeeding W. V. Thompson, Georgetown; C. T. Dehore, Cincinnati, secretary, succeeding A. L. C. Henry, Detroit. These officers and the following comprise a new board of directors; Judson Harmon, William A. Stark, C. C. Chase, C. H. Deppe and J. T. Myhan.

Mr. Van Ness, the new president, is general manager of the Cincinnati, Lawrenceburg & Aurora Electric Railroad; Mr. Elliott is a banker, while Mr. Dehore is manager of the railway department of the Cincinnati branch of the General Electric Company. Of the directors Judson Harmon is a former Governor of Ohio, Mr. Stark is receiver for the Cincinnati, Lawrenceburg & Aurora Electric Railroad Company, while Messrs. Chase, Deppe and Myhan are retired Cincinnati business men.

Officers of the company said that $150,000 would be spent in restoring the roadway, tracks and car equipment, within the next six months. An important innovation contemplated is to abandon the generating station at Lake Allyn, Ohio, and to secure the current from the Union Gas & Electric Company at Cincinnati. The traction company has been supplying current for light and power to a number of municipalities along its route, and is now negotiating for changes in the contracts in accordance with its proposed new source of supply.

Railway Announces Refunding Plan

It is announced that the $4,623,000 extended general mortgage bonds of the Union Traction Company of Indiana, Anderson, Ind., due on July 1, 1922, have been extended to July 1, 1932, at 6 per cent. This makes the second time that payment on these bonds has been extended, the first being on July 1, 1919, at that time bearing 5 per cent, when they were extended to July 1, 1922, in the hope that conditions would be more favorable for a refunding plan.

In a circular to the bondholders it was stated that the consensus of opinion sought was favorable to a ten-year extension because 80 per cent of the bonds of the Union Traction system would then expire on a uniform date and thus add greatly to the prospect of a general refunding plan. The circular said further that the extension to July 1, 1932, was proposed reserving the privilege of prepayment at any time after three years by giving sixty days notice and paying a 5 per cent premium in the fourth and fifth years and 1 per cent less for each subsequent year and par during the last year of the extension, together with accrued interest. The extension is being handled by the Equitable Trust Company, New York, N. Y., Guarantee Trust & Safe Deposit Company, Philadelphia, Pa., and the Indiana Trust Company of Indianapolis, Ind.

Long Island Property Sold

The New York & North Shore Traction Company, Roslyn, L. I., was sold for $15,000 at auction on July 24 to Michael Schiarone, a dealer of Jersey City. The sale took place in the Nassau County Court House at Mineola. The line went into receivership some time ago and suspended operations on May 3, 1920. The property comprises thirty-eight miles of track with equipment including nineteen motor and three other cars besides a power station at Little Neck Bay and repair shops at Roslyn and Flushing.

The sale was conducted by order of the court by Arthur C. Huhn, special master, to satisfy the Union Trust Company and Edward V. Hale, who have begun suits.

Cities Service Resumes Cash Dividends

The directors of Cities Service Company, New York, N. Y., have authorized the announcement of a plan for the payment of dividends in cash on the preferred stock on Sept. 1 and the preference stock on Oct. 1 and the redemption of all scrip issued for dividends on these stocks.

It is proposed to give the holders of preferred and preference stock, or the holders of the scrip issued in lieu of cash dividends on these stocks, either cash or, at their option, a special debenture bond created solely for this purpose.

Some of the details of this special bond will be that it will bear 8 per cent interest and will be convertible into 85 per cent of preference stock, and 15 per cent of common stock, with the cumulative feature on the common stock as in previous issues of debentures, and to carry an initial call price of 115 per cent of par. The directors feel this bond will serve as a reward to the stockholders who have temporarily foregone cash dividends.

Property Sale Aug. 15

The property of the Ohio Electric Railway, Springfield, Ohio, will be sold at public auction on Aug. 15. Bids of not less than $2,000,000 will be accepted at the Lafayette Street Station at Toledo. The Toledo-Lima interurban line, electric light and power are included in the property as well as the Lima Street Railway system.

In this connection a tentative draft of a twenty-five year franchise has been placed before the City Commission for the Lima Street Railway, which proposes to buy the local system from Receiver Jones. A representative of the new company states that a total of $200,000 will be spent in rebuilding and extending the line.

Financial News Notes

Railway Sold.—The Brockton & Plymouth Street Railway operating in Plymouth, Mass., has been sold under foreclosure by Receiver Gleason to J. H. Dawson, who represented the State Street Trust Company of Boston. The price was $100,000.

News-Issue Offered.—Alex. Brown & Sons, Baltimore, Md., are offering $2,500,000 of five-year 6 per cent gold notes of The United Railways & Electric Company, Baltimore, Md. The price is 98 and interest to yield more than 6.45 per cent. The bonds are dated Aug. 1, 1922, and are due Aug. 1, 1927.

Six Months' Surplus Reported.—For the six months ended June 30, 1922 the Quebec Railway, Light, Heat & Power Company, Quebec, Can., reports a surplus after expenses and fixed charges of $115,952 against a deficit for the corresponding period a year ago of $5,482. The gross earnings were $1,346,018 against $1,359,514 for the six months ended June 30, 1921.

Net Income for Six Months Period.—For the six months ending June 30, 1922, the Eastern Massachusetts Street Railway, Boston, Mass., reports a gross income of $1,276,659, against $1,175,244 for the same period in 1921. Bond interest and rentals amounted to $770,467 for the first six months of 1922. The net income was $506,191, against $374,618 for the corresponding period in 1921 and against a deficit for the same period in 1920 of $760,656.

Preferred Stock Offered.—Ray F. McGuire & Company, Des Moines, Iowa, are offering 7 per cent preferred stock of the Iowa Railway & Light Company, Cedar Rapids, Ia. The stock is offered at par ($100), either for cash or by ten-payment plan. The stock can be redeemed at 102½ and dividends. The dividends on the preferred stock of this company have been paid for more than twenty-four years. On Dec. 31, 1921, the 74th dividend was distributed.

Company Claims Bigger Return Needed.—The New York State Railways Company in its reply to Mayor Walrath's application for a reduced fare in Syracuse, submitted evidence tending to show that in order to earn a fair return on the investment value to the property in Syracuse, it should have received for the twelve months ended April 30, 1922, $351,379 more than it actually did and for the two months ended June 30, 1922, an additional $77,495. These figures for a fair return were based on a value of $8,920,000 as fixed by a former Public Service Commissioner.

Traffic and Transportation

Repopularizes Excursion Fares

Pacific Electric Railway Announces Former Thursday Reduced Fares to Beaches—Week-End Excursions

The restoration of the Pacific Electric Railway's former Thursday excursion fares of 40 cents for adults and 20 cents for children during the summer months from Los Angeles to the nearby beaches recently was announced by O. A. Smith, passenger traffic manager of the company. This special round trip fare was made effective on June 22, 1922, and continues each Thursday until Sept. 14, 1922, inclusive. The fares apply to Santa Monica, Ocean Park, Venice, Playa del Rey, El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, San Pedro, Wilmington, Long Beach, Seal Beach and Anaheim Landing. The minimum distance for this special fare to nearest beach is 14.79 miles, while the maximum distant beach available under this excursion fare is 24.61 miles.

This is the first time these open reduced fares have been published by the company since the summer of 1919. For several years prior to 1919 similar reduced fares on each Thursday were in effect during the summer months, for one fare to all beach points herein named, and these particular reduced fares proved to be very popular.

EQUIPMENT CONDITIONS RETARD EXCURSION REDUCTIONS

During the summer months of 1920 and 1921 the equipment situation prevented the company from making these special fares effective. However, since the recent receipt of thirty new all-steel interurban cars, which were ordered two years ago, and the purchase of fifty additional cars, at a total cost for the eighty cars of $2,000,000, it has been possible for the Pacific Electric to restore the old privilege.

The original purpose in granting these reduced rates—and this is still the controlling factor—was to permit the women and children in families of very moderate means to spend a day each week during the hot summer months at the beaches for rest and recreation.

Prior to increases granted the Pacific Electric Lines in regular interurban and commutation fares by the California State Railroad Commission, which were made effective Jan. 1, 1922, the regular interurban one-way and round trip fares between Los Angeles and the beaches were under a zone blanket system of rates; that is, the regular one-way or round trip fare between Los Angeles and any one of the particular beaches in the blanket zone was one and the same fare. The commission's rate increase decision removed this blanket zone fare and the regular rates were established on a mileage basis. However, the special excursion rate for one day each week for the summer months gives a special reduced rate on a blanket basis to all beaches.

Likewise, the company also made an announcement of sweeping reductions in week-end excursion fares to beach resorts from forty-one principal interior points on its lines where agencies are maintained, exclusive of Los Angeles. These particular new excursion fares made the greatest reductions ever published and were made effective Saturdays and Sundays, with return limit the Monday following dates of sale. The reductions were made effective to all beach resorts served by the Pacific Electric Lines and average slightly more than 33 per cent.

This was the second announcement of excursion fares recently made to the beaches by the company. The first announcement being the one where the former Thursday beach excursion fare was to be restored. Inability and delay in securing additional equipment, together with other operating difficulties resulting from war conditions, has prevented the company from making excursion fares during the past few years. In addition to the company's heavy purchase of equipment, the company is completing a thorough rehabilitation of its facilities, the results of which are being reflected in its operations.

Thirty-four Buses Will Operate on Five Lines

In order to force the Tacoma Railway & Power Company, Tacoma, Wash., to reduce car fares to 5 cents, Mayor A. V. Fawcett and the City Council have arranged for the operation of not less than thirty-four buses on five railway lines in Tacoma, bus service to be started on Aug. 1. Negotiations have been closed with Spokane and Seattle jitney operators who have agreed to transfer their equipment to Tacoma and cover the five lines for a 5-cent fare.

Reduced Rates at Night

The Indiana Railways & Light Company, Kokomo, Ind., has a reduced fare rate on its interurban cars. This rate has been in effect since Dec. 1, 1921, and the amount of the reduction is 40 per cent from regular rates, i. e., night round trip fares are 120 per cent of the one-way day fare. These rates are good on regular trains after 5 p. m. each day for a passenger returning on any car on the same day. The company reports that the amount of night riding has increased.

Labor Council Opposes Fare Reduction

According to a complaint filed with the Public Service Commission of Oregon by the Housewives Council of Portland, asking that fares in effect on the lines of the Portland Railway, Light & Power Company prior to Jan. 15, 1918, be restored, "8 cents is too much for a 5-cent car ride."

After an investigation covering several weeks, the Central Labor Council of Portland recently went on record unanimously as being opposed to any reduction in existing fares. Included in the report of the special committee which conducted the investigation was the further statement that "the entire increase in revenue received by the railway company as a result of raising the fares from 5 cents to 8 cents has gone into the pockets of employees of the company and not the stockholders." The Central Labor Council appointed an investigating committee two months ago, and extended conferences were held. Three different hearings were held at which Franklin T. Griffith, president of the company, testified. The committee also had access to records bearing upon the history of the local fare situation.

New Temporary Fare Schedule for Rockford

A new schedule of fares will become effective on Aug. 1 on the lines of the Rockford (Ill.) Traction Company which will mean a saving for regular patrons but an increase of 2 cents for the occasional riders and those who pay cash fares. The order of the Illinois Commerce Commission at the same time restricts the operation of the Fay Motor Bus Company.

Under the new plan four tickets will be sold on all cars for 25 cents, good for the bearer. In addition a forty-ride ticket can be purchased for $2, good for the use of any member of the family of the purchaser for the calendar month. These tickets are to be sold at at least ten central points in Rockford convenient to the patrons. The order also includes school tickets to be used by children over twelve years of age who attend high school, thirty rides for 90 cents. The single cash fare will be 10 cents.

The order states that while all the evidence in the complaint has not been completed the commission is of the opinion that temporary relief should be granted until the final determination of the reasonable permanent rate.

W. C. Sparks, vice-president and general manager of the traction company, intimated that the company may appeal the rate decision. He said that under the new tariff the estimated average fare will be 5.85 cents, while the present average was 7.3 cents.

Rockford patrons of the electric railway have not paid a 5-cent fare since pre-war days. When the commission authorized an 8-cent cash fare, the company had petitioned for a 10-cent cash fare.

Rehearing Denial May Mean Passage of Fare Ordinance

Denial by the United States Circuit Court of Appeals at Cincinnati to grant the city a rehearing on the Louisville (Ky.) Railway injunction, under which the company is now collecting a 7-cent fare, in the opinion of city officials makes certain the passage of the car-fare contract ordinance now before the City Council in its present form. Mayor Quin publicly stated that the Council would probably be in contempt of court unless it passed the bill as it is.

James P. Barnes, president of the company, has been invited to meet the railroad committee of the lower board of councilmen immediately before the next meeting of the Council convenes. President Barnes has accepted the invitation. It is said that the point at issue with some of the dissatisfied Council members is the 7-cent cash fare with a 6-cent ticket fare. They demand a straight 6-cent fare and a guarantee of "adequate" service, it is said.

City officials predict that if the measure fails to pass the case will be in litigation at least two years before any settlement is reached and that the company's injunction, by which it collects a 7-cent fare, will obtain during that time.

Bonus Increases Courtesy and Develops Public Toleration

Winning a bonus is one thing for the men and something else for the company. For the lucky ones it means extra compensation and for the donor it means decreased number of accidents on its lines. At least, that is what it amounts to in Atlanta, Ga., where the Georgia Railway & Power Company is meeting with marked success on this bonus idea which was started some few months ago. As the bonus grows avoidable accidents decrease. In April, 564 motormen and conductors earned the $3 bonus pay for the month with a clean record. In May there were 691 men to be rewarded. Not only must the winners have a clean record on accidents, but they must also have had no disputes resulting in complaints from passengers and they must also keep strict obeisance to the rules of the company. F. L. Butler, general manager of the company, states that one of the outstanding effects of the bonus plan is that complaints from passengers have practically ceased. In his opinion this shows more courtesy on the part of the employees and more toleration on the part of the public. It also shows that cautious employees are usually the courteous employees.

Five-Cent Fare in Cleveland

John J. Stanley, president of the Cleveland (Ohio) Railway, has notified the Mayor and City Council that tentative figures showing the results of the operation of the car lines in June indicate that the interest fund is now in excess of $700,000, the point at which the ordinance calls for a fare reduction. Accordingly, Mr. Stanley says that the company is preparing to reduce the rate of fare one notch, as provided for by the grant, and that on and after Aug. 1 Cleveland car riders will ride for 5 cents or eleven tickets for 50 cents with a 1-cent charge for transfer. The present rate of fare is 6 cents cash with a 1-cent charge for a transfer. Directors of the company were scheduled to meet July 27 to hear the detailed report of the company's operation in June.

Public Co-operation Sought

Trollicar Topics has made its appearance in Jacksonville (Fla.), where the Jacksonville Traction Company is placing the pamphlet in the cars with the request "take it and read." A committee representing the employees proposes to issue this four-page leaflet weekly. The publishers of *Trollicar Topics* have invited criticism and suggestion and they express the desire to render to the public the best service possible resulting in a closer relation between the company, its employees and the public."

In the first number of the leaflet a message from the management is included. It is as follows:

> Our trainmen are the salesmen of the Jacksonville Traction Company. The passengers are our customers. Trainmen are reminded that patrons form their estimate of the company in accordance with the treatment received on the cars. It is therefore especially important that passengers shall be extended every courtesy and attention.

Transportation News Notes

Improved Service Increases Patronage.—Improved facilities provided by the Reading Transit & Light Company, Reading, Pa., to the park near the borough of Pottstown have resulted in increased patronage. A special rate has been offered to patrons riding to the park from any part of Pottstown. The new rate is effective from July 1 until Oct. 31.

Increased Rates in Effect.—The Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., put into effect on July 4 an increase in the zone fare from 5 cents to 8 cents. It was announced that 7 cents would be the rate per zone for persons purchasing ten or more tokens. The ruling of the court authorizing this increase was referred to in the *Electric Railway Journal*, issue of June 10.

Files Appeal on Increased Rates.—Corporation Councel O'Brien for the benefit of Bronx taxpayers has filed an appeal with the New York Transit Commission from its recent order giving permission to the New York, Westchester & Boston Railroad, New York, N. Y., to advance its fare within the city limit from 5 cents to 7 cents. The city contends that the petition for increased rates was made on war-time prices.

Injunction on Fare Order Issued.—Judge Page Morris of the Federal Court issued an injunction on July 19 to prevent the State Railroad & Warehouse Commission from enforcing its order July 14 allowing the Duluth Street Railway a fare of 6 cents or five tokens for 25 cents effective Aug. 1. The hearing was set for July 29, in St. Paul. The city of Duluth had planned an appeal from the commission in the district court of St. Louis County.

Plan for Handling Traffic Tried.—A plan of "islands of safety" for the expediting of trolley traffic and the better protection of passengers was put in force in Springfield, Mass., on June 27 in the busy part of Main Street. The "islands" are outlined in white paint, and the plan enables automobiles to pass more rapidly than otherwise would be possible. Parking of automobiles is prohibited within thirty feet of either end of an "island." The plan is to be given a month's trial.

Will Reduce Fare.—The Grand Rapids, Grand Haven & Muskegon Railway has notified the City Council of Grand Haven, Mich., that it will reduce the fare from 6 cents to 5 cents on the Highland Park-Grand Haven run. The action was taken after the City Council passed an ordinance regulating the buses on the run. The city contended the company had no legal right to make the 6-cent charge as the franchise provided for a 5-cent fare. Highland Park is a resort center, where many Grand Haven people reside during the summer.

Fare Issue Deferred.—The United States Supreme Court has been requested by the Georgia Railway & Power Company, Atlanta, Ga., to review the decision of the Supreme Court of Georgia in its case against the Mayor and Council of the City of College Park. The company seeks to invalidate an ordinance of the Council forbidding the company from increasing its fares on the College Park line from 5 cents to 7 cents per passenger. The lower court upheld a suit of the council enjoining the company from exacting the increased fare. The case will not be considered by the court, however, until it reconvenes in October.

Electric Proud to Transport Washers.—The Illinois Traction System, Peoria, Ill., has the distinction of being the first electric railroad to carry a trainload of washing machines. This immense shipment of A B C washers consigned by the Altofer Brothers Company to the Morton Electric Company, St. Louis, Mo., caused much excitement along the way. Considerable interest was attached to the incident because the officials of the traction company considered the shipment an important one and established a precedent by giving this trainload the right of way on a daylight run from Peoria to St. Louis. No. 11 of Vol. 3 of The A-B-C of Selling, "Published in the interests of the World's Best Washing Machine," writes up this achievement of the Illinois Traction System.

Personal Mention

J. P. Ingle Takes Over Management of Jacksonville Traction Company

J. P. Ingle, who has been looking after the interests of Stone & Webster in many parts of the country, is now taking over the work of manager of the Jacksonville (Fla.) Traction Company. He succeeds Hardy Croom, who has been transferred to Boston to take charge of some special work for Stone & Webster.

Mr. Ingle for the past two years has been in Haverhill, Mass., in charge of the Stone & Webster property there. His work for eleven years previously had been in Keokuk, Iowa, where he went as superintendent of the Keokuk Electric Company. In 1914 he became general superintendent, and in 1915 manager of the company. The Keokuk Electric Company does the electric railway, lighting, power and gas business in several towns in Iowa and Illinois. He was president of the Iowa Electric Railway Association in 1919.

Twenty-seven years of service in the public utility field is Mr. Ingle's record. His work has ranged from that of office boy, billing clerk and bookkeeper with the Atlanta Gas Light Company, assistant superintendent of the Gas Light Company of Columbus, Ga., and superintendent of the gas department of the Boston Rouge (La.) Electric Company. He was graduated from the Georgia School of Technology.

H. G. Mason Made Superintendent

H. G. Mason has been made superintendent of transportation of the Ohio Electric Railway, Springfield, Ohio. Other appointments recently made are: Executive, C. W. Randolph; superintendent city lines, O. J. Mannon; superintendent light and power, W. C. Winemiller; engineer power station, D. O. Snider; superintendent shops and substations, J. B. Corderman; engineer maintenance of way, J. F. Cupp.

I. W. Miller Leaves Olean Company

Irving W. Miller, for the past twenty-five years general superintendent of the street railway and branch lines in Olean, N. Y., of the Olean, Bradford & Salamanca Railway, has severed his connection with that company. Mr. Miller has made no plans for the future, but will spend some time at rest after his many years of strenuous labor.

Mr. Miller began his street railway career as a conductor in 1890 on the lines in Newark, N. J. In 1891 he went to Allentown, Pa., where he was employed as master mechanic at the carhouses there for several years. From Allentown he went to Lancaster, Pa., where he was placed in charge of construction work for the Lancaster Railway Construction Company. He was afterward also employed in various capacities at New Castle, Pa. In 1897 he went to Olean, where he has been since. He opened up the Portville line of the Olean, Bradford & Salamanca Railway and superintended construction of its lines to Bolivar, Shinglehouse and Salamanca.

H. S. Fleming President of Scranton, Montrose & Binghamton Railroad

At the permanent organization of the board of directors of the Scranton, Montrose & Binghamton Railroad, Scranton, Pa., Henry Stuart Fleming, New York City, was elected president of the company. R. W. Day was elected vice-president. He will continue as general manager.

H. S. Fleming

Mr. Fleming is a constructive engineer and his association with the company will mean the development of the property and the assurance of financial strength. He is well known in New York and London from his success in reorganizing old properties and greatly increasing their usefulness. From time to time he has had a hand in the management of railroads, navigation companies, public utilities, coal corporations, iron and steel plants, irrigation, telephone, timber and miscellaneous manufacturing concerns. In much of this work he has acted as the agent of bankers, numbering among his clients some of the principal banking institutions of the day.

He was graduated from the University of Pennsylvania in 1883 with degrees of analytical chemist and metallurgical engineer, opening his engineering office in Chattanooga, Tenn. He later took charge of blast furnaces, coal and iron mines in Dayton, Tenn.; Mayville, Wis., and Emporium, Pa. In 1890 he opened an engineering office in New York and shortly afterward, at the solicitation of the late C. D. Simpson, became secretary and treasurer of the Anthracite Coal Operators' Association, retaining this position until the purpose of the association was accomplished and it was disbanded.

From the mining field he passed to other large industrial operations, serving as adviser, financial expert and in many cases as the executive head of important enterprises, among them the Staples Coal Company of Boston and other enterprises in which he acted for Edward J. Berwind, financier, the Montana Coal & Iron Company, which he built up from a small operation to one of the best and most practical coal companies in Montana, and Canadian Collieries (Dunsmuir) Ltd., on Vancouver Island, B. C. He is also associated with Colgate Hoyt & Company and E. C. Benedict & Company of New York as a director and in charge of the operations of the Moju Rubber Plantations Company, owning rubber plantations in Brazil; with E. C. Benedict & Company as a director of the Roadless Patents Holding Company, owners of the American rights in a new form of suspended caterpillar tractor developed by the British War Office, and has for many years been a director of the Empire Trust Company of New York.

He is a member of the American Society of Mechanical Engineers, American Institute of Mining Engineers, American Chemical Society, American Society for Testing Materials, International Association for Testing Materials, North of England Institute of Mining and Mechanical Engineers and the American Geographical Society.

Charles Day, has been elected vice-president of the Citizen's Traction Company, Oil City, Pa. He succeeds James Crosby Brown.

G. F. Russell is now superintendent of public utilities of Seattle, Wash., succeeding Carl H. Reeves. As such he is in charge of affairs of the Seattle Municipal Railway.

C. A. Leland, Jr., who has been operating superintendent of the Atchison Railway, Light & Power Company, Atchison, Kan., has been promoted to the position of general superintendent, which was previously held by J. W. Waggener.

R. S. Huber, is now holding the position of superintendent of the Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, left vacant by the resignation of E. O. Shryock. The latter is now superintendent of the Columbus, Newark & Zanesville branch of the Ohio Electric Railway.

Ross Murphy, newspaper man of Memphis, Tenn., has been appointed director of the Tennessee Public Service Information Bureau, which has just started to issue a news bulletin of general utility information. Headquarters of the information bureau are in the Chamber of Commerce Building, Nashville.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Priority Orders for Coal Movement

In order to facilitate rapid movement of coal, the Interstate Commerce Commission, in an order effective July 26, 1922, established five classes of preferential consumers to whom coal shall be delivered. Public utilities are listed in Class 2 of preferred consumers.

The various classes and the purposes designated are:

1. For such special purposes as may be designated by the commission.

2. (a) Fuel for railroads and other common carriers and for bunkering ships and vessels. (b) For public utilities which directly serve the general public under a franchise therefor, with street and interurban railways, electric power and light, gas, water and sewer works. Ice plants and hospitals are also included. (c) For government institutions, hospitals, schools, etc., and to common carriers which supply coal to these institutions.

3. For bituminous coal consigned to any Lake Erie ports for trans-shipment by water to points on Lake Superior.

4. Commercial sizes of coal for domestic use.

5. Coal for other purposes.

Representatives of public utilities of New York City conferred with Secretary of Commerce Hoover on Wednesday in connection with plans to secure necessary coal for such utilities. Conferences were also held with representatives of the Shipping Board looking to the use of coal which is being imported from abroad by the board.

Marion Properties Coal Supply Good

Marion, Ohio, industries seem to be in no immediate danger of shortage of fuel on account of the coal and rail strikes. The Columbus, Delaware & Marion and the Columbus, Marion & Bucyrus interurban lines have supplies sufficient for six months.

Electric Railway Construction in Spain

The United States Department of Commerce reports a total of 12 km. of new street railway as put into operation in Spain during 1922: The line from Avilés to Salinas (Oviedo), 6 km. in length; the Armilla-Alhendin (Granada) section, 4 km.; and the Sol-Atocha portion of the Madrid subway, 1.81 km. In addition, work has begun on the Metropolitano de Barcelona, which will join the port with San Gervasio, passing through the Plaza de Cataluña. A second enterprise, the Gran Metropolitano de Barcelona, has secured concessions for a line to cross that city in an opposite direction from Sans, an industrial suburb, to the Norte Railway Station, also traversing the Plaza de Cataluña.

Several different electric railway lines are in operation or being constructed. On the Metropolitano de Madrid the section Sol-Ventas and the extension of the section Atocha-Vallecas are in actual operation. Work is under way on the line from Granada to Zubia, and also on the Call d'en Rabassa al Arenal in Palma de Mallorca. The work on the extension of the railway from Correño to Avilés, a distance of 25 km., is well under way and will be completed this year. The main line of this road, running from Gijón (Musel) to Veriña, Aboño and Candas, was electrified in 1920.

Altogether, four interurban electric railways have been put in operation: The first, from Barcelona to Sarriã, now extended to Manresa (about 65 km. away); the second, from Pamplona to Sanguesa (54 km.); the third, from San Sebastiãn to the French frontier at Hendaye, a distance of 23 km., and the fourth, the line from Musel to Avilés (mentioned above), 32 km. in length. Petitions for concessions covering new interurban electric railways and street railways are numerous.

Powdered Fuel to Be Used in St. Louis

The Union Electric Light & Power Company, subsidiary of the North American Company, has decided on plans for a $6,000,000 power plant in St. Louis in which powdered fuel will be burned.

The reasons for this decision are not necessarily applicable to other large plants, but depend on quality and price of fuel, site of the plant, general layout, load factor and other conditions, so that each individual case must be worked out according to its own merits. Extensive tests and investigations on stoker equipment in comparison with pulverized fuel indicated to the designing engineers that the latter contains advantages under conditions obtaining at this plant.

The present plant is situated 20 miles from the center of the coal mining district, so that the fuel costs approximately $2.50 a ton and contains in the neighborhood of 17 per cent ash; hence the decision to use powdered fuel is here of marked significance.

The initial installation will include eight B & W boilers of 18,000 sq.ft. of heating surface each, with one 30,000-kw. single-cylinder General Electric and also a Westinghouse unit of the same size. The plant will ultimately contain eight similar units. Steam will be supplied at 300 lb. absolute, 690 deg. at the throttle, the boilers being arranged for 350 lb. pressure. Economizers will not be installed.

An unusual feature will be the installation of the Lopulco System for powdered fuel, by the Combustion Engineering Corporation, in the boiler room; this is contrary to the usual practice of installing the powdered coal equipment in a separate building.

McClelland & Junkersfield, Inc., the consulting engineers and constructors in charge of this project, point out that improvements may be expected in the development of stokers as well as in pulverized fuel equipment, but that stokers have been under development for a long period of years and the burning of coal in pulverized form in large quantities by central stations has been done only in the last few years.

Activity in Car Building Business

The United States Department of Labor through the Bureau of Labor Statistics compiles monthly reports concerning the volume of employment from representative establishments in twelve manufacturing industries. Among these is that of car building and repairing, whose figures for June, 1922, compared with June, 1921, are as follows:

STATISTICS OF CAR BUILDING INDUSTRY

	June, 1921	June, 1920	Increase per Cent
Number of establishments reporting....	61	61	....
Number on payroll..........	44,462	58,025	30.5
Amount of payroll..........	$3,057,619	$3,481,629	13.9

There was an increase in June, 1922, over May, 1922, of 6.9 per cent in number of men on the payroll and 10.6 per cent in the amount of the payroll. This is an increase of 3.4 per cent per capita.

Other industries showing increases in amount of payroll between June, 1922, and June, 1921, are iron and steel, 40.7 per cent; automobiles, 24.7 per cent; hosiery and underwear, 15.2 per cent; leather, 14.4 per cent; paper making, 12.0 per cent. Decreases were shown in the other five industries listed, namely, cotton manufacturing, 34.0 per cent; silk, 33.8 per cent; cotton finishing, 22.6 per cent; men's clothing, 10.9 per cent; cigar manufacturing, 10.5 per cent.

Metal, Coal and Material Prices

Metals—New York	July 25, 1922
Copper, electrolytic, cents per lb.........	13.687
Copper wire base, cents per lb...........	15.625
Lead, cents per lb......................	5.70
Zinc, cents per lb......................	6.25
Tin, Straits, cents per lb................	32.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons......................	$7.675
Somerset mine run, Boston, net tons......	3.75
Pittsburgh, mine run, Pittsburgh, net tons	....
Franklin, Ill., screenings, Chicago, net tons	...
Central, Ill., screenings, Chicago, net tons	....
Kansas screenings, Kansas City, net tons	4.25
Materials	
Rubber-covered wire, N. Y., cents per lb..	5.90
Weatherproof wire base, N. Y., cents per lb.	15.50
Cement, Chicago net prices, without bags...	$2.05
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	91.50
White lead, (100-lb. keg), N. Y., cents per lb.	12.50
Turpentine (bbl. lots), N.Y., per gal......	$1.20

Rolling Stock

New York Consolidated Railroad, through its receiver, Lindley M. Garrison, has stated that in accepting the recent order of the New York Transit Commission the terms are accepted with the understanding that the fifty all-steel cars to be ordered shall be trailer cars.

Savannah (Ga.) Electric & Power Company through Manager Brooks has announced that the thirty one-man cars recently purchased will be installed for service as rapidly as they are delivered by the manufacturers. Reference was made to this purchase in the *Electric Railway Journal*, issue of July 22.

Louisville (Ky.) Railway expects to purchase fifty or more single-end safety cars built according to standard specifications except that they will be equipped with a separate exit and entrance doorway, each door to be operated by a separate door engine. The placing of the order is contingent upon the passage of an ordinance now pending before the Louisville general council.

Track and Roadway

Reading (Pa.) Transit Company will pave between its tracks on Cumberland Street between Fourth Street and Lincoln Avenue in Lebanon.

Gary (Ind.) Street Railway will reconstruct its tracks and repave its right of way following the recent improvement order of the Board of Public Works.

Community Traction Company, Toledo, Ohio, has received the approval of the council for repaving between the rails of Ashland Avenue, East Broadway and Woodville Street.

Trenton & Mercer County Traction Corporation, Trenton, N. J., used steel ties for the first time in the history of the concern, in connection with the laying of new tracks on South Clinton Avenue and on East State Street.

Cincinnati, Georgetown & Portsmouth Traction Company, Cincinnati, Ohio, expects to spend $150,000 in restoring the roadway, tracks and car equipment within the next six months.

Quebec Railway, Light, Heat & Power Company, Quebec, Can., has been notified by the City of Quebec that it must start work upon the proposed extension on Dorchester Street and on the Charlesbourg Road before Aug. 1.

Knoxville (Tenn.) Railway & Light Company will construct the loop on Walnut Avenue between Clinch and Union Avenues. The improvement will involve an expenditure of between $20,000 and $25,000.

Omaha & Council Bluffs Street Railway, Omaha, Neb., is tearing up its old track and laying new steel for more than a mile on North Sixteenth Street and for about the same distance on Sherman Avenue.

Public Service Railway, Newark N. J., is making improvements to its roadway on Haddon Avenue, Collingswood, Westmont and Haddonfield. The roadbed is being relaid and graded to the level of the pavement and new rails are being placed.

Southern Indiana Gas & Electric Company, Evansville, Ind., will pave the streets between car tracks soon. The improvements will cost about $15,000. The company will ask permission to lay double tracks in Walnut Street. This improvement will cost approximately $40,000.

Trenton Bristol & Philadelphia Street Railway, Philadelphia, Pa., has abandoned temporarily plans for the construction of an extension of the tracks down the foot of Market Street, to the foot of the Delaware River, Bristol, Pa. It was the intention of the company to run a siding from the Radcliffe Street division to expedite traffic to Island Beach in the Delaware River. The cost of construction is considered too high at this time and the project was laid over.

Springfield (Mass.) Street Railway has announced track-laying projects for the season estimated to cost $131,000. The double-track line to Indian Orchard, Ludlow and Palmer is to have new rails on Berkshire Avenue between Bay Road and Harvey Street, about four-fifths of a mile, at a cost of $45,000 and for about one-fourth of a mile in North Wilbraham at a cost of $15,000; the Belmont Avenue single-track line is to be renewed from Bellevue Avenue to Oakland Street, about three-fourths of a mile, at a cost of $21,000; the Liberty Street line is to be double-tracked from Fisk Park to St. James Avenue, about four-fifths of a mile, at a cost of $30,000; the Longmeadow line from the Green north is to have new tracks totaling about one-half of a mile at a cost of $10,000; the line to Holyoke is to have a half-mile of new track in West Springfield at a cost of $10,000. Several shorter renewals will be laid at an average cost of $5,000 per project.

Power Houses, Shops and Buildings

Northern States Power Company, Fargo, N. D., opened up recently its new office and appliance display room at Sioux Falls, S. D. Practically all departments of the company are now grouped in one building.

West Jersey & Seashore Railroad has announced that an agreement has been reached with the Pennsylvania Railroad whereby power will be purchased from the Philadelphia Electric Company. Work on the necessary connecting line will be started at once. The line will run across the Delaware River bridge and connect with the West Jersey & Seashore line in Westville. The current now used by the railroad is generated at its Westville plant. It has not yet been decided whether this plant will be abandoned or maintained for auxiliary and emergency use.

The Union Street Railway, New Bedford Mass, has recently increased the generating capacity of its Parker's Wharf Power Station by 2,000 k.w. This station, which was completed in 1919, provides direct current at 600 volts for the operation of the railway system in and about New Bedford and has now a total rated capacity of 6,000 k.w. The electrical work on this installation was by Ernest Howarth & Company, New Bedford, and the piping by the Lumsden & Van Stone Company of Boston. Engineering and general construction was by the Harry M. Hope Engineering Company of Boston, which was also the engineer on the original installation.

Trade Notes

Westinghouse Electric International Company recently extended its offices in Mexico City, Mexico. The company also maintains large warehouses on the outskirts of the city where quantities of stock are kept on hand to meet trade demands.

Automatic Register Company, St. Louis, Mo., announces that it has an automatic fare register on exhibition at the works of the St. Louis Car Company, St. Louis, Mo., and all interested are invited to inspect this exhibit.

Griffin Wheel Corporation, Chicago, Ill., is converting its brass foundry at South Tacoma, Wash., into an electric furnace foundry by installing Baily resistance type electric melting furnace equipment. The furnaces are built by the Electric Furnace Company of Salem, Ohio.

New Advertising Literature

Schweitzer & Conrad, Inc., Chicago, Ill., has issued a folder entitled "Lightning Arrester Performance." This gives information in regard to the company's type H arrester.

General Welding & Equipment Company, Boston, Mass., has issued a booklet in connection with its welding and cutting equipment. This gives information regarding automatic cutting and welding machines.

Link Belt Company, Chicago, Ill., has just issued a booklet, No. 444, describing its power hoe. This is an improved form of drag scraper for handling coal, gravel, sand or similar material.

Economy Electric Devices Company, Chicago, is distributing a folder describing the electrical and mechanical characteristics of the Lind aluminum field coil, for which it has recently become the general sales agent. The saving in weight possible by replacing copper with aluminum steel coils is shown in tabular form for a number of various types of motors.

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The Traffic Leak via Telephone

AT DIVERS times this paper has had something to say with regard to the connection between the telephone and the street railway; how increased use of the former often follows decreased use of the latter. One interesting way in which this relationship came to light in a certain community was in the change of policy by a large "cash and carry" grocery.

This grocery had built up its business to a volume that had its old-time delivery rivals thoroughly frightened. This had occurred during a period when fares were low and traffic at its maximum. The store was located in the downtown area, so that most patrons had to make use of the street cars. When the fares were almost doubled, however, there was a sharp falling off in this personal, take-it-home shopping. It was not the prices that were at fault, but the public's sudden awakening to the fact that carfare really existed and was now an item to be taken into consideration.

What did the merchant do about this situation? Perhaps he spent a few minutes in cussing out the street railway, which had followed the upward swing of prices long after the groceries of the town. Or perhaps he didn't cuss. At any rate, he was a practical philosopher and reasoned that if people would no longer come to him, he would have to go to them. So he installed a battery of telephones and uttered the old "Cash and Carry" slogan in whispers only. His clerks now sell by telephone. Unlike the street car, the telephone doesn't help to carry the goods home. The street railway is out the fare, and doubtless the customers and the grocer must share between them the increased cost of doing business via telephone instead of street railway.

Of course, this is only one of the many ways in which the telephone acts as an apparently cheaper substitute for the street car. The word "apparently" is used because personal shopping or face-to-face discussion is in the long run the most satisfactory for all concerned. Here is a most effective argument for the increase in car riders and one that at the same time will meet with the hearty indorsement of every merchant in town.

Paris Now Has a Super-Power Plant

DURING the past few years a number of great power plants have been put into commission, notably in this country, for the purpose of cutting the cost of producing a kilowatt-hour of electrical energy. They might properly be termed "super-power plants" by virtue of their size as compared with the usual plant. There are now several coal-burning plants in this country with ratings of 150,000 kw. or more and they are producing a kilowatt-hour from less than two pounds of good coal, corresponding to, say, from 20,000 to 25,000 B.t.u. in the coal per energy unit turned out.

The latest competitor for honors in this field is the Gennevilliers power plant of the Union d'Electricité, located in the suburbs of Paris. It is now approaching completion. No operating results are as yet available, but from the guaranteed steam consumption of the turbines, less than 9.5 lb. per kilowatt-hour at the best load, there is no doubt that the fuel consumption will be very low. It may well break the record in this particular; only time can tell. Such scrupulous care has been taken to utilize the possibilities of what the late Robert H. Thurston called "the power and potency of high-pressure steam" that it would be a disappointment to power plant engineers everywhere if the results at Gennevilliers should prove disappointing.

What are some of the ways in which, in this case, more than usual of the available heat in the steam has been tempted to transform itself into mechanical energy? In the first place the high throttle pressure of 313 lb. gage with 280 deg. F. superheat was adopted. Thus the steam temperature is above 700 deg., which in itself insures a low fuel consumption. Then flue gas, generator and other losses are trapped and returned to the feed water and the air for the furnaces is preheated by the flue gases. Every possible provision is made to preserve perfect heat balance in the plant.

Recent giant power plants have been designed with such skill that no sensational results can be expected in the latest one. Locally it will prove astonishing to those who have not kept pace with the latest developments, for it will cut down energy costs tremendously. In addition it will play an important part in transportation in the Paris vicinity and will ultimately form a part of a super-power system now being developed in sections by the great steam railroads of France.

More to Be Pitied than Censured

SEVERAL papers in New York City are disposed to be over-critical of the railway in commenting on the recent power accident which compelled a suspension of service during the rush hour on the Brooklyn Rapid Transit on July 25. In view of two or three interruptions to service recently on the transit lines in New York the easiest thing to do is of course to blame the companies. The facts are, however, that both the Interborough subway short circuit of July 6 and the B.R.T. power house accident were untoward incidents of operation ever potentially present but seldom actually occurring. So far as the Interborough is concerned the company has been exonerated by the transit commission in that it has been found that the deadly fumes from which passengers suffered were generated from the burning insulation, copper, paint and other substances, and that no hazard was present to passengers because the company had not exhausted its resources in the search for some other means than that which is used for preventing fire in its cars. In the Brooklyn case a fire following a short circuit in an oil switch in the main generating station had to be fought with water because the flames spread to nearby apparatus. In suppressing the fire enough of the water leaked through the floors to necessitate the shutting down of the generators.

The Brooklyn accident should be remembered, if at all, for the excellent and prompt way in which the company reassured passengers in its stalled cars and trains and for the expediency with which service was resumed.

The transit companies are just as anxious to render travel on their lines safe as is the public in desiring to be safe or as are the public officials in seeking to make travel safe. A moment's serious reflection ought to be enough to prove this to be true. But even a moment's serious reflection is too much for politicians with axes to grind. In both the Brooklyn Rapid Transit and the Interborough cases there was a combination of circumstances extreme in their degree of probability of recurrence. If anything both accidents serve to illustrate how greatly attenuated and refined are the elements which tie together the transportation arteries of any metropolitan transportation system and how unerring they usually are in functioning day in and day out.

Co-operation with Municipal Engineers on Track Problems Is Essential

THE subject of tracks in paved streets is one of the most important now, as ever, before electric railway engineers for study. Its status was clearly outlined in the paper read before the Engineers' Club of Philadelphia some months ago by E. J. McIlraith, of the Philadelphia Rapid Transit Company. Mr. McIlraith's analysis was abstracted in the issue of this paper for July 29. The following comments are intended to reinforce his statement of the situation:

The problems which require solution in this connection are numerous and pressing. The very fact that electric railway engineers have not settled upon one, two or even three general types or standards to be adhered to in surface-track construction indicates the difficulty which lies in the path of such an action. Municipal engineers have sometimes criticized railway engineers because more has not been done in this direction. They have not fully understood the nature of the situation, which is three-fold:

First, there is the limited knowledge of the nature and bearing power of soils in streets at the sub-grade level, for neither the municipal nor the railway engineer has made much of a study of sub-soils. Until more is known about the stability of these soils and the need for drainage, there will be considerable hesitancy in the setting up of any standards of construction which can be applied to a large extent all over the country. Here seems to be an opportunity for an extended and careful study of soils, involving samples taken from numerous and widely separated locations. These samples might be analyzed at Washington. Tests of the various soils for ability to retain or discharge moisture must be made and further tests are desired with respect to the action of these soils under varying loads and temperatures. In the tests the soils should be confined as they are in the streets, but slightly below the surface at the bearing level or subgrade.

Second, there is the general division of engineers into two camps on the relative merits of the solid concrete, or rigid type of construction as compared with the resilient or ordinary stone ballast construction for tracks. Municipal engineers seem to recognize this important factor in their proposed specifications for track construction, which describe not only the two foregoing types but also the concrete-slab sub-ballast type of construction which is having some vogue.

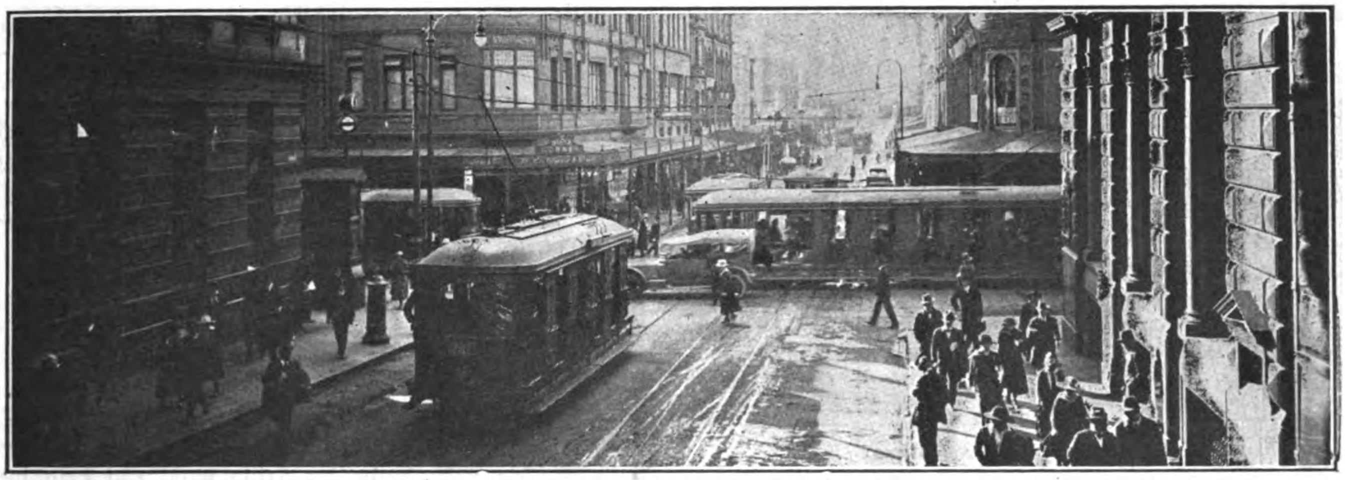
Third, the question of what constitutes a proper or efficient type of pavement for a track has never been fully settled. There is no doubt, however, that several distinct types of pavements can successfully be installed and maintained in street railway tracks, provided they are carefully selected to suit the tracks and with due regard to vehicular traffic.

It must be admitted that many good track pavements have been disrupted by inadequate track construction. Frequently an attempt unduly to prolong the life of a track has led to trouble along these lines. Again, municipalities have sometimes forced the railways to install inappropriate types of pavements in tracks, and have, nevertheless, afterwards blamed the railways for their early failure. The impression that some municipal engineers seem to have to the effect that tracks cannot be properly paved is erroneous, because there are many miles of well-paved tracks about the country which are standing up well under the most severe usage.

The attempt to limit or define the details of the track proper in such matters as joints, rail fastenings, tie plates, ties and similar items has little merit. It would be far better to make statements of the desired qualities and allow some choice in the methods which may be used in meeting them. Certainly no municipal engineer would attempt to set up a single kind of asphalt or a single kind of brick for use in pavements all over the country, nor would he try to tell his brethren how he should regulate the crowns and grades of his streets without first seeing the actual conditions to be met.

Another feature of track maintenance in streets which involves consideration in the design of tracks is the constant disruption of the pavement and roadbed caused by openings made to accommodate sewer and water-main construction, to say nothing of other openings made incidental to the installation of the services of the various utilities such as telephone, electric light and gas companies. It frequently happens in the course of reconstruction of a set of tracks in the streets, that even before the work is finished the track is ripped open somewhere to permit the making of house connections or to accommodate some one of the above-mentioned utilities. Such openings cannot fail to harm the track structure, to say nothing of the pavements which are seldom properly restored following such openings. Damage to track pavements, which the laws require the railways to maintain, when caused by other than railway forces, are a source of misunderstanding.

From the considerations outlined it is evident that a more thorough co-operation between municipal and railway engineers relative to track pavements is highly desirable to be brought about. A better mutual knowledge of the controlling factors will benefit both municipalities and railways. It is to be hoped that the Engineering Association in its joint study with the American Society for Municipal Improvements will be able to convince the latter that the subject is one which may require a year or two of continued conferences before an agreement can be reached upon the fundamentals. Snap action would be most unfortunate.



INTERSECTION OF GEORGE AND KING STREETS, SYDNEY, WHERE A HEADWAY OF EIGHT SECONDS IS MAINTAINED

Rolling Stock for Sydney Metropolitan Electric Service

A Description of Some of the Street Traffic Problems Encountered in Sydney, Australia, and the Necessity for Using Cars of Large Carrying Capacity for Handling the Rush-Hour Loads—The Latest Type of Tramcar Construction Is Also Given

A BRIEF ARTICLE of the New South Wales Government Tramways in Sydney, Australia, with map, was published in the ELECTRIC RAILWAY JOURNAL for July 6, 1918. Certain service conditions and details of new rolling stock now being placed in operation were recently given in a paper read before the Sydney Division of the Institution of Engineers of Australia by William Alexander Gordon Douglas. Much of the information given in this article is taken from that paper. The illustrations used were not a part of the paper as presented by Mr. Douglas, but are reproduced with the permission of the New South Wales Government Tramways through C. F. Dewey.

Sydney, like most large cities, has its congestion problems, and during the rush hours the tramway load in the city sections has reached large proportions. The figures in Table I show the number of cars or trains on ordinary weekdays during the evening rush hour, which occurs between 5:15 and 6:15, on certain business streets.

Table II shows a number of different types of cars in service, how used, when placed in commission, and the annual mileage, based on the record during the first five months of 1920.

The average number of passengers carried per outward-bound tram in George Street during the rush hour is eighty-five; a considerable proportion of the units in question being pairs of large coupled cars. Experience has shown that any increase in the number of trams in George Street over and above the figures given in the table results only in a dislocation of the service, despite the utmost efforts of the staff, and on this line it must be accepted that under the present system the limit of headway has been reached.

Prior to the war the number of passengers carried per annum per head of population had reached 362, and though the figure for 1920 did not nearly reach this level it is again rising rapidly, as is also the total population, showing clearly the necessity for rapid development of the service to anticipate the traffic demands.

TABLE I—SYDNEY CITY SERVICE, RUSH-HOUR CONDITIONS

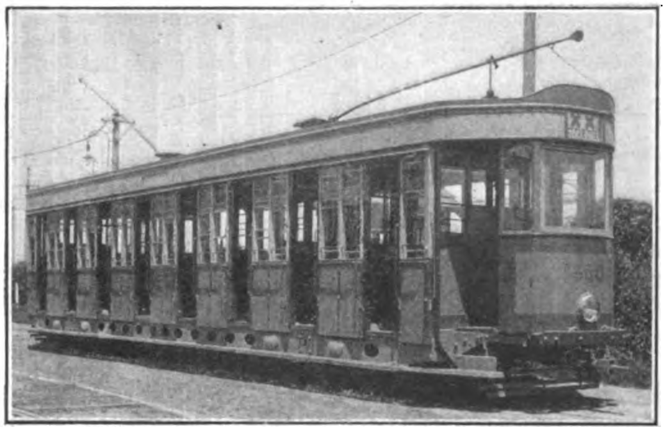
System	No. of Cars Or Trains During Rush Hour	Headway In Seconds
George Street and King Street Crossing (four ways)	438	8
Elizabeth Street and King Street Crossing (four ways)	380	9
King Street only, one way	62	58
Pitt Street only, one way	143	25
George Street West, one way	200	18

Table II, covering the annual mileage of each class of car in the service, shows the extent to which the larger units are used, this being particularly noticeable in the case of the "L" type cars, where the annual mileage of the single cars with fifty-five seats is only 5,500, compared with 18,600 miles for the coupled sets, which seat 110 passengers.

Special attention was given to keeping the steps of the "O" type car as low as was possible under the conditions prevailing at the time, and suitable recesses,

TABLE II—ROLLING STOCK OF THE SYDNEY METROPOLITAN TRAMWAYS—TYPES OF CARS, DATES OF BUILDING AND ANNUAL MILEAGE

Types	Cars			How Used	Placed In Commission	Annual Mileage Based on First Five Months of 1920.
	Type	Seats	Number			
Single-truck closed	(C)	22-26	51	In trains	1897-9	2,200
Single-truck combination	(D)	34	16	In trains	1899	3,300
St. Louis and Brill coupled	(G)	49	16	In trains	1899-1900	15,600
Double-truck combination	(L)	55	251	Mainly trains	1900-02	14,200 (single, 5,500; coupled, 18,600)
Single-truck cross-seat for trains	(E)	45	202	In trains	1901-03	20,000
Seventy-passenger	(N)	70	90	Single	1901-06	16,000
Single-truck cross-seat single	(J)	50	47	Single and in trains	1904-08	14,600
Tourist single-truck	(H)	50	2	Single	1907	17,500 (vary considerably)
Tourist double-truck	(M)	70	2	Single	1907	5,500 (vary considerably)
Single-truck cross-seat combination	(K)	50	107	Mainly coupled	1908-13	17,800
Eighty-passenger	(O)	80	626	Coupled and single	1908-14	22,300



NEW TYPE OF CAR FOR SYDNEY

into which the wheels project, were provided in the floor. The wheels of the "O" type are 33 in. in diameter on the tread, but the height from the rail level to the under side of the floor is only 30½ in., with the exception of the two compartments over the truck centers, where the corresponding dimension is 33½ in.

NEW TYPE OF CAR

In view of the foregoing, it was decided that the new standard cars, to be known as "Type P cars," should all be motor cars of the maximum size which could be operated over the existing system, this decision being governed by the rush hour and special traffic demands, and not by the normal average loading. This is a confirmation of the policy adopted in 1908, when it was first decided to build eighty-seat cars, of which 626 have since been put into service. All the new standard cars will also be fitted with automatic car, air, and electric couplers so that they may readily be connected up as two-car trains for periods of heavy traffic.

The management realizes that these cars are too large and heavy for the most economical handling of the average normal load but it is thought it is only by their use that an immediate improvement can be effected in the rush-hour city service, under the existing conditions of routes, etc. Steps are being taken, therefore, to obtain also a limited number of small light-weight safety cars of the American pattern, with pneumatic door and step control and other automatic safety features. These cars will be tested on some of the suitable routes, and the future policy regarding the use of "one-man" cars for the Sydney tramways will no doubt largely depend on the results obtained.

GEORGE STREET, SYDNEY, SHOWING THE QUEEN VICTORIA BUILDINGS

PROVISIONS FOR COMFORT AND CONVENIENCE OF PASSENGERS

In the "P" type of car the height of the steps has been reduced by 3 in., as compared with the "O" type, through the use of a smaller diameter of motor, but cross benches with protection from wind and rain by balanced windows have been retained throughout the entire length of the car with the exception of the entrance openings which are fitted with special blinds.

The electric lighting on the "P" type car is on a more liberal scale than that provided on the older types; the lamp fittings have been partially sunk in the roof lining and fitted with shades which retain a greater portion of the light within the car and also protect the passengers' eyes from glare. The seat contour has been modified from the previous standard as the result of a series of tests, the contour finally adopted being one which was adopted by the New York Municipal Railway.

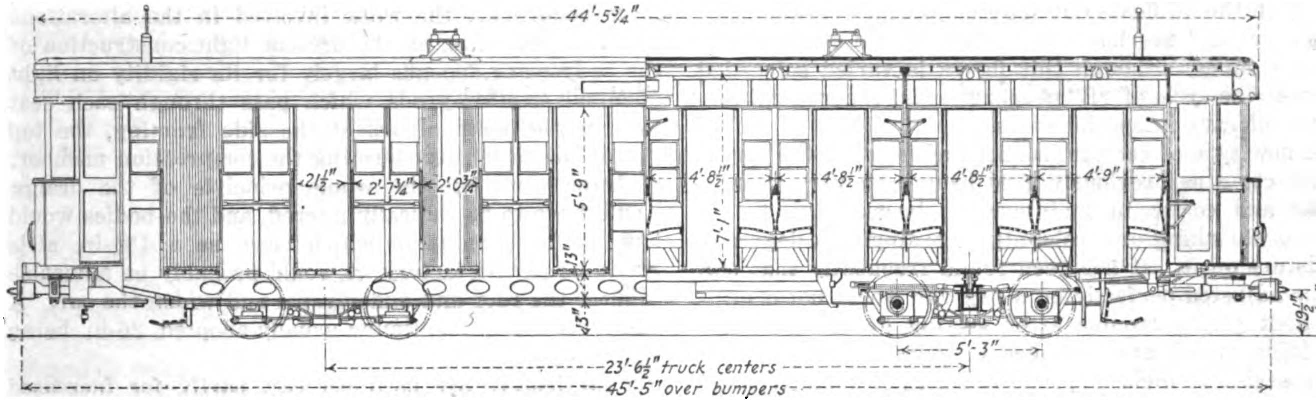
In place of the usual hanging straps for the use of standing passengers, stout handrails have been provided, running from side to side of the car, and of sufficient strength to give passengers ample support in every direction. Special attention has been given to the reduction of noise, and as far as possible loose parts have been eliminated or arranged to cushion against rubber stops.

The end destination boxes have been formed in the car framing at the end of the roof, and these will be clearly visible on cars moving through crowded thoroughfares, whereas the older types, which were mounted at the waist-rail level, could not be seen by a person standing in a crowd while at night they were more or less obscured by the glare from the headlight. Both side and end destination boxes will be illuminated at night, and the destination signs can be changed by operating hand wheels placed in convenient positions inside the car.

The trucks have been specially designed with a view to securing an easy riding car, and in this respect it is anticipated that the results attained will be an improvement on any of the existing stock. The maximum amount of seating accommodation which is possible in a car of this size has been provided in preference to reducing the seating space in favor of standing room.

THE REDUCTION OF CONSTRUCTION AND MAINTENANCE COSTS

Special consideration has been given towards obtaining a design which would readily lend itself to cheap construction and maintenance, and to this end it has been decided to use electric welding wherever practicable, it being lower in first cost than other methods, while its use reduces the number of separate parts to such an extent that there are comparatively few portions which can develop trouble by working loose. Moreover, it permits of lighter construction generally owing to the increased areas required by rivets and bolts.



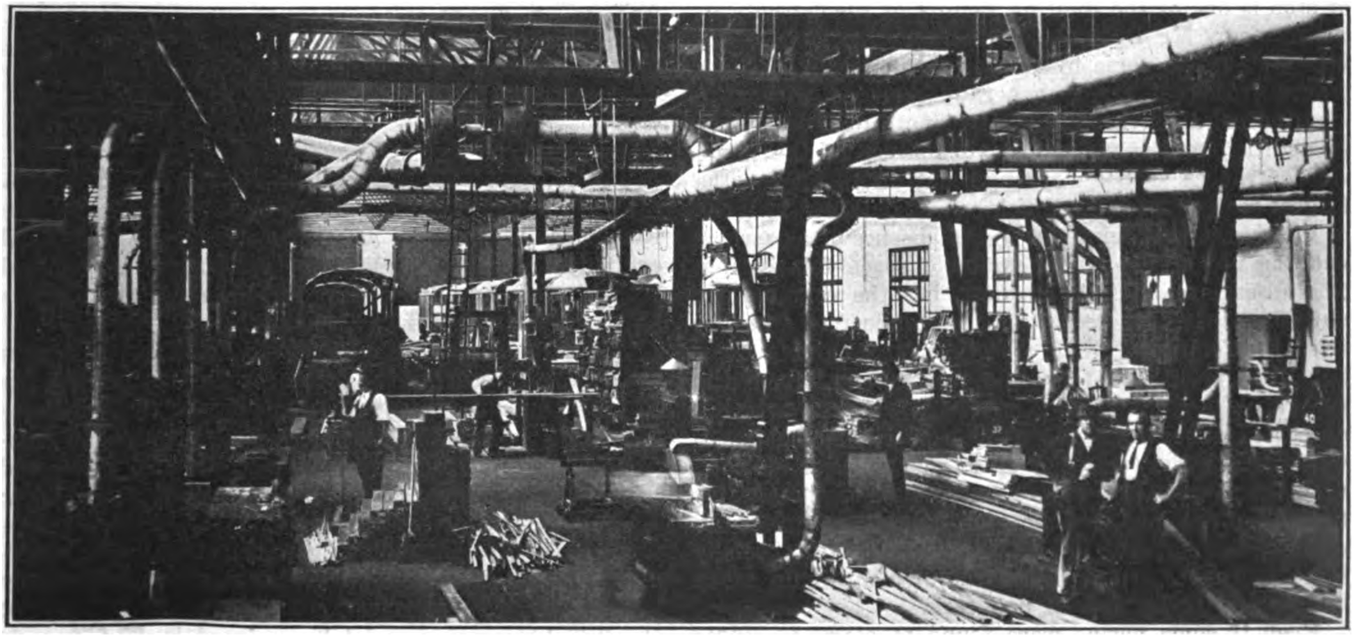
HALF SIDE ELEVATION AND HALF LONGITUDINAL SECTION OF TYPE "P" CAR, SYDNEY

Regarding the decision to use electric welding it may be of interest to mention that early in 1918 a pair of trucks were manufactured by this method, and were put into the heaviest service available. They have been in continuous operation ever since, excepting for the time required for regulation overhauls, and have now completed a service of over 42,000 miles. During this period the general operation has been entirely satisfactory, no weakness has developed, and with the exception of the usual attention to the ordinary wearing parts the maintenance costs have been nil. Electric welding has been very extensively used in effecting the tramway rolling-stock repairs during the last five years, as a result of which its use has now been decided upon for practically all work of this class. It is recognized, however, as a result of the experience gained, that the work must be specially designed to give the necessary flexibility for the successful use of this medium.

BODY FRAMING

To expedite production and facilitate repairs the body framing has been designed in such a way that whole quarters can be assembled and finished at the workmen's benches, after which they can be erected on the car as completed units. The roofs also are built on a suitable trestle framework which supports the work at the height best suited to the convenience of the car builders when they are standing on the workshop floor. When finished, the roof can be lifted into place, complete in all respects, the cables and fittings being already secured in position. No bent woodwork is used in the roof framing, the whole of the special shaped timbers being bandsaw work. The ends of the roof are not shaped in the usual way, the longitudinal contour being straight from end to end of the car, thus avoiding the necessity for specially tapering and fitting the boards when forming the ends of the roof. The seats are treated on somewhat similar lines, the battens being fitted into cast aluminum shapes, and assembled at the bench. All work is being made to gage or template, and will be strictly interchangeable with other similar parts, thus greatly facilitating repairs.

Special attention has been given to providing all wearing surfaces, where possible, with easily replaceable hardened steel liners, and an endeavor has been made to secure a life of wearing parts, and parts needing adjustment, which will carry the car over the average mileage between minor or "B" overhauls. The period between these overhauls is governed by the life of the wheel flanges, which averages 10,970 miles, and the axle boxes have been designed with a view to attaining this mileage, with a reasonable margin, without reoiling or other attention. This necessitated precautions being taken to keep water and dust out of the axle boxes, the former being a source of much trouble in tramway work where it is not uncommon for the water, picked up by the wheels in wet weather, to find its way into the reservoir in large quantities, as a consequence



PORTION OF WOODWORKING SHOP AT RANDWICK—SEVERAL CARS IN COURSE OF CONSTRUCTION IN BACKGROUND of which the oil floats out and dry journals result. The main, or "A," overhauls take place at the end of every 100,000 miles, although this figure is varied somewhat to meet the cycle of "B" overhauls, and the general condition of cars in special cases.

A new type of curtain has been adopted, as the spring roller curtains previously used have been very troublesome and costly in maintenance, largely due to the canvas shrinking or stretching according to a degree of moisture on it. It has been found frequently that curtains adjusted perfectly on a fine day would not operate without giving trouble after getting damp. The new curtains, which are arranged in pairs, are constructed as a series of folds or pleats attached to frames, which operate on the same principle as roller-sliding doors. In this arrangement ample allowance is made for the shrinkage of the canvas, and when not in use the curtains automatically fold away into space provided.

Care has been taken to avoid placing on the floor any unnecessary obstructions which may tend to collect dirt, and all fittings about the car have been left as plain and simple as possible to facilitate the car-cleaners' work; wider floor slats have been used with a view to increasing their life and reducing the work of sweeping between them. Spaces which would tend to hold water or dampness have been carefully avoided either by sealing the space altogether or by leaving ample room for air currents to pass through.

CONDITIONS AFFECTING RAPID LOADING AND UNLOADING

The arrangement of the seats and entrances on the "P" type car is in accordance with the department's standard practice, which dates back to the days of the original steam service. The car is divided into a number of small compartments, each 4 ft. 8½ in. wide, with a seat on each side extending the full width of the car, each seat providing accommodation for five passengers. Each compartment has an entrance from either side of the car, and this feature permits of a very rapid rate of loading and unloading, a continuous step being provided from end to end on each side of the car, both steps always being available when the car is in service.

This arrangement of entrances has proved most satisfactory during rush-hour traffic when the cars are being operated under minimum headway, and the length of stop is one of the limiting factors of the capacity of the service. Mr. Douglas said that no other large tramway system has come to his notice where the side entrance cross-seat car is generally accepted without a longitudinal aisle throughout the length of the car, but in addition to the undoubted advantages of the many side entrances such an arrangement offers by far the largest seating capacity which can be obtained in a car of given size, this being due to the absence of a corridor and the use of the whole available space for seating. The absence of an aisle however, has the very serious objection that it necessitates the conductors working from the footboard when collecting fares, giving them but little protection from the weather and from the general vehicular traffic. The adoption of end-entrance or center-entrance, in the opinion of the management, would reduce the frequency of service which is attained with the present type of car on account of the greater time required for loading and unloading, unless an entirely new type of low-step car body, with specially large entrances, were introduced, which would mean building an entire fleet of new cars.

Even if some means were found to carry on under these conditions, the work involved in the alterations would be immense, as the present light construction of the body work depends largely for its rigidity on light diagonal steel stayrods which pass through each seat back to the main pillars of the side framing, the top rail of the seat backs forming the compression member. If these were cut the whole principle of the design would have to be radically altered, and the bodies would have to be rebuilt, in which case, as a 16½-in. aisle would be unsatisfactory, it would probably be advisable to alter the roof and underframe and widen the car. A 22-in. aisle is the minimum usually adopted, 26-in. being better.

Four motors are used per car, partly for increased traction and partly to keep the floor low.

PAINTING

For several years the department has used air-drying enamel for painting the tramcar body work, in preference to the previous method of carriage painting and varnishing, which involved the application of no less than fifteen separate coats of paint and varnish, and required twenty-six days for application from start to finish, as compared with a total of six coats and ten days in the case of the enamel.

The applications of air-drying enamel on new work are as follows: Two coats of primer; two coats of surfacer; one coat of flat color; one coat of enamel. The car is well sandpapered after the fourth coat has thoroughly set, and slightly sandpapered after each other coat except the last.

Experience has shown that the results obtained are more permanent and much cheaper than those achieved by the previous methods. All coats applied are of the same tint as the final one scratches, therefore, are less apparent than when different colors are used.

The average life of the enamel is about twenty-two months, after which a further coat of enamel is applied over the old one with entirely satisfactory results, the only preparation required being a wet rubdown with horsehair and powdered pumice.

TABLE III—DETAILED DIMENSIONS OF "P" TYPE CAR

Length over bumpers	45 ft., 5 in.
Width over running-boards	9 ft., 0 in.
Width over body-framing	7 ft., 7 in.
Width over weather rails	8 ft., 0 in.
Height to top of roof	9 ft., 8¼ in.
Height of top of trolley bridge	10 ft., 8 in.
Height of steps—	
Rail to step	1 ft., 3 in.
Step to car floor	1 ft., 1 in.
Height of floor from rail level	2 ft., 4 in.
Wheel base of car	28 ft., 9½ in.
Distance between pivotal centres	23 ft., 6½ in.
Wheel base of trucks	5 ft., 3 in.
Gage	4 ft., 8½ in.
Total weight, including all equipment	15.35 tons.

For the two sample cars now being built in the Randwick Workshops of the system, one electrical equipment will be supplied by the Australian General Electric Company and one by the Metropolitan Vickers Electrical Manufacturing Company.

The Australian General Electric Company has been successful in securing the order for the equipments for for the next installment of twenty-five cars, and these will be of the following type: G. E.-247A motors, complete, 59-14 gear ratio, with "B" grade solid gears and "M" grade pinions; P. C. 5E 1 motor controllers; C. J. 129A master controllers; C. P. 27B air compressors; M. L. type compressor governors; S. F. 10 motorman's valves; U. S. 13D trolley bases, and all necessary switches, reservoirs, valves, etc. The estimated cost of the "P" type cars completely equipped is £3,650 each.

Swedish Railways Increase Use of Diesel Electrics

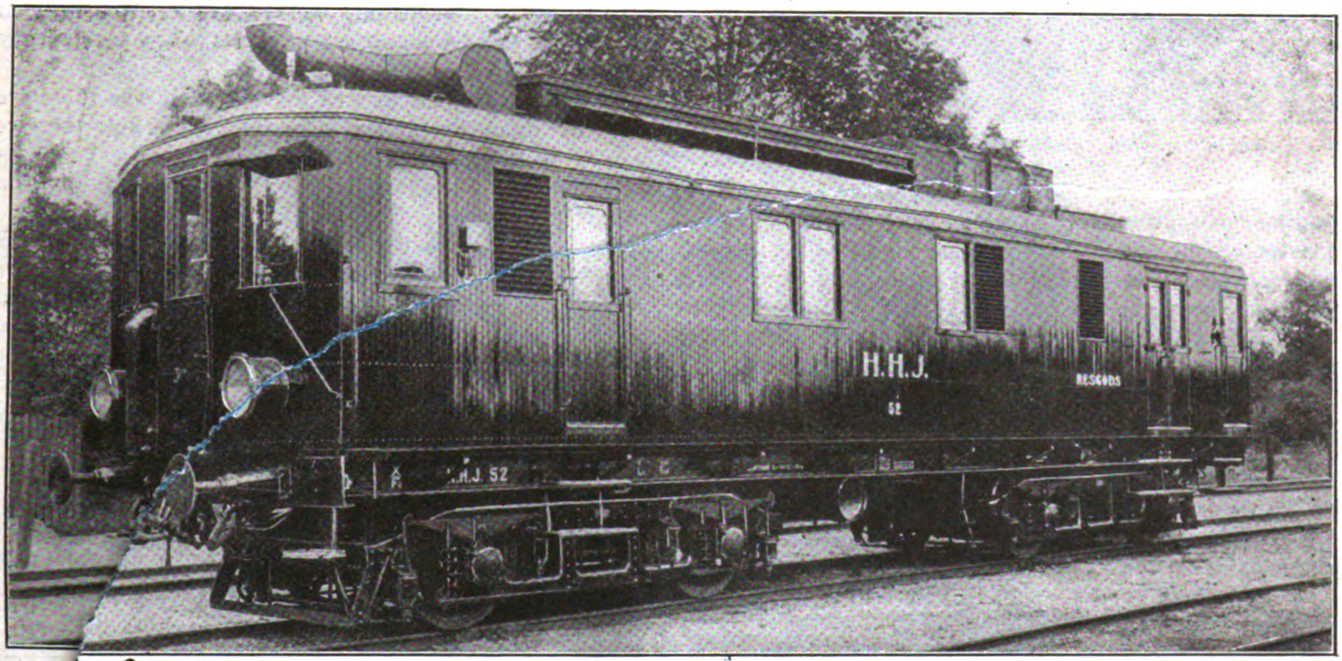
Success of Small Motor Cars Leads to Introduction of Those With 160 and 250-Hp. Capacity—Reduction in Operating Cost and Improved Service Among Results Achieved

IN SPARSELY populated districts and in countries where the railway mileage per inhabitant is high, so that the traffic is light, there must necessarily be a keen demand for light passenger equipment. This demand is being satisfied in Sweden, where the railway mileage per inhabitant is said to be greater than in any other European country, by the use of motor cars with Diesel engines and electric transmission to the driving wheels.

The motor cars described below are manufactured by the Diesel-Elektriska Vaghn-Aktiebolaget, of Vasteras, Sweden. The smaller sizes, rated at 75 and 120 hp., have been in use on seven different lines, some since 1913. Last summer some of the same lines that have used these smaller sizes put into operation motor cars of 160-hp. and 250-hp. capacity. At present four of the large units are in regular service on three lines in southwest Sweden connecting Halmstad, Smalandsstener and Nässjö, Helsingborg and Hessleholm, and other cities to the south of Gothenburg.

The 75-hp. car is designed to carry passengers as well as baggage, while the larger cars have baggage compartments only, the passengers being carried in trailers. The standard-gage 75-hp. car has two third-class compartments with seating accommodations for forty-one passengers, and a second-class compartment for ten passengers. Seats in the third-class compartments are of varnished pine, while those in the second-class have removable cushions and backs.

Hand-operated and automatic air pressure brakes can be controlled from each end of the car. All cars can be driven from either end so that no turntable is required. During the winter the car is heated by cooling water from the Diesel engine, this being led through radiators or pipes under the seats. Electric lights are provided and can be connected to the trail cars.



EXTERIOR OF 250-HP. RAIL CAR. EXHAUST PIPE AND RADIATOR FOR COOLING WATER SHOWN ON ROOF OF CAR

POWER EQUIPMENT

The complete power installation for the motor car consists of the following apparatus, which is similar for the different sizes:

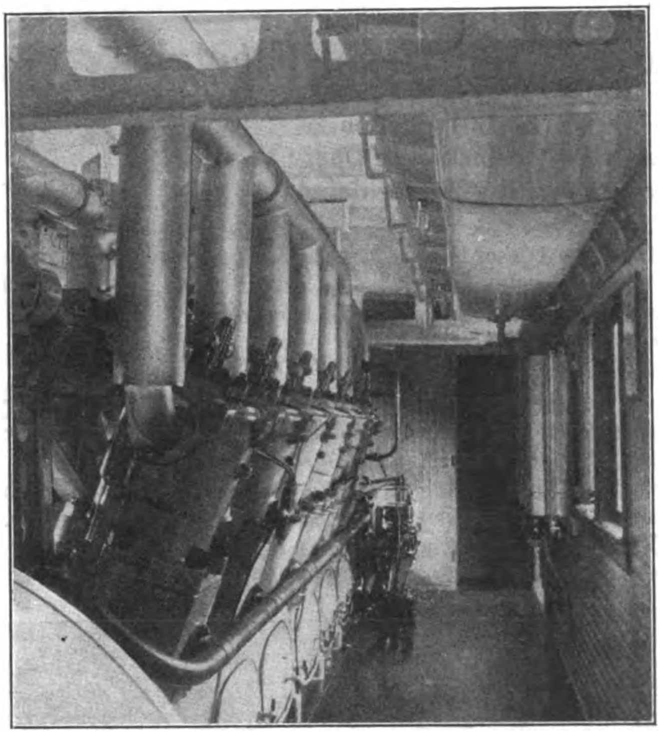
One Diesel engine of the four-stroke cycle type, with six, eight or twelve cylinders, according to the capacity. The size of generators and other electrical equipment is also increased with the engine capacity.

One direct-coupled, direct-current generator of the eight-pole type, with commutating poles. The generator is shunt wound, but has a separate series winding, the latter being connected to the circuit only when the generator is driven from the storage battery in starting. The generator voltage can be varied within wide limits up to 550 volts.

Two electric motors of standard series-wound railway type, with commutating poles. Power is transmitted to the axles by spur gearing.

One storage battery of the alkaline Jungner type. This is suspended beneath the car and supplies current for starting, lighting and working auxiliary apparatus. It is charged automatically while the car is in motion, and a special switch is provided for charging when the car is standing.

The driver starts the Diesel engine by the controller at either end of the car, the engine requiring no attention while in operation. The lubrication and fuel feed are automatic, and the driver can check the operation by inspection of gages and meters in his cab. Thus no



TWELVE-CYLINDER DIESEL ENGINE (250 HP.) USED ON SWEDISH RAIL CARS

engine-room attendant is necessary. The engine is started on the first position of the speed control drum, and movement of its handle to the second and third positions connects the motors, bringing the car up to speed. To stop the car it is necessary only to let go the safety button. If anything happens to the driver, the button is released so that the engine stops and the car comes to a standstill.

The general construction and performance of these cars are indicated in the accompanying tables. The performance is for motor cars traveling at a fair average speed and hauling trailers with a weight per passenger comparable to the light passenger car used in Sweden. The performance of the 250-hp. car on grades is indicated in the chart.

The layout of the two large cars is shown in the accompanying drawing. The 160-hp. car has a spacious engine room, situated in the center, and baggage and postal compartments. For the 250-hp. car, however, the engine is placed in a compartment at one end, as shown in the illustration. The larger car differs also in that it runs on two four-wheel bogies, that under the engine room being of the trailer type, while the other is a motor bogie containing two driving motors. This car also contains an engine room and a baggage compartment.

The motor cars recently delivered contain several improvements that will be incorporated in all future cars. The cooling water for the Diesel engine is recooled in an apparatus consisting of a number of common automobile radiators. These are mounted on the roof of the car as shown in the accompanying picture. A fan blower driven directly from the main engine forces air over these radiators. Thus the cooling is independent of the speed of the car.

A change has also been made in the electrical apparatus so that the propelling motors, ordinarily connected in parallel, can be connected in series when particularly great tractive power is required.

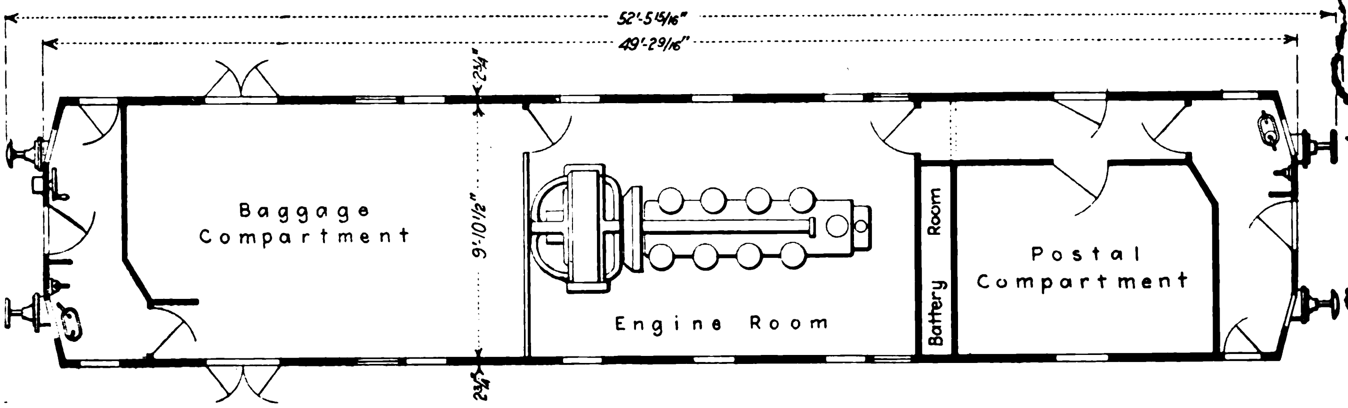
The fuel oil consumptions mentioned in the table are those obtained in practical operation. In regular service it is said, the new 160-hp. motor cars have a fuel consumption of only about 1.77 lb. per mile, with a train weight of 90 tons.

During a demonstration trip of one of the 120-hp. cars, covering 2,180 miles, with a drawbar load of two or three passenger cars, the manufacturer found that the oil consumption averaged only 6 per cent (calculated by weight, as the cost per kilogram of fuel oil and English coal at the time of the trip was the same) of the coal consumption for a corresponding steam locomotive train.

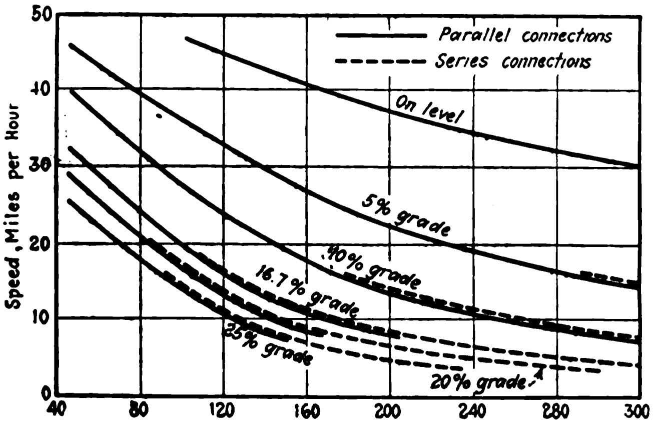
Compared with steam locomotive traffic, the Diesel electric motor car traffic involves a materially lower operating cost, and further a reduction of wages and maintenance cost, the cars being worked by only one-man crews. The exact amount of the savings, of course, depends upon local conditions.

DIMENSIONS AND WEIGHTS FOR DIESEL-ELECTRIC CARS USED ON SWEDISH RAILWAYS

Horsepower Rating	Gage ft.-in	Length Over: Buffers ft.-in.	Length Over: Car Body ft.-in.	Width, Outside ft.-in.	Height Outside, From Top of Rail ft.-in.	Height Inside ft.-in.	Wheelbase: Truck Centers ft.-in.	Wheelbase: Motor Truck ft.-in.	Wheelbase: Trailer Truck ft.-in.	Total Weight, Pounds
75	4- 8½	52- 5 15/16	49-6½	10-4	12-1¾	7-8½	26-10⅜	5-10 11/16	5-10 11/16	64,6[illegible]0
75	2-11 1/16	50- 0⅝	47-2 15/16	8-6⅝	11-2¾	7-4 9/16	37- 1⅜	6-10 11/16	5- 5	58,2[illegible]0
120	4- 8½	45-11 5/16	42-7⅞	10-4	12-1¾	7-6 11/16	21-11⅜	5-10 11/16	5-10 11/16	72,31[illegible]
120	2-11 1/16	35- 7 9/16	32-9¾	8-6⅝	11-2	7-4⅝	23- 3 9/16	6-10 11/16	6-10 11/16	60,85[illegible]
160	4- 8½	52- 5 15/16	49-2 9/16	10-4	12-1¾	7-8½	25-11 1/16	6- 0⅝	6- 0⅝	82,67[illegible]
250	4- 8½	45-11 5/16	42-7⅞	10-4	12-1¾	7-8½	24- 6½	8- 3 5/16	8-10	110,230



PLAN OF 160-HP. CAR. DRIVER'S COMPARTMENT WITH COMPLETE CONTROL EQUIPMENT AT EACH END



Performance Curves for 250-Hp. Diesel-Electric Car on Grades Up to 25 Per Cent

The consumption of lubricating oil does not increase in proportion to the capacity of the Diesel engine. This is also true of the maintenance and repair costs, as the greater part of these items represent cost for dismantling and assembling the machinery and the car during the general overhauling. The Swedish cars as a rule are overhauled after running about 40,000 miles, although it is said that railway engineers favor 60,000 miles.

In calculating the depreciation costs of the car, it is estimated that the "length of life" of the machinery is fifteen years, and of the car twenty-five years, which results in an average of about twenty years for the complete motor car. Experience of more than eight years of service is said to justify this consumption.

PERFORMANCE OF DIESEL-ELECTRIC RAIL CARS ON SWEDISH RAILWAYS*

Hp.	Passenger Seating Capacity	Train Weight, Short Tons	Fuel Oil Consumption, Pounds per Train Mile
75	100	55.1	1.42
120	150	88.1	1.95
160	225	115.7	2.48
250	375	181.9	3.55

*Based on fair average speed, with maximum grade of 1 per cent.

One railway company is reported as having run one of the Diesel cars for fifty and more consecutive days, as the slight attention and repairs during this time did not necessitate taking the car out of service. This is put forth as an explanation of the saving in maintenance as compared with the steam locomotive, which must be taken out of service for repair more often.

In addition to the saving in operating costs, other advantages cited for the Diesel-electric motor cars are the saving in car heating from the engine cooling water, the independence of cooling and charging stations, and the elimination of waste of time in taking on water and fuel at stations, as the oil fuel suffices for a run of from 370 to 620 miles, and no cooling water is lost or evaporated.

A Twenty-six-Year-Old Subway

Features of the Budapest Line Are the Shallowness and in Consequence the Cheapness of Its Construction

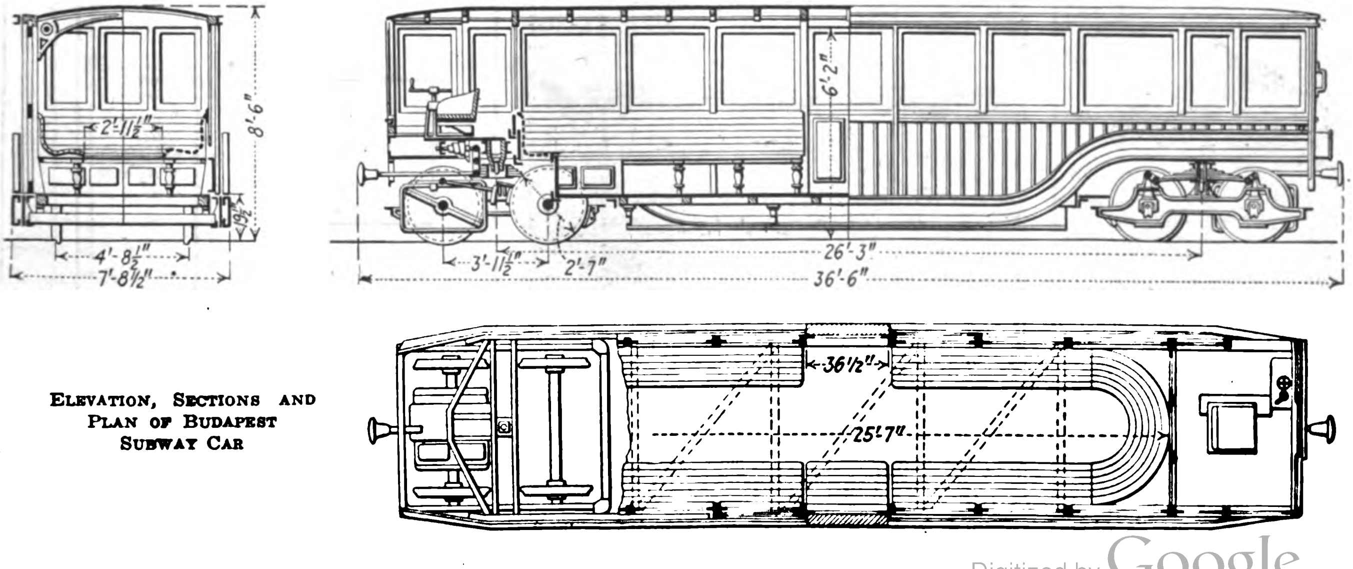
On May 2 the Budapest subway was twenty-six years old, operation having been started on May 2, 1896. It was one of the first, if not the first, electric railway in the world to be operated completely underground. It is a standard-gage double-track line, laid close under the pavement and 3.7 km. (2.3 miles) in length of route. For the greater part of the distance the road extends under Andrassy Strasse. Stations are located an average of 1,230 ft. apart. At the outer end of the line the road comes to the surface within the city park. Some particulars of its construction are given in a recent issue of *Elektrische Kraftbetriebe und Bahnen.*

Every effort was made in the construction of this subway to keep it as shallow as possible, both to reduce cost of excavation and also to avoid relocation of the main water supply system of the city. In consequence, the cars are only 2.6 meters (8 ft. 6 in.) from top of roof to head of rail and the head of the rail is only one meter (39.4 in.) above the bottom of the excavation in which the subway was constructed.

Twenty cars, each equipped with two motors, supply the service. These cars have longitudinal seats and a capacity of twenty-six seated and fourteen standing passengers. The chief feature of their construction is the ingenious way in which the over-all height has been kept down.

The entrance is in the center, and the inside wheels (800 mm. or 31½ in. in diameter) swing to some extent under the seats so that the floor of the car is only 500 mm. (19½ in.) above the head of the rail.

The overhead system is used. The trolley voltage is 300, with double overhead sliding contact, and about 1,000,000 car-kilometers (620,000 car-miles) by the road are operated each year.



Elevation, Sections and Plan of Budapest Subway Car

Car-Stop Posts Used for Advertising on Berlin Tramway

AN ACCOUNT was published in the issue of this paper for Nov. 5, 1921, of various types of car-stop posts of a design to carry advertising being tried by the Berlin Municial Railway. Since that time the designs have been generally standardized to the four-sided stop indicator, illustrated in the accompanying engraving. This car-stop sign is square in cross-section, with an iron base 21 in. square and 20 in. high, and two display spaces above on each side, being 14½ in. wide and with an aggregate height of 87 in. There is also a space about 9 in. high and 17 in. wide at the top on each side. The total height of the stop sign is 10 ft. 10 in.

One space on the side facing the sidewalk is reserved for a time-table of the cars passing that point. An enlarged view of this time-table is also published. This sign states that this is a stopping point for all of the cars of the following lines, the lines being indicated by the route numerals, 1, 6, 7, etc., as shown on dash signs on the cars. Underneath these numbers is a list of the routes of each line and terminal points with the passing time of the cars, such as "Week days; first car, 6:39 a.m.; last car, 12:49 p.m.; Sundays; first car, 7:45 a.m.; last car, 12:21 p.m." In the lower corner are given the addresses of the nearest fire station, hospital and emergency station, police headquarters, and branch post office.

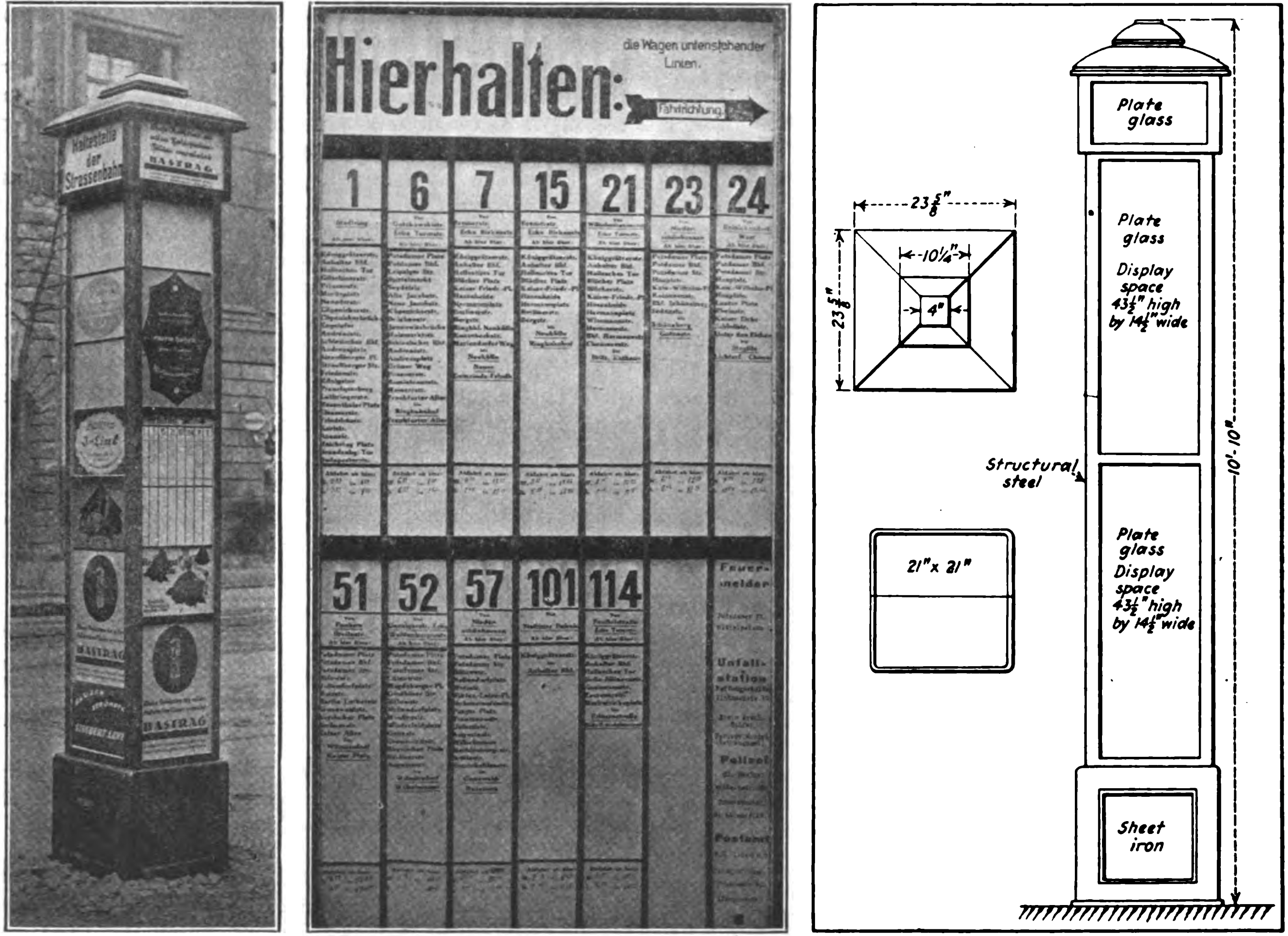
The data in the time-table, as well as the advertisements, are printed on opaque paper and pasted onto the inside of the glass. At night, the post is illuminated from the inside so that the time-tables and advertisements can be read.

The Berlin Street Railway has recently issued a new style of ticket, well engraved and of a convenient pocket size so that it can be used for currency, and possibly this was the purpose. On one side the ticket reads that it is valid on the Berlin Street Railway until revoked by a notice in the city publications. The reason for this provision is that owing to the fluctuating rate of exchange the price of tickets varies, usually going up. Thus, in April of this year, the fare without transfer had increased to 3 marks and the fare with a transfer cost 5 marks, and there was a report that the prices would soon be 4 marks and 7 marks respectively. The reverse side of these tickets shows a historical scene in street transportation, such as one of the early horse cars or an original motor taxicab.

Gasoline Car Hauls Mixed Train

THE Oil Fields Short Line Railroad has installed an F. W. D. rail car in place of the steam locomotive which was formerly operated over the 8 miles between Dilworth and Clifford, Okla., where the line connects with the St. Louis & San Francisco Railroad.

The rail car has capacity for twenty-four passengers and is equipped with M. C. B. couplers front and rear. To haul freight, a box car or flat car can be coupled on during one of the regular passenger runs.


Haltestelle der Strassenbahn
HASTRAG
Hierhalten:
die Wagen untenstehender Linien.
Fahrtrichtung
1
6
7
15
21
23
24
51
52
57
101
114
Feuermelder
Unfallstation
Polizei
Postamt
Plate glass
Plate glass
Display space 43½" high by 14½" wide
Plate glass
Display space 43½" high by 14½" wide
Sheet iron
Structural steel
23⅝"
10¼"
4"
23⅝"
21" x 21"
10'-10"

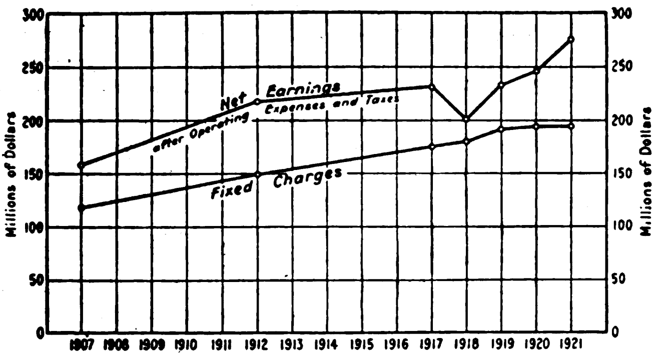
CAR STOP WITH TIME TABLE AND ADVERTISING USED IN BERLIN

Railway Finances Improving

Analysis by Bonbright & Company with Charts Gives Six Reasons for Better Conditions

A GREAT deal of interest was created about four weeks ago by a statement issued by Bonbright & Company, Inc., investment bankers, New York, on electric railway securities. This statement was published as an advertisement in the *Electric Railway Journal* for July 8 and in several of the leading daily papers during the first part of July. It was headed "Street Railway Securities" and read as follows:

> The first electric street railways in this country were built between 1880 and 1890. By 1900 they represented an investment of $2,000,000,000. Prior to 1914 their mortgage bonds were highly regarded as investments and generally sold at higher prices than comparable securities of electric light and power companies.
>
> The general level of commodity prices and wages rose steadily from 1896 to 1920, greatly accelerated by the outbreak of the War in 1914 and by the participation of the United States in 1917. In general, increasing operating expenses had largely offset gains in the gross earnings of street railways by 1912 and the five year period 1915-1920 was one of unusual hardship to many traction properties, so that there has been a strong prejudice against their securities in recent years.



NET EARNINGS AND FIXED CHARGES OF THE ELECTRIC RAILWAY INDUSTRY

1907, 1912, 1917—From U. S. census reports; subsequent years—Figures furnished by American Electric Railway Association based on reports of its member companies.

Note—Net earnings include net revenue from railway operations, net revenue from auxiliary operations, and other income; net earnings are after deduction of all operating expenses, including maintenance and depreciation, and taxes; fixed charges include interest on funded and unfunded debt, rentals, amortization of debt discount, etc.

> After careful analysis of the present situation, we believe that these difficulties have been overcome with respect to the street railway situation as a whole throughout the United States and that the outlook is decidedly favorable for well managed and conservatively capitalized companies. We believe that within two or three years the investment securities of such companies will have regained much of their former standing.

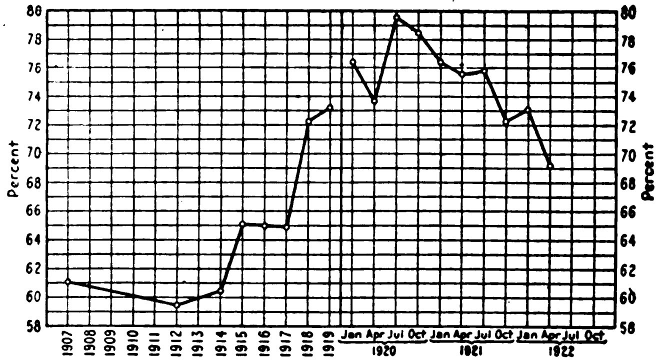
EVIDENCES OF IMPROVED CONDITIONS CITED

This week the same banking organization has issued a statement giving further particulars of its analysis of the electric railway financial situation. From this statement the following particulars are taken:

The present condition and future possibilities of the street railway companies of the country are influenced by such a variety of factors that there are marked differences in the positions of various groups of companies. For example, independent companies in communities of medium size, where public relations have been good, have been quite uniformly successful during the past year. Likewise, there have been but few defaults in the issues of street railway subsidiaries of large electric power and light groups. On the other hand, independent companies in large cities where traffic and political problems have been acute, present so many individual problems that the probable future must be considered separately in each case.

However, though the record and outlook of any individual company must be considered as a problem by itself, statistics of the electric railway industry for 1921, as compiled by the American Electric Railway Association, and evidences of improving conditions during the current year, show that the industry as a whole has definitely turned the corner and is gradually recovering from the difficulties brought about by the period of greatly increased prices and wages.

The accompanying chart shows that net earnings in 1921 not only were greater than in any previous year but that they exceeded fixed charges by a greater percentage than in any other year shown on the chart, with the exception of 1912. As shown in the second chart the operating ratio of eighty-one companies was 69.5 per cent for April, 1922, a decline of 13.5 per cent of the July, 1920, figure of 79.6 per cent. The annual average operating ratio of the industry rose to a peak of 74.8 per cent for 1920 and then declined to 72.2 per cent for 1921. (These last two figures are not shown on the chart.) The foregoing charts indicate that a continuously lessening proportion of the gross earnings is being absorbed by operating expenses and that the net earnings remaining are increasing more rapidly than are the fixed charges. Increases in gross earnings, due to the gradual revival of business activity, should add materially to the margin of safety of net earnings over fixed charges.



THE RATIO OF RAILWAY OPERATING EXPENSES TO RAILWAY OPERATING INCOME

1907, 1912, 1917—From U. S. census reports; other years—Figures furnished by American Electric Railway Association based on reports of its member companies.

Further evidence of the improving financial condition of street railways is shown by the fact that the number of receiverships (sixteen)* in 1921 was, except for 1914 and 1916, less than any year since 1910. During the first six months of 1922 there were only four* receiverships.

A recent investigation made by the *Electric Railway Journal* shows that from Jan. 1, 1922, to June 15, 1922, orders were placed by electric railway companies for 1,016 new cars, which exceeds the entire number purchased during 1921 by 122. That the financial conditions of the electric railway industry warrant such substantial increases in orders for new equipment is evidence that a considerable improvement is in progress.

REASONS FOR IMPROVING CONDITIONS

An analysis shows that there are several fundamental reasons for the improving conditions of street railways: (1) reduction of material costs, (2) reduction of labor costs, (3) increased fares, (4) the partial elimination of uncontrolled "jitney" and bus competition, (5) marked economies of operation, (6) improvement in public relations.

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*Figures furnished by American Electric Railway Association.

(1) *Reduction of Material Costs:* Several interesting cost indexes, compiled by Albert S. Richey, were published in the *Electric Railway Journal* of June 24, 1922. The index of the cost of street railway operating materials, which is based on 1913 average as 100, rose to a peak of 247 in September, 1920. Since that time it has fallen rapidly and at present it is between 156 and 159.

(2) *Reduction of Labor Costs:* A similar index of street railway labor costs rose to a peak of 232 in September, 1921. From this point it has now declined about 8 per cent to 213.

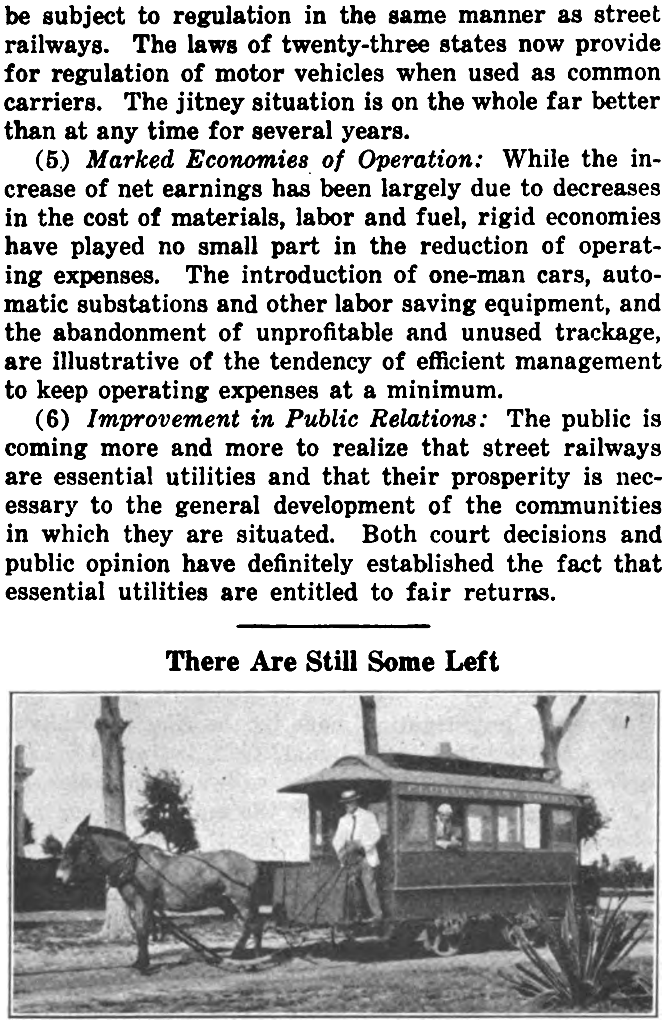
(3) *Increased Fares:* Mr. Richey's index of street railway fares shows that the average in 1913 was 4.84 cents. Only very slight increases show in this index prior to May, 1918, when a fairly uniform rise started, reaching its high point of 7.24 cents in May, 1921. Since that time there has been a decline to about 7.14 cents at present.

(4) *The Partial Elimination of Uncontrolled Jitney and Bus Competition:* While in many communities the operation of jitneys and auto buses, subject to little or no regulation, is still a serious menace to the street railways with which they compete, there is a growing tendency on the part of regulating bodies to realize that such jitneys and auto buses, as public carriers, should be subject to regulation in the same manner as street railways. The laws of twenty-three states now provide for regulation of motor vehicles when used as common carriers. The jitney situation is on the whole far better than at any time for several years.

(5) *Marked Economies of Operation:* While the increase of net earnings has been largely due to decreases in the cost of materials, labor and fuel, rigid economies have played no small part in the reduction of operating expenses. The introduction of one-man cars, automatic substations and other labor saving equipment, and the abandonment of unprofitable and unused trackage, are illustrative of the tendency of efficient management to keep operating expenses at a minimum.

(6) *Improvement in Public Relations:* The public is coming more and more to realize that street railways are essential utilities and that their prosperity is necessary to the general development of the communities in which they are situated. Both court decisions and public opinion have definitely established the fact that essential utilities are entitled to fair returns.

There Are Still Some Left



MULE CAR AT PALM BEACH TO CARRY PASSENGERS BETWEEN THE PONCIANA HOTEL AND THE BREAKERS

Letters to the Editors

Present Status of Rail Standardization

PUBLIC SERVICE RAILWAY COMPANY
NEWARK, N. J., July 25, 1922.

To the Editors:

I have read with considerable interest the editorial in your issue of July 15 on "The Present Status of Rail Standardization," particularly your plea for a more extensive adoption of existing standards which have met the test of actual service over a period of years. Where conditions will permit, the economic advantages of such a course should be evident to every one, especially to the smaller companies whose individual requirements in any one line are comparatively small. And even in the case of the larger properties the developments of new standards such as rail sections, where the expense of constructing new rolls is high, should not be undertaken without a careful survey of every condition involved.

The cost of an entire set of rolls for a new grooved girder section will probably be in the neighborhood of $8,000, although it sometimes happens that, as was true in the case of the new Cleveland 7¼-in. T-rail, roughing rolls for existing sections (in this case L.S. 87-399) are suitable for use with the new section, thus somewhat reducing the expense of producing the latter. In your editorial you have assumed a distribution of the cost of the rolls over 6,000 tons, or $1 per ton. This is probably giving the railway companies the benefit of the doubt to a considerable extent. It would be interesting to know, for example, how many rolls have been produced by the rail manufacturers which have turned out more than 1,000 tons, which is the amount of the first rolling for the new San Francisco rail, and there are probably a number that have not turned out more than half this amount. No matter whether the cost is borne by the purchaser or is absorbed by the manufacturer in his general manufacturing costs, the electric railway industry as a whole pays the bill. As long as the manufacturer is willing to assume the cost of rolls for new sections, just so long will we continue to find engineers insisting on having their own ideas as to rail design carried out, even though in many cases the differences between the latter and some one or more of the 500 existing varieties are so slight as to be practically negligible.

On the other hand, as you have stated, along with standardization must go experimentation. What is standard today may become obsolete tomorrow and there will probably never be a "one best" product or design of any kind for all conditions. Local considerations must govern. In the case of the Cleveland rail, for example, the preponderance of 2¾-in. wheel treads on some trackage was resulting in unequal wear over the 3-in. head of the old 95-400 section and at the same time a total width of head of 3 in. was considered essential in order to protect the adjoining paving on tracks over which interurban cars with their wider wheel treads were operating. It was also desired to retain the use of the T-rail and, since it was exactly this situation which was responsible for the design of the sloped back heads on girder rails, it was a perfectly logical thing to apply this principle of design to a T-rail. It must have required considerable courage on the part of Mr. Clark to advocate a change in T-rail design involving the long established conventional symmetrical feature. At first glance it may seem a peculiar design, yet a careful study will show that this was a perfectly logical change to make. The curved-head feature, which has been responsible for the change in design of several girder rails in the past few years, and which many engineers consider very desirable, has been incorporated in the new T-rail section. It would not appear unlikely that other companies using high T-rail will recognize the possible advantage of this new design for use in paved streets.

As to the changes in design involved in the new 9-in. grooved girder rail of the Market Street Railway of San Francisco, it is probably true that economic considerations were largely responsible for the failure of this company to adopt the Association standard 9-in. girder rail. The new design weighs 121 lb. per yard as against 134 lb. for the Association standard, a difference of 13 lb. per yard, or nearly 20½ tons per mile, with a saving of approximately $1,030 per mile. The ⅝-in. flange depth in use on the car wheels in San Francisco did not require a rail groove depth as great as that of the Association standard and it was also deemed desirable that the fish plates be interchangeable between the old and new sections.

Criticisms are bound to be heard when changes of this kind are made. Our company was criticised from some sources as having taken a step backward when we recently decided to return to the use of a tram girder rail, after having used L.S. 116-434 and its predecessor L.S. 114-393 since 1907, yet the change offered several advantages. First, we eliminated rail wear due to wheel flanges cutting into the rail lip, with the resulting additional wear on the wheel flanges themselves; second, we reduced the amount of power required to move cars when the rail groove is packed with snow and ice; and, last, but not least, we reduced the weight of rail 15 lb. per yard or 23.6 tons per mile of track, a saving of about $1,190 per mile. This was done without sacrificing any appreciable amount of metal in the head, introducing the curved head feature, without materially changing the position of the center of bearing with respect to the center of the web, and also retaining the beveled head feature and the same width of base.

While it is very desirable that our association or other existing standards be utilized wherever possible, it is considerations such as these that will probably always continue to govern in problems such as confronted the engineers in Cleveland and San Francisco.

HOWARD H. GEORGE,
Engineer of Maintenance of Way.

Rail Corrugation on Steam Roads

ROBERT W. HUNT & COMPANY, ENGINEERS
CHICAGO, ILL., July 19, 1922.

To the Editors:

Electric railway engineers who have fought corrugated (or roaring) rail and regarded it as apparently one of the evils of electric operation perhaps will find solace in knowing that a very bad case of it also exists on a single track-road used exclusively for steam operation. A recent trip took me over some forty miles of 85-lb. A. S. C. E. section and 90-lb. A. R. A. "A" section of open-hearth steel rail that was very badly corrugated. The former was laid in 1912 and the latter in 1916, and the corrugations are reported to have commenced to develop within a few months after the rail was laid. As a result of careful inspection I can say unqualifiedly that neither train operation nor track conditions has apparently had the slightest effect on the development. The corrugations seemingly occur under all conditions of speed, steaming and braking; on curved as well as tangent track; on rock and gravel-ballasted track, and on bridges and trestles.

The occurrence is really remarkable and is being carefully investigated. In the meanwhile, I should greatly appreciate the benefit of any new facts pertaining to corrugation that your readers may have.

C. W. GENNET, JR.

Application of Resistance in Railway Automatic Substations

GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y., July 29, 1922.

To the Editors:

The discussion of the use of resistance in connection with automatic station control equipments on railway service brings up the question of how far experience has indicated the service considerations which dictate the application of resistance in railway automatic substations. The letters from operators given in the issue of June 24 indicate the wide diversity of opinions as dictated by varying conditions of service. Owing to the fact, however, that every operator answers the question with reference to his own conditions of service, there is no actual disagreement. The fundamental reasons for the variations in practice might well be outlined for the assistance of those not yet experienced in the application of automatic substations.

It should be recognized that a wide variation of protection for direct-current circuits is available and each type has been developed in order to meet certain specific requirements. At one extreme we find the use of three steps of resistance in a machine circuit with a total over-all ohmic value such as to limit the machine output in the event of a short circuit on the bus to the commutating guarantee. At the other extreme we find absolutely no resistance, but simply the application of a high-speed breaker which interrupts service entirely until certain definite conditions have been established. In order to give an indication of the general method of preparing recommendations for machine and feeder protection, the following classification has been prepared:

SYNCHRONOUS CONVERTER PROTECTION

Without Feeders

I. Three steps of resistance.
II. No resistance.

With Feeders

III. Two steps of resistance.
IV. One step of resistance and drooping characteristic.
V. No resistance.

FEEDER PROTECTION

A. One step of load-limiting resistance.
B. No resistance — overload circuit breaker reclosed by feeling out protective equipment for stub or multiple end feed.
C. No resistance—high-speed breaker with discriminating trip features reclosed by feeling out equipment for stub or multiple-end feed.

Different combinations of machine and feeder protection are made up to meet different types of service largely in accordance with load characteristics, some of the characteristics of which we will outline in detail in order to illustrate the method of application.

I. Where no feeders are included the conversion unit is usually one of several connected to an interurban line. The resistance is divided into three steps, such that the short circuiting of any one particular step will not result in an overload such as to trip the short-circuiting contactors and reintroduce the resistance, which would result in chattering of the short-circuiting device. The functions of the resistance are to cushion the machine on to the line if at the time of starting up the trolley voltage is very different from the normal machine voltage. It is also designed to act as commutating protection in the event of short circuit or overload so close to the station that although the safe hot spot temperature might not be exceeded, the commutator and brushes of the machine might be threatened if the load is sustained for an excessive period. This protection is obtained through limiting the heat storage capacity of the resistors. The third function of the resistance is to increase the equivalent machine rating. Where the load is of such concentrating character as to constitute a draft in excess of the commutating limit of the converter, it is necessary to hold the draft on any one particular station down to this limit at least. For instance, where occasional locomotive and train operation is contemplated on an interurban, running high-speed, single-car service a 300-kw. synchronous converter is ample for the service, provided in the event of starting the locomotive close to the station sufficient load-limiting resistance can be introduced automatically to hold the station output to the safe commutating limit of a 300-kw. machine.

II. The load-limiting resistance equipment is a very large factor in the cost of a complete automatic control and is often not required where the connected useful load will not exceed the machine rating in service. In such cases operators have used simple reclosing circuit-breaker schemes which disconnect the machine entirely from the line in the event of non-useful loads such as short circuits.

III. Where feeders are included in the station, the feeder protection should act to prevent a short circuit from reflecting back on to the machine. The function of the feeder circuit breaker will be to limit a disturbance to the particular zone or feeder to which it is connected, so permitting uninterrupted service on the other sections. In such cases it is necessary where the total concentrated load of the system may exceed the rating of the machine in the station to supply machine resistors as in the locomotive case illustrated above. The first step of resistance will constitute merely a very small drop in voltage under normal load conditions in order to permit other conversion units connected to the system to assume part of the loads. This step can only be of small ohmic value, however, in order to prevent chattering conditions outlined above and, therefore, a second step is necessary in case of high overloads or short circuits on any particular feeder where the feeder includes a load-limiting resistance step corresponding to the third or highest step of resistance in the machine circuit as illustrated under I above.

IV. As a substitute for the first step of resistance of low ohmic value, it is possible to use the natural droop of a machine with shunt characteristic since the regulation to 150 per cent load will be equal approximately to the voltage drop in resistance if the first step is inserted at 150 per cent load.

V. Again, in systems where the service is extremely light and does not warrant large expenditure for protective equipment and the ability to sustain overloads afforded by the resistance, protection may be afforded by a circuit breaker arranged to trip only at loads indicating disturbances on the system. This circuit breaker may be fitted with feeling out equipment corresponding to that on the feeders.

A. A step of high resistance for load limiting in each feeder may be used in conjunction with machine equipments outlined in III and IV. In this case the heating capacity of the resistance is such as to overheat the resistance before any damage to the feeder may be anticipated, since the feeder will be disconnected from the load by thermostat at any desired predetermined point. When used in conjunction with machine protection III, the load limiting resistance in the feeder will permit of sustaining useful concentrated loads and delivering maximum current to any load within permissible limits of commutation. At the same time an overload on any one particular feeder will not constitute any interference with service on other feeders running out from the same station which are not overloaded.

Such resistance equipment is particularly applicable where the total over-all trolley and feeder resistance between substations is relatively large, so that a very considerable voltage drop is necessary on any feeder in order to shift the center of gravity of the load toward another feeding point, or obtain any material load limiting. A resistance feeder equipment is not applicable in the city system where the traffic is heavy and the density of population dictates a feeder network such that equivalent resistance between feeding points is very low. In such cases the introduction of a high resistance in a feeder simply results in moving the center of gravity of the load to the other end of the feeder, or the other source of power, and prevents any supply to the load in question.

B. Where the system does not warrant the investment in resistance, or the layout is such that the resistance equipment will not function, a circuit-breaker equipment may be applied. This circuit breaker will act to disconnect the machine from the load and resume service after a feeling out resistance indicates that the external load would not exceed the rating of the feeder if the circuit breaker is reclosed. This constitutes a complete interruption of the service and is not feasible on many systems.

C. On heavy city systems with low resistance between feed points continuity of service is paramount. A few systems, in fact, are opposed to disconnecting the trolley, even under short-circuit conditions, preferring to burn off any disturbances at whatever cost. Other systems do not feel that they are warranted in such procedure, but do insist on sustaining any possible useful loads. A high speed breaker has been developed to meet this service. It is of such cost as to compete with other forms of feeder protection. In view of the high speed feature, it is possible to set the ultimate trip point of the breaker beyond the commutating limits of the machines connected to the bus; that is, without any consideration of the normal feeder rating (it may often be set at ten times normal feeder rating). This breaker contains inherently a tripping feature which permits of discriminating on short feeds, such as city service, between useful inductive loads and pure resistance short circuits. Under such conditions of protection, it is possible to sustain any conceivable concentration of cars on a feeder within limits of safe heating for insulation and soldered joints. At the same time, the high speed trip will prevent any reflection of a disturbance from one feeder to the bus or other connected loads. This high speed breaker after a trip due to short circuit may be reclosed by a number of expedients developed to meet different conditions, such as a feeling out resistor or simple timing device, to reestablish connections after definite intervals.

Types B and C resistors may be applied with machine protective equipments III, IV or V.

The outline and tabulation indicate the different combinations of control possible, giving a range which the large variety of service conditions have indicated as necessary to meet the desires of different operators.

G. HALL ROOSEVELT,
Railway Engineering Department.

Wants Further Information from Mr. Stuck

YOUNGSTOWN MUNICIPAL RAILWAY
YOUNGSTOWN, OHIO, July 25, 1922.

To the Editors:

I have taken a great interest in a letter from W. G. Stuck, on page 138 of *Electric Railway Journal* for July 22, in regard to Ulco Frary Metal, also in the lubrication cost quoted by him of 4.3 cents per thousand car miles. I have given a lot of study and thought to keeping down the cost of the lubrication of our equipment and still keep inside of the safety zone and avoid hot bearings of any kind. But I must admit, low as our cost has been, it is nowhere near the figures given in this letter.

We have at the present time some Ulco metal on test on our property and from all appearance it is doing fine work. It is not so much the metal as the lubrication cost that interests me, and I think it should interest every man who is responsible for the operation of a railway property. If Mr. Stuck can find the time to write up a very detailed letter for the *Journal* and explain just how he accomplished this and just what lubrication he charges to this account, it will be something that every master mechanic and superintendent of equipment will greatly appreciate.

I might say that we are operating close to 350,000 car miles per month. All our cars are equipped with bronze bearings with the exception of a few cars that are on test with solid babbitt axle and journal bearings. We have in our equipment twenty-four Standard safety cars and 111 double truck city cars; which are equipped with Westinghouse-56, Westinghouse-101, G. E.-80, G.E.-216 and G.E.-247 motors. We have been using Tulc for the past two and one-half years to lubricate our cars, and we reduced the cost per thousand car miles from 47.9 cents to 19.5 cents.

A. B. CREELMAN,
Master Mechanic.

Paris Tramways During the War*

All of the Street Railway and Bus Lines in Paris Have Been Taken Over by the Department of the Seine, But Are Operated by a Private Company

BY A. MARIAGE
General Manager Paris Tramway and Omnibus System

THE present tramway system is made up of six companies, which in 1904 were operated under individual franchises.†

These companies were of different sizes and with various kinds of equipment, but were working toward certain standards, and at the time that war broke out were to a large extent reconstructing their systems for electric power along uniform lines.

On Aug. 1, 1914, at 5 p.m. omnibus traffic was suddenly stopped throughout Paris by the military authorities and the next morning 264 buses required in the mobilization movements were traveling toward the frontier. Within the next few days 770 other buses were taken for the same purpose.

As this mobilization was carried out according to a definite and pre-arranged plan, with which the company was familiar, it did not disturb or disrupt the Paris transportation system. Obviously, also, mobilization did not stop the tramway system. In fact, the cars had to furnish more service than formerly, with an organization entirely new and utilizing to a considerable extent female help. The figures in Table I are from the system of the General Omnibus Company, Paris, which company operated not only buses but also the largest tramcar system in Paris.

While this table is carried back to 1913, the first complete year preceding the war, that year can hardly be considered normal because the electrification of the lines had not then been completed. Certain routes were still operating by compressed air or steam, and others were not in operation because they were being rehabilitated. However, based on these figures, it might be said that if there had been no war the following results might have been expected by 1920:

1. The car-kilometers would have amounted to 42,000,000.
2. The gross receipts would have been about 38,000,000 francs, with the receipts per car-kilometer remaining at 0.91 franc.
3. The expenses per car-kilometer, including fixed charges, would certainly have been reduced by the consolidation and rehabilitation under way to a figure less than 0.80 franc (the figure of 1913).

The tramway system would then have had an additional grant of about 4,000,000 francs, a grant intended, under the franchise of 1910, to compensate for the deficit of the omnibus system.

The statistics have also been plotted in graphical form, the figures being reducted to a car-mile and cents basis. Examination of this graph, which gives figures only for the General Omnibus Company, suggests the following:

In 1914 and 1915, on account of the insufficiency of the operating force and consequent reduction in service, the car-miles and the number of passengers decreased, while the number of passengers per car-mile increased about 10 per cent.

In 1916 the car-miles approached those of 1913, without, however, being adequate to the needs of the population. The passengers increased to 25,000,000. There was an increase of about 18 per cent as compared with 1913 in the number of passengers per car-mile, and the expenses per car-mile increased so rapidly as to cause an economic crisis in the affairs of the company or the system. The different companies took the matter up with the authorities and urged an increase in fares, but nothing was done. The consequences soon made themselves felt.

In 1917 and 1918, on the lines of the General Omnibus Company, the number of passengers increased, but the number of car-miles run decreased, with the resulting coefficient of utilization of the equipment some 45 per cent above that in 1913. In the meantime the expenses per car-kilometer reached 1.64 francs.

The tremendous increase in the number of passengers carried per car-mile corresponded to a decrease in the quality of the product. The passengers had to wait a long time before finding a seat. This increase was due to three causes. The first was the insufficient operating force, which compelled the companies to reduce the number of cars. Second, the reduction in service appeared to be one means of decreasing the total expenses of operation which were constantly increasing. Finally, the depreciation of money, which for the companies was equivalent to a reduction of fare, stimulated a tremendous increase in passengers.

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*Abstract of paper presented at the meeting of the Union des Voies Ferrées d'Intérêt local et des Transports publics automobiles de France, Paris, Oct. 20-23, 1922.

†See article in the *Electric Railway Journal* for July 1, 1922.

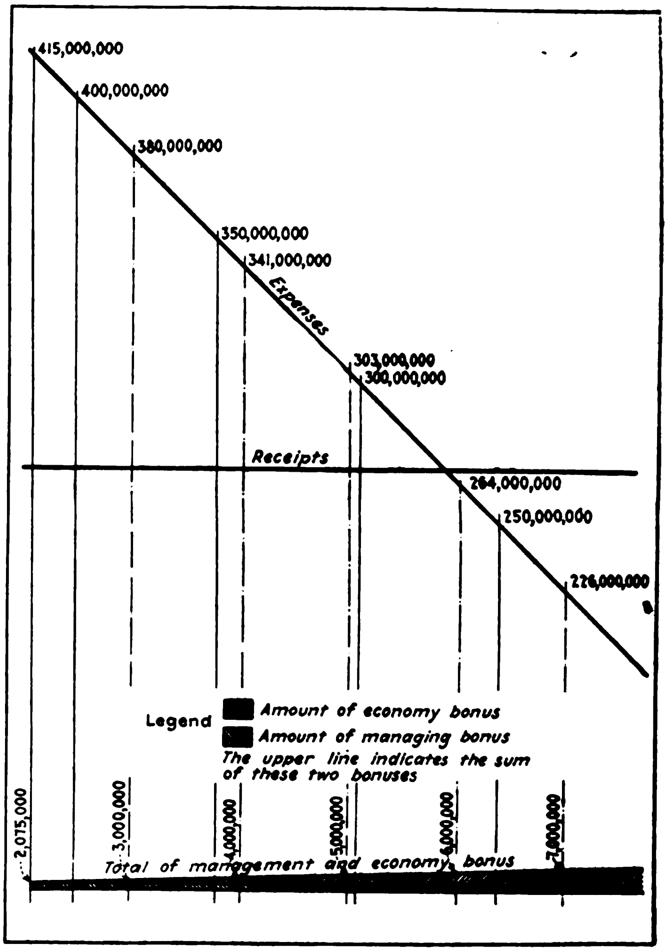
In 1917 negotiations were again opened with the public authorities with the idea of obtaining some compensation so as to help balance the budget, but without result.

By the end of 1918 it was evident that the companies could not continue much longer to remain solvent and in Jan. 22, 1919, a provisional agreement was reached with the city and the Department of the Seine which was to be retroactive to Jan. 1, 1918, and which had for its purpose the establishment of conditions by which the lines could be kept in operation during the war and thereafter until matters could be placed on a more definite basis. This agreement authorized first a slight increase in fare, without which of course operation would have been impossible. This increase in fare went into effect Feb. 8, 1919. A résumé will be given of the financial terms of this agreement, so far as they concern the system of the General Omnibus Company.

A new account, called the administration account, to cover the receipts and expenses of the service was established. In the expenses were included, besides the operating expenses and interest and sinking fund on the debt, a sum of 3,000,000 francs as a reserve for renewals of track and rolling stock and to pay not more than 4 per cent return on the outstanding capital stock. Deficits, if there should be any, after the obligations of the "administration account" are fulfilled, are carried to a reserve account, called "special war reserve fund." If this "special war reserve fund" should contain a deficit at the end of the provisional period, this deficit was to be made up by payment by the city, the amount to be fixed by arbitration. If, on the other hand, this "special war reserve fund" showed a surplus, this surplus would be divided between the city and the company.

Through this arrangement, it was possible to increase the number of car-miles by about 18 per cent during 1919 and 30 per cent (as compared with 1918) in 1920. The number of passengers increased, but not as rapidly as the car-miles, so that the passengers per car-mile began to decrease.

AT RIGHT, DIAGRAM SHOWING RELATION BETWEEN BONUS FOR OPERATION AND GROSS RECEIPTS — PARIS TRANSPORTATION COMPANY



BELOW, DIAGRAM SHOWING STATISTICS OF TRAMWAY SYSTEM OF GENERAL OMNIBUS COMPANY, PARIS

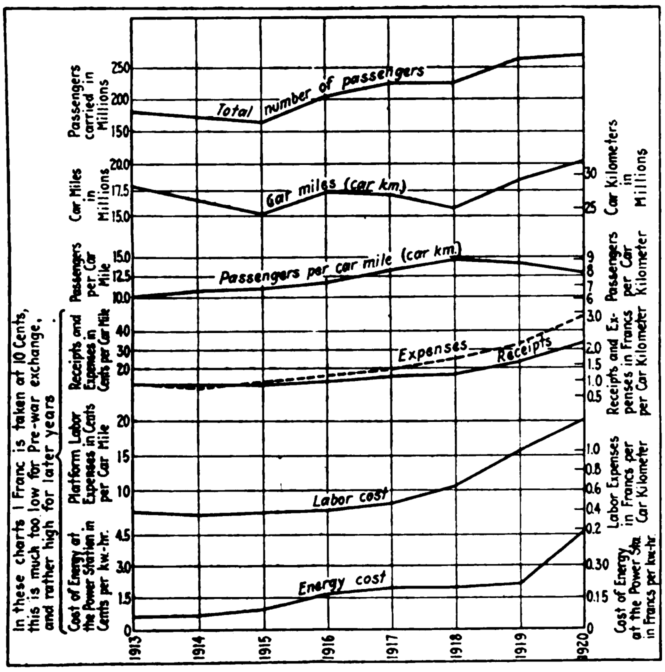


TABLE I—STATISTICS OF THE TRAMWAY SYSTEM OF THE GENERAL OMNIBUS COMPANY, PARIS, FRANCE

	1913	1914	1915	1916	1917	1918	1919	1920
Number of tramcars in service.....	651	604	626	707	707	710	748	788
Car-kilometers in thousands.......	28,835	26,357	24,093	27,728	27,211	25,069	29,694	32,770
Number of passengers in thousands	180,219	174,887	166,453	205,805	226,303	228,245	261,648	263,023
Number of passengers per car-kilometer........................	6.24	6.63	6.90	7.42	8.31	9.12	8.81	8.02
Expenses per car-kilometer, includfixed charges, in francs.........	0.803	0.781	0.958	1.146	1.335	1.641	2.080	2.911
Total receipts in thousands of francs	23,175	21,695	20,527	25,188	27,894	28,425	46,478	70,284
Receipts per car-kilometer in francs	0.821	0.837	0.864	0.919	1.041	1.151	1.581	2.165

It was expected that after the armistice, prices whose increase had so seriously affected the results in 1918 would grow less and that the application of the provisional agreement already mentioned would bring back the system to a comparative degree of normalcy. This did not occur, however. Instead, the expenses increased to a marked degree, so that the total expense per car-kilometer on the General Omnibus system, which were 1.64 francs in 1918, got up to 2.08 in 1919, and finally reached 2.91 francs in 1920.

The graph herewith shows the continuing excess of expenses over receipts of these years, in spite of the fare increase made in April, 1920. The graph also shows the increase in energy costs, measured as high tension in kilowatt-hours at the power station. The principal element in increase in cost was for coal, which rose from 14.875 francs per ton in 1913 to 262 francs in 1920. There were also increases in power station wages, so that the cost per car-kilometer increased from 0.109 franc in 1913 to 0.541 franc in 1920. On the other hand, some saving was possible by more economical operation.

In the meantime wages had also gone up, as shown in tables II and III.

It should be borne in mind in connection with these tables that in 1913 and 1914 the figures represent exclusively man labor for the conductors, whereas during later years there was both male and female labor.

TABLE II—TRANSPORTATION DEPARTMENT. AVERAGE DAILY WAGES IN FRANCS

	Inspectors	Conductors	Motormen
1913.........	7.811	7.039	6.972
1915.........	8.458	6.814	8.614
1917.........	11.788	7.315	11.163
1919.........	17.089	13.507	14.058
1920.........	23.710	20.709	23.993

TABLE III—SHOP DEPARTMENT AVERAGE DAILY WAGES IN FRANCS

	Shop Men on Piece Work	Shop Men on Hourly Work	Carhouse Men
1914.....	.....	9.70	8.20
1915.....	11.90	9.70	8.20
1917.....	19.90	13.40	11.20
1919.....	26.15	22.25	18.75
1920.....	29.05	25.35	22.25

Table IV shows the rates of fare charged. As shown by the main group of graphs, however, the increases as a rule came too late to be of much help.

A few words might be said here in regard to the omnibus system.

As explained in the first part of this article, the service was entirely interrupted in 1914 on account of the requisition of the buses for mobilization. Between 1916 and 1918 the company had about eighty buses in service. Attention is drawn to these figures because otherwise the statistics given, especially when compared with those of 1913, might be misleading.

PRESENT FRANCHISE SIMPLY A LEASE

The situation, as outlined later, could not be continued for any length of time. The temporary arrangement made between the authorities and the companies under the stress of war conditions came to a natural end and the public interest demanded a quick reorganization of the transportation facilities under the best possible conditions.

From the standpoint of economical operation, as well as from that of finances of the companies, there was only one possible solution, namely, the purchase of the concessions of the companies and their merger into one organization for the united transportation of the entire Paris district. This would permit a reduction of general expenses and a simplification of operation. Realizing the impossibility of a continuance of the existing franchises, the representatives of the Seine Department and the City of Paris adopted for the future a policy of municipal ownership and private operation of the roads. Before the advantages of this plan under the existing economic conditions are explained it might be well to review the main features of the system of private ownership and operation under franchises as it existed in France.

Originally, private ownership and operation of a transportation system in Paris under a franchise were economically possible. The owners of the franchise were bound to relatively well defined obligations, their field of operation was restricted, the schedules were definite, and they were not subject to such strict regulation as they are today. Under those conditions it was possible for some enterprises to show a reasonable profit, though it should not be forgotten that others failed to do so. Gradually, however, the interest of investors in these enterprises lessened, and it became continually more difficult for these companies to raise new capital.

Under present conditions the system of private franchises has the following disadvantages: (a) Impossibility of the company to vary the rate of fare according to changes in cost of operation. (b) Difficulty of raising capital, especially for the construction of lines which do not promise an early profit, yet such lines are necessary in every growing community for the convenience of the public. (c) Difficulty in amortizing the cost of installation within the short period for which franchises have been granted, yet neither the city nor the company wishes to be tied up to too long a lease.

These difficulties, always present, were accentuated by the war. Hence attention was given to determine whether an entirely different concession might not be found.

For example, consideration was given to a franchise which called for a guaranteed minimum return with a supplementary return in case of good management. But this did not appear as practicable as one in which the granting power assumed the expenses of the installation and became proprietor of it. The franchise would be given then only for operating the property.

The above discussion suggests the question whether if the municipality owns the property it might just as well operate the lines. Such a plan, however, does not seem suitable to present economic conditions. To insure good management, such an enterprise should be purely non-political, and with commercial characteristics so as to take prompt advantage of opportunities as they present themselves to improve the financial condition of the property. This requires a type of organization quite different from that usual in administering political divisions. The Department of the Seine, realizing these conditions, decided then to adopt the principle of owning the property but farming out the operation.

Under this system, as under direct municipal ownership, the granting power is sole owner of the property, furnishes all capital required by the first installation and for repairs, and it reserves entire control of new lines and rates.

TABLE IV—FARES ON THE PARIS TRAMWAYS (IN FRANCS)

		Urban Fares		Interurban Fares
		For one Zone or Fraction	For More Than One Zone	per Kilometer
Before Feb. 8, 1919....................	First class	0.15	0.20	0.055 (approximate)*
	Second class	0.10	0.15	0.033 (approximate)*
From Feb. 8, 1919 (first class increase)..	First class	0.20	0.30	0.07 (with minimum of 0.15)
To Feb. 1, 1920 (second class increase)..	Second class	0.15	0.20	0.05 (with minimum of 0.10)
Since April 1, 1920....................	First class	0.35	0.50	0.11 (with minimum of 0.20)
	Second class	0.25	0.35	0.08 (with minimum of 0.15)

*Fares of General Omnibus Company.

A system of accounts has been started consisting of the following:

Capital account, including interest and amortization of the property of the former operating companies and for the cancellation of special war expenses, and interest and sinking fund payments for the amortization of loans contracted by the department to take over the installation.

Operating account, including all direct and indirect receipts from the operation of the lines or from the capital invested in the enterprise, including the interest on the guarantee and the legal reserve fund; in other words, all expenses resulting from operation with the exception of those included above in capital account and the remuneration of the managers of the company and their assistants and the commissioners of accounts.

An account covering the remuneration of the company. The method by which this is determined will now be described.

It would have been useless to give the company a share in the profits, because there are none and will not be for at least a number of years if the existing rates of fare are continued. The plan allows the company, therefore, the following:

1. Six per cent on all invested capital.
2. A reward for management, calculated at 0.75 per cent of the receipts from all sources resulting from the operation of the lines (excluding the proceeds from capital invested otherwise than in operation and the interest on company's guarantee fund), up to an amount of 250,000,000 francs receipts, and 1 per cent for all amounts above that sum.
3. A bonus for economy, calculated on a basis of 0.04 (R-0.65 D), where R represents the total receipts from operation and D the total expenditures during the same time, the expenditures including all fixed charges, such as interest and amortization on the purchase sum, the war loans and rehabilitation costs.

From its remuneration the company has to pay its board of directors and operating personnel (manager, heads and assistant heads of departments, etc., a total of not less than forty-five). These individuals receive a definite salary, but also an additional payment proportional to the bonus for economical management received by the company. The responsible heads of the company are, therefore, directly interested in the good functioning of the service and have the same interest in it as has the company.

The other part of the economy bonus mentioned under (3) above is reserved for the capital of the company and is used as a revolving fund for repairs, construction and reconstruction of equipment, for the maintenance of good service conditions. In the writer's opinion the rate of 6 per cent allowed on this sum is insufficient. The return should be proportional to the current rate for money.

In this way the company is constantly pooling its interest with that of the department, and in the end it will be found that the real beneficiary of this co-operation is the Parisian public. In fact, the new company is interested not only in the perfect operation of the merged and reorganized lines but also in building new lines. The accompanying chart shows the relations of the bonuses received by the company to the operating income of the combined lines.

If E is the amount of the economy bonus, then

$E = 0.04\ (R - 0.65\ D)$ and $D = R + p$

where p is the deficit from operation, including the charges on the capital. Then, if D is larger than R:

$$E = 0.04\ [R - 0.65\ (R + p)]$$

or

$$E = 0.014\ R - 0.026\ p$$

If we assume p to be zero; that is, if there is no deficit, we find $E = 0.014\ R$. On the other hand, the reward for management, G, given to the company for receipts in excess of 250,000,000 francs, is found from the formula

$$G = 0.01\ R,$$

from which may be derived

$$E + G = (0.014 + 0.01)\ R$$

$$E + G = 0.024\ R$$

From the above it is evident that any increase of receipts of, say, 1,000,000 francs will increase the remuneration of the company by only 24,000 francs. This is rather a small sum when compared with the results achieved.

The close co-operation between the Seine Department and the company has, however, produced excellent results. There has been a continual increase in car-miles and transported passengers. And the expenses showed a reasonable decrease.

Results of the Consolidation

The decree authorizing new franchise first appeared in the *Journal Official* on Dec. 31, 1920. The company, the Société des Transports en Commun de la Région Parisienne, was organized March 4, 1921, and on March 9 accepted the franchise. On April 8 the company voted to take over also the operation of the boats on the Seine and has increased the service from two to eight boats.

The system now includes the following:

Forty-five buildings used as shops, carhouses or garages, with a floor area of 465,000 sq.m.

Sixteen substations, with a capacity of 34,500 kva.; 1,762 motor cars, 832 trail cars and 1,050 buses.

Of this rolling stock about 82 per cent of the tramcars and 88 per cent of the motor buses are in daily service and make about 340,000 vehicle-kilometers a day and transport daily 2,500,000 passengers.

The tramway system has a length, measured at single track, of 960 km. and the omnibuses 256 km. of routes. The average daily receipts are about 800,000 francs, and the maximum receipts for one day have already exceeded 1,000,000 francs. There are 26,000 employees. There are sixty-three boats, of which eight are in actual service.

The company has laid out a program of construction which during 1921 will aggregate a cost of 100,000,000 francs. At present 20 km. of track has been completely rehabilitated and 8 km. more is under reconstruction; 25 km. of overhead feeders have been replaced. Three new types of vehicles are under test. One is a six-wheel motor bus with a capacity for forty-eight passengers, in place of the thirty-eight wheel bus. The second is a light tramway car weighing 20 per cent less than the standard car, which has the same passenger capacity. The third is a trackless trolley.

At first it seemed that the approximate annual receipts of the system would be about 285,000,000 francs under normal conditions, but for 1921, owing to difficulties at the beginning of the year, the receipts will probably not be far from 265,000,000 francs. The deficit will not exceed 75,000,000 francs. It is thought that the consolidation has been able to effect an economy of 35,000,000 francs as compared with previous operation.

New England Club Holds Outing at Newport

IT MAY have been Socretes, or perhaps it was Ty Cobb,—anyhow some well-known philosopher once said: "It isn't so much what you play as how you play it that counts." That probably explains why those New England street railway men hold such successful annual outings. For about three hundred and sixty-four days a year, they spend approximately twenty-four hours per day coaxing street cars up and down the remaining rails in the old New England States. But one day in each successive year, they abandon the street cars to their own devices and foregather at some chosen spot to renew their youth and also their old acquaintances.

Thus it befell that on the last Thursday in July of the year 1922 A.D., there assembled at Newport, R. I., a goodly crew of managers and motormen, purchasing agents and selling agents, in just about every kind of official and unofficial that has anything whatsoever to do with making the trolley cars trolley.

There stands in the public square at Newport, a queer looking round stone structure, known as the Old Stone Mill. Legend connects this piece of masonry with the landing of the Norsemen, several centuries before Columbus shoved off from the sunny shores of Spain to discover the New World. Why they spent their time laboriously rearing this queer monument when there are so many more interesting things to see and do in Newport, no one seems to know. The members of the New England Street Railway Club did nothing so foolish. They came to Newport for a good time. And they had it!

The crowd began to arrive at Newport Beach about ten o'clock in the morning. They came from all over New England. Incredible as it may seem, there is, here and there, a railway man who can still afford to own an automobile, or at least a flivver.

The pre-arranged program consisted entirely of sports, and the most popular sport seemed to be eating. When they weren't eating, most of the delegates and their wives or friends were dancing. However, there were enough athletically inclined present to run off the scheduled sporting events and carry home the prizes. Many really valuable articles were donated by various members as prizes for the different events. The ladies as well as the men were remembered by the committee on arrangements, and many a New England home was blessed with the addition of an electric flat-iron, electric curling iron, silver bureau set, or other vanity dear to the heart of the housewife.

The arrangements had failed to include a baseball game, but Edward Dana, the enthusiastic general manager of the Boston "L" would never permit a New England Street Railway Club outing to go into history without the annual battle of bats between the railway men and the supply men. So two teams were improvised of anyone who could be impressed into service, and historic opponents clashed arms while there beside the sad sea waves the helpless clams buried in the sands below, trembled at the disturbance above. The railway team, captained by Ed Dana, and ably assisted by R. B. Stearns on third base, is reported to have won the historic contest by the score of 10-6. "Charlie" Leonard, Superintendent of Division 1, of the Boston Elevated was umpire, and carping critics claim that this accounts for the result.

Nearly three hundred people sat down to one of the famous Newport Shore Dinners in the big pavilion at Newport Beach, and for nearly an hour the clashing dishes competed with the crashing surf outside; while a seemingly tireless group of instrument players, humorously referred to as musicians, made the rafters ring with jazz. Short speeches of welcome were made by Mayor J. P. Mahoney of Newport, and the Honorable Clark Burdick, Congressman from the First Rhode Island District.

As the shades of evening fell, the party took to the automobiles again. An hour's ride was enjoyed around the famous Cliff Drive. Then the day was done.

The committee in charge of the outing consisted of A. E. Potter, president of the club, Edward A. Brown, H. B. Potter, W. W. Field, Howard F. Fitch, Edward P. Gosling and John W. Belling. Edward H. Wilkinson, was in charge of the athletic events and the awarding of prizes.

Association Convention Dates

Name of Association	Date	Location	Name and Address of Secretary
Central Electric Railway Accountants Association	Aug. 25-26, 1922	Michigan City, Ind.........	L. E. Earlywine, 308, Traction Terminal Bldg., Indianapolis, Ind.
Amer. Inst., Elec. Engineers, Pacific Coast............	Aug. 8-11, 1922	Vancouver, B. C., Canada...	....
Arkansas Utilities Assn.....	Sept., 1922	Hot Springs, Ark...........	R. I. Brown, Little Rock, Ry. & Elec. Co., Little Rock, Ark.
Central Elec. Traffic Ass'n.	Sept. 22-23, 1922	Webster Lake, Ind..........	L. E. Earlywine, Secy., 308 Traction Terminal Bldg., Indianapolis, Ind.
Nat. Assn. Ry. & Utilities Commissioners, Nat. Convention................	Sept. 26-30, 1922	Detroit, Mich.............	Jas. B. Walker, Pelham Manor, N. Y.
Illinois State Elec. Assn....	Sept. 28-30, 1922	French Lick Springs, Ind....	R. V. Prather, 305 Ill., Mine Workers Bldg., Springfield
Colorado Elec. Lt., Pwr. & Ry. Assn., State Convention with Rocky Mountain Division of N. E. L. A.	Sept. 11-13, 1922	Glenwood Springs, Colo....	Miss M. B. Baker, Gas & Elec. Lt. Co., Denver, Colorado
Amalgamated Asso. St. & Elec. Ry. Employees in national convention......	Sept, 1922	Oakland, Cal...............	R. L. Reeves, 260 E. High St., Detroit, Mich.
Amer. Elec. Railway Assn. and Affiliated Assns......	Oct. 2-6, 1922	Chicago, Ill................	J. W. Welsh, 8 W. 40th St., New York City
The Electrical and Industrial Exposition..........	Oct. 7-14, 1922	New York, N. Y............	Arthur Williams, Pres., Irving Place and 15th St., New York City

American Association News

Executive Committee Meets on Lake Erie

THE American Association executive committee held its July meeting on the 28th, aboard the yacht Tillicum, as guests of F. R. Coates, president of the Community Traction Company, Toledo, Ohio. The members appreciated this welcome change for the location of the meeting as one conducive to a more comfortable discussion of business than hot city offices. In holding its midsummer meeting on board the Tillicum the executive committee followed the precedent set last year by the committee on company and associate membership.

A large part of the time of the committee was devoted to a discussion of a report submitted by the trackless transportation committee, but no action was taken pending a further discussion at the August meeting.

In his regular report as executive secretary, J. W. Welsh said that the association is now on a basis of paying all bills as presented. There are, however, unpaid dues in excess of $37,000, which Mr. Welsh is endeavoring to collect before the end of the fiscal year (Oct. 31) when association funds naturally are low.

In reporting for the subjects and meetings committee, C. D. Emmons said that he felt he could predict a successful Past-Presidents' Day as one of the substantial features of the October convention program. Already a large number of past-presidents have signified their willingness to contribute each his four or five minutes of comment on the problems of the day.

A report of the special committee on constitution and by-laws recommended an amendment to the constitution which would require at least nine (in place of the present twelve) meetings of the executive committee each year. The last meeting for the retiring committee and the first for the new would precede and follow the annual convention, respectively; a third would be held at the midyear conference and the other six as set by the executive committee at its first meeting. This seemed to be the average estimate of the desirable number of meetings as disclosed by a mail poll of the members of the present executive committee, including the active officers and past-presidents.

The amendment as proposed and approved by the executive committee for action by the association in October, is as follows:

> Section VI—(d)—The executive committee shall hold nine regular meetings during the association year and such special meetings as may be necessary. Three of these regular meetings of the executive committee shall be held at the time of the meetings of the association, one being held immediately before the annual convention, one immediately after the annual convention and one at the time of the mid-year meeting of the association. The times and places of the remaining regular meetings shall be fixed by the executive committee at its first meeting in the association year.
>
> The special meetings may be called by the president or by any five members of the executive committee. Seven voting members of the executive committee shall constitute a quorum at all meetings.
>
> The executive secretary shall give such reasonable notice of all special meetings as the committee shall by vote prescribe, and all such notices shall as far as practicable, specify the business to be brought to the attention of the committee at such meetings.

The executive committee also considered the advisability of permitting representation of its members by proxies but after full discussion it was decided not to favor this practice.

The committee also adopted an appropriate resolution on the death of C. B. Holmes, president of the American Street Railway Association in 1887 and 1888.

Those present at the yacht meeting of the committee were: President R. I. Todd; Vice-Presidents C. D. Emmons and F. R. Coates; L. H. Palmer, W. H. Sawyer, L. E. Gould, Geo. Tontrup; Past Presidents C. L. Henry and J. J. Stanley; Executive Secretary J. W. Welsh, and the following guests: H. B. Flowers, E. M. Walker, W. S. Rodger, M. B. Lambert, H. J. Kenfield and H. V. Bozell.

The next meeting of the executive committee was scheduled to be held in New York City, Friday, Aug. 25.

Engineering Association Nominations Announced

THE committee on nominations of the Engineering Association appointed has submitted the following list of nominees for officers and members of the executive committee for the coming year.

President—L. C. Datz, chief engineer the Little Rock Railway & Electric Company, Little Rock, Ark.

First Vice-President—H. A. Johnson, assistant to general manager, Metropolitan West Side Elevated Ry., Chicago, Ill.

Second Vice-President—C. H. Clark, engineer of maintenance of way, Cleveland (Ohio) Railway.

Third Vice-President—R. C. Cram, engineer surface roadway, Brooklyn Rapid Transit Company, Brooklyn, N. Y.

Secretary and Treasurer—James W. Welsh, New York, N. Y.

For members of executive committee: Charles R. Harte, construction engineer The Connecticut Company, New Haven, Conn.; Daniel Durie, general superintendent West Penn Railways, Connellsville, Pa.; R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.; E. H. Scofield, engineer of power Twin City Rapid Transit Company, Minneapolis, Minn.

The members of the nominating committee, making the above report are: H. H. Adams, chairman; E. R. Hill, Sidney Withington, M. B. Rosevear and W. F. Graves.

Exhibit Space Being Assigned

THE Convention Committee on exhibits has commenced the assignment of exhibit space on the Municipal Pier to those manufacturers which up to this time have sent in their applications. Up to Tuesday, August 1, 51,000 sq.ft. of exhibit space had been applied for, and at the rate that applications are being received it is expected that the remaining 10,000 ft. will soon be taken. Should requests be received for more than 60,000 sq.ft. provision for additional exhibitors can easily be made. Some little trouble was experienced in meeting the requests of exhibitors as to location of space because of the long narrow shape of the pierhouse.

Recent Happenings in Great Britain

Municipal Tramway Financial Results—Start of Development Work on London Underground Railways—Electrification Completed

(From Our British News Representative)

OWING to the season of the year this letter is largely devoted to financial matters. In order that readers may see how the big municipal tramway concerns are weathering hard times, an indication is given of the accounts now being issued in regard to a few of the most important of these undertakings. The poor showing of London is largely explained by the high capital charges for the conduit system and the intensity of motor omnibus competition. Neither of these factors prevails elsewhere. The finance of the London underground railways and the beginning of their big new development work also receive attention. So do the completion of the London & North Western Railway surburban electrification and the enveloping success of Glasgow Town Council. There are indeed many "happenings" at present on this side of the water.

Municipal Results Elsewhere

The accounts of the London County Council Tramways for the year ended March 31 last show a deficiency on working of £88,757 after payment of all charges including interest and sinking fund. The total revenue was £4,904,427 in the previous year. After paying operating expenses and half the cost of renewals there was a surplus of £570,581, against only £65,134 in the preceding year. After allowing, however, for capital charges, there is the deficit stated above. The passengers numbered more than 688,000,000, or a trifle less than the preceding year, but the average fare was higher. The miles of route operated number 156; the receipts per car mile were 20.39d. (against 19.91d.); the working expenses were 17.68d. per car mile (against 19.3d.). In the current year the whole (instead of the half) of the cost of renewals will be charged to revenue, but despite that it is estimated that there will be a surplus of £38,337.

The accounts of Glasgow Corporation Tramways for the year ended May 31 last show that the receipts were £2,350,752, a decrease on the previous year of £42,101, while the expenses, including £413,521 in respect of maintenance and repairs, amounted to £1,804,652, being £133,012 less than the costs of the previous year. Various amounts, which included £309,349 in name of renewals and depreciation, have been set aside, leaving a balance of £152,723 from which there falls to be deducted £2,735 the balance of the deficit for 1919-20. This, accordingly, leaves an available surplus amounting to £149,988 to be placed to the credit of the Common Good. Considerable economies have been effected with regard to general expenses, which are almost £36,000 lower than last year's; maintenance and repairs, which have been decreased by over £48,000, and power expenses, which are reduced by nearly £37,000. Since June, 1914, the department has been carrying its own third party accident risk. The sum of £40,000 has been placed at the credit of this fund for the past year; the claims and other expenses paid in connection with the fund during the year amounted to £35,821, and the balance at the credit of the fund on May 31 was £20,841. With regard to the employers' liability and workmen's compensation risk, which the department took over in June, 1915, the sum placed to the credit of the fund for the year was £3,500; claims and other expenses amounted to £2,022, and the balance stands at £5,282. The cars in stock number 956.

The accounts of Birmingham Corporation Tramways for the year ended March 31, 1922, show that the total receipts were £1,520,741 compared with £1,156,654 in the previous year. The total expenses were £1,164,591, against £1,328,943. The credit balance was thus £356,150, against £327,711. After meeting interest, sinking fund, etc., there was a net profit of £192,541, of which £71,524 was carried to suspense account and £121,017 to renewals fund account. The number of cars in use is 636.

The accounts of Manchester Corporation Tramways for the year ended March 31, 1922, show that the total revenue was £1,994,577, as compared with £1,813,401 in the previous year. The working expenses were £1,519,838, against £1,507,506. After meeting interest on the redemption of capital charges, there remains £256,572, against £124,429 in the preceding year. Out of this, £218,842 goes to renewals fund and the remainder to the payment of income tax. The traffic revenue per car mile was 24.36d., against 23.12d., and the working expenses were 18.74d., against 19.34d. The passengers numbered 281,140,974 against 277,738,710. The route length operated is 120 miles.

London Underground New Capital

In the end of June the London Electric Railway Corporation and the City & South London Railway Corporation made an issue of £2,500,000 of second debenture stocks of the price of 94. The rate of interest is 4½ per cent. This is the sequel to obtaining a Government guarantee under the Trade Facilities Act of principal and interest of the new capital for the improvement and extension of London underground railway system.

The works authorized by Parliament to be constructed by the London Electric Railway Corporation are an extension of 4½ miles from Golders Green to Hendon in the northern outskirts of the metropolis, a junction line connecting the City & South London and the Charing Cross and Hampstead lines at Camden Town, a junction at Hammersmith between the Great Northern and Piccadilly line and the London & South Western Railway, the reconstruction of various stations, and the provision of additional rolling stock. An extension of time for the completion of these already authorized works to 1926 is proposed. The works to be carried out by the City & South London Corporation are an enlargement of tunnels so as to make them of approximately the same diameter as those of the other "tube" railways, and the provision of new rolling stock. The carrying capacity of the City & South London Railways will be doubled.

In the end of June the City & South London Railway Corporation issued a notice that on Aug. 9 the northern half of the railway (namely the part between Moorgate and Euston stations) will be closed. On that date the work of reconstruction of the tunnels will be begun. In substitution for the railway facilities, a three-minute service of motor omnibuses will be run on the streets between Euston Road and Moorgate.

Congratulations to North Western Railways

The London suburban electrification scheme of the London & North Western Railway Company is now complete. The last section to be electrified, that from Euston to Chalk Farm, began electrical working on July 10. The scheme has been frequently described, but a few main points may be recalled. With the exception of the mile and a half from Euston to Chalk Farm, the rest of the lines have been working electrically for some time, some for several years. The completion was delayed by the war and by the enormous works required at the complicated Chalk Farm junction and by the construction of additional tunnels under the adjoining Primrose Hill. The total length of route electrified is some 30 miles, including associated lines over which the company runs its trains. There are two routes from the center of London (Broad Street and Euston) which unite at Chalk Farm, whence the line goes on to Watford. There are also the Hampstead loop and the branches to Earl's Court and Richmond. Further, there is through running to and from the south of London by a junction with the Baker Street & Waterloo (tube) Railway. Apart from occasional tunnels, all the lines are on the surface except the Baker Street & Waterloo, the mileage of which is not included in the above total. It is eight years since the first of the converted lines was operated electrically.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Concluding Stage Reached

Buffalo Company Proceeds Against Jitneys Now That Railway Service is Normal

Herbert G. Tulley, president of the International Railway, Buffalo, N. Y., has made a formal demand on Mayor Frank X. Schwab to stop all jitney and bus lines operating within the city in violation of the state laws. If the Mayor fails to enforce the law, the legal department of the International will apply to the courts for a writ of mandamus requiring the municipal authorities to rid the streets of jitneys.

This move on the part of the International was prompted because normal day and evening service is being given on all local and interurban lines of the company and night service on most lines is continuous up until 12:30 a.m.

In explanation of this demand on the Mayor to rid the city of jitneys, President Tulley issued this statement:

> To avoid inconveniencing the riding public, the International Railway has refrained from proceeding against unlawful jitney operation until it could again itself render adequate service. The International Railway is now operating day and night cars on all Buffalo lines and has therefore, petitioned the proper authorities to order the discontinuance of jitney competition.

There have been many desertions from the ranks of the strikers and many former employees have signed up with the company to operate cars. The great bulk of the employees now operating cars, however, are vacationists from the Philadelphia Rapid Transit Company, but there are a few men from Baltimore, New York, Albany and Troy. More than 80 per cent of the men are housed at Camp Tulley at the Cold Springs barns.

Members of the New York state constabulary who were detailed to active duty in Buffalo during the early days of the car strike to protect the company's property and prevent riots have been withdrawn from the city.

With the removal of the jitney lines from the streets, President Tulley of the International believes that the strike will be practically ended. Passengers then will begin riding and it is expected normal conditions again will prevail. The company has recruited a sufficient force to operate normal service on all lines even during the morning and evening rush hour periods. Police are riding in each car and motorcycle patrolmen are stationed at important intersections throughout the city in case of rioting or disorder.

After the Chamber of Commerce and the International had rejected his proposal for each to designate five members of a committee to investigate the strike, Mayor Frank X. Schwab appointed his own committee which finally submitted majority and minority reports, being unable to agree as to which side was responsible for the trouble.

Both reports reviewed at length the causes leading up to the strike but did not touch upon any phase of the company's viewpoint because President Tulley of the International refused to participate in the investigation.

In declining to appear before the citizens' committee, Mr. Tulley issued this statement:

> Mitten policies saved Buffalo from a threatened strike during the Pan American in 1901 and for more than ten years kept Buffalo street railways free from strikes. Mitten influence was withdrawn from Buffalo in 1912. Unionism then became dominant and discipline suffered. No man could work without first joining the union which, in 1918 during the war, broke its contract with the International Railway and subjected Buffalo to a long drawn out strike.
>
> Mitten management has publicly proved that the present strike could not have occured if the union had faithfully observed the terms of the Mitten-Mahon understanding which, at the local union's own request, had been extended to cover 1922. Mitten management will not participate in futile hearings planned by the union and the Mayor further to mislead the men, who by false hopes are encouraged to hold out against the company while the opportunity of regaining their former places is rapidly slipping away.
>
> Mitten management present procedure will remove the possibility of further strikes and, while still endeavoring, with the help of Philadelphia Rapid Transit vacationists, to save all possible jobs for the misled strikers, Mitten management will have no further dealings with this union which has repeatedly repudiated its own undertaking.

The action taken by the company against the operation of the buses was successful to the extent that the Public Service Commission ruled on Aug. 3 that it considered the operation of the buses illegal in that the owners were operating without the consent of the commission.

Municipal Operation Begun in Ashtabula

Ashtabula is the first city in Ohio to try municipal ownership of its street car lines. The city formally took over the Ashtabula Rapid Transit Company's property on Aug. 1. Purchase of the property for $150,000 was authorized by the voters last spring. The money for the purchase of the bonds on the lines was obtained from a surplus contained in the city's municipal electric light fund. This surplus was due to the fact that a $1,000,000 bond issue had been sold for extending the municipal light plant and only $760,000 of it spent because of price reductions made before the light plant extensions were built.

Fare on the Ashtabula municipal lines will continue to be 8 cents, according to city manager W. M. Cotton. The city also plans soon to issue $35,000 of bonds for the purchase of one-man cars.

It is interesting to note that bond issues recently authorized by the Ashtabula City Council including the $150,000 for the purchase of the city railways, now brings that city's bonded indebtedness up to within $20,000 of the amount it is legally permitted to have.

Awaits Referendum Election in Akron

An unusual situation has arisen in Akron, Ohio, where The Northern Ohio Traction & Light Company operates a city system in conjunction with its interurban lines. A special referendum election has been called for Aug. 8 and the electorate called upon to vote upon a temporary franchise to remain in force until February, 1924. The franchise was passed by the City Council last April and provides for:

1. Construction of a new line from the downtown district on Main Street across the new $2,000,000 viaduct, through the North Hill district to Cuyahoga Falls Avenue on the north, a distance of nearly one mile.
2. Establishment of eight new bus lines as feeders to the present street railway system.
3. Rebuilding of a portion of the West Hill line.
4. Continuation of the 5-cent fare until Feb. 1, 1924.

The referendum petitions, containing nearly 4,000 names, were filed fifty-nine days after the Council passed the franchise ordinance. The city charter provides petitions must be filed within sixty days. The state constitution provides they must be filed within thirty days.

Following the calling of the election, The Northern Ohio Traction & Light Company announced that it had bought all material for all work provided for in the franchise and that, "having faith in the voters of Akron" it would at once begin:—

1. Laying tracks on the viaduct so the structure could be opened for public use without delay. (Tracks are being laid.)
2. Rebuilding the West Market Street line immediately (the work is nearly completed).
3. Purchasing buses and installing the routes as fast as the buses arrived. (Most of them are now in service.)

So far as can be determined at this time there is little or no opposition to the franchise. Many voters who signed the petitions have since announced that they signed with a misunderstanding of the petition. By the time the election is held practically all provisions of the contract will have been carried out, and if the franchise is defeated the only effect of it might be to reduce the fare to six tickets for 25 cents. In view of the fact that the legality of the referendum is in doubt, it is probable, however, that even this would not happen. But there appears little doubt that the franchise will carry a heavy vote. The company is making no aggressive campaign.

Terminal Project Revived

More Than $1,000,000 Ready for Investment in Kansas City—Industrial Line Sold Under Foreclosure

Development of the Kansas City-Outer Belt Electric Railway, a project originally conceived by Arthur E. Stillwell twenty years ago, seems about to be undertaken. The property has been in the hands of a receiver for thirteen years. It was auctioned on June 28, but the highest bidder at this auction may not secure the property, as confirmation of sale is being held up pending action by the Federal Court in September. Whether or not J. J. Heim and his associates, who were the high bidders, secure the property, the improvement is said to be definitely assured.

LINE WILL TOUCH UNDEVELOPED FIELD

The project is significant as an undertaking in that it has for its object the construction of a belt line practically encircling Kansas City on the west, passing through a district that is now largely undeveloped industrially, touching bottom lands of two rivers.

The present developed industrial sections admit of very little further expansion. They are well served with railroads, switching facilities and "belt lines." The Outer Belt railroad is laid out to connect the undeveloped industrial sites of the Missouri bottoms, north, with the large industrial areas, only partly developed, along the Kaw.

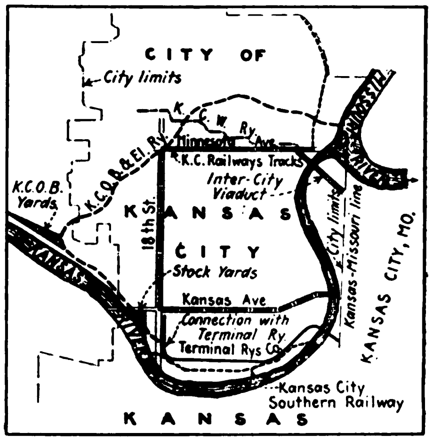
The Outer Belt Company had graded practically all of the right-of-way, 7 miles, entirely through Kansas City, Kan., from the Missouri to the Kaw. It owns about 245 acres of potential industrial switch property. Included in the tract are 40 acres in Clay County, Mo., across the Missouri from the large undeveloped tracts of Missouri River bottom lands in the State of Kansas. The Outer Belt Company has a site for a bridge across the Missouri connecting its holding in Missouri and in Kansas—a bridge which it has been declared must ultimately be built at or near this site eventually for accommodation of business. The company also owns 50 acres along the Kaw River, where industrial development is now proceeding; 12 acres adjacent to the Procter & Gamble soap factory, and 6 acres adjoining the plant of Peet Brothers. Ample acreage is reserved for the railroad's own yards.

WILL SOLVE FREIGHT CONGESTION

The Outer Belt right-of-way touches several steam railroads at various points. In the northeastern part of Kansas City, Kan., it crosses the Missouri Pacific and the Chicago Great Western. It also crosses the tracks of the Kansas City & Northwestern near the latter's station and yards, suggesting further possibilities for electric service for freight. The Outer Belt touches the Union Pacific and Rock Island near the Kaw River; and a bridge over the Kaw would provide connection with the Santa Fe near the latter's chief yards.

The factors that have caused more than local interest in the future of the Outer Belt road are increasing congestion in freight movement despite elaborate and efficient facilites, and the ultimate necessity for expansion into industrial districts not now extensively utilized. Many of these problems it is thought, could be solved by the complete development of the Outer Belt.

The original promoters of the Outer Belt conceived of it as an adjunct of the Kansas City, Mexico & Orient Railroad. Twenty years have made such changes in freight-moving conditions, however, that it is now conceived by most observers as a factor in electrically moved freight cars, either as an adjunct of an existing electric line, or as serving in terminal capacity to both electric and steam roads. The Kaw Valley line, which serves an industrial section the development of which has scarcely begun, now does as much freight as passenger business, so that the possibilities for an electric freight service in the valleys of both the Kaw and the Missouri may be considered fairly important, even as subsidiary to an electric line now operating.



ROUTE OF OUTER BELT LINE

The Kansas City-Outer Belt Electric Railway was promoted by Kansas City, Mexico & Orient interests, which had spent more than $2,500,000 on it. The bonds of the Outer Belt are owned by the bondholders of the Orient Railroad, which also is in bankruptcy. W. T. Kemper, receiver for the Orient, was a bidder at the auction, bidding up to $302,000. J. J. Heim and the interests identified with him, bid $330,900, which was not topped. Mr. Kemper has filed a motion to arrest the sale, and confirmation to Mr. Heim probably will not come before the court until September.

Mr. Heim is the chief owner of the Kansas City, Kaw Valley & Western Railway, an electric line. He and other officers were unwilling to discuss the project, pending action on their bid. It is well known, however, that if their bid is successful, probably more than $1,000,000 will be spent to develop the line as an electric terminal railroad.

Indianapolis Property Relieved of Paving

The Indiana Public Service Commission has relieved the Indianapolis Street Railway from the expense of paving between the tracks. It granted a petition which the company filed asking it to set aside an order of the city Board of Works, made under the authority of a city ordinance and directing the company to pave between tracks in certain streets. Although the order for paving was issued by the Board of Works, the proceeding before the commission was a friendly one and was so understood by the board and the city administration. Mayor Shank, himself, in a statement he made public, paved the way for procuring greater income for the car company.

The commission decided that when the company surrendered its franchises under the 1921 act, it was relieved from all obligations imposed by the old franchises and that the city had no authority to reenact the provisions by means of an ordinance. The order establishes a principle also at issue in Kokomo, East Chicago and other cities of the State. The commission said:

> It is not the province of the commission to say whether the paving between the tracks should be paid for by the abutting property owners, by the owners of vehicles or by the city out of its general fund, but it is certain that the street car riders, as a group, should not be assessed for such paving and, therefore, that the ordinance should be held to be unreasonable.

The commission referred to the poor financial condition of the Indianapolis Street Railway saying that a serious deficit from its operation now existed. Further, that no dividends had been paid in the five or six last periods past and that the company was in dire need of funds, and lacked credit by which it could finance improvements.

Railway's Propaganda Helps to Reduce Accidents

Through newspaper and card publicity the Monongahela Power & Railway Company, Fairmont, W. Va. has entered whole heartedly into the national Careful Crossing Campaign and as a result the number of accidents on road and street crossings along the lines of the local company is greatly reduced over the showing of a year ago. The company has been using its newspaper space in urging the public to be cautious when crossing over railroad tracks and will distribute thousands of cards showing the dangers of being careless.

Cleveland and Baltimore Compared

A comparison of the electric railway operation in Cleveland and Baltimore has been made the subject of a series of three articles in the Baltimore *Sun* by Harold E. West. The accounts were prepared after Mr. West had been investigating conditions in Cleveland following an announcement that fares in Cleveland would go down to 5 cents after Aug. 1. His articles explained in detail the service-at-cost franchise and how it came to be put in operation in Cleveland.

Surface and Elevated Lines Tied Up in Chicago

Review of Twelve Days' Parley When Placed Before Men Results in Vote to Go Out—Elevated Men Quit in Sympathy While Still Negotiating

CHICAGO is walking to work. At least a large part of it is, for both the surface and the elevated lines there are tied up by a strike declared on the morning of Aug. 1. The disposition of the steam railroads and the owners of autos and trucks has been to do everything possible to transport the workers in the emergency, but the steam railroads themselves are suffering from a strike among their own employees and no amount of traffic by motor vehicle can be made to compensate for the service of the surface and elevated lines.

So far as the Chicago Surface Lines are concerned the action of the men in going out was more or less deliberate, but in the case of the elevated men it was precipitate. The meeting of these men—if it can really be called a meeting—was stormed. As soon as the fact had been established that the surface men had voted to go out, about 300 elevated men staged what purported to be a meeting and after voting they then sent couriers to all the terminals to notify the men not to man the elevated cars in the morning. To have placed in operation the machinery for a bona fide vote among the elevated men would have required several days and have resulted in the operation of the elevated for at least two days after the surface lines had shut down. This was a contingency fraught with so many elements of danger to itself that the union sought safety in the expedient of calling an impromptu meeting and voting at this gathering—for such it was—to go out at once.

At the meeting of the surface men on the evening of July 31, President Quinlan of the union presented to the men a summary of the events of the previous twelve days reviewing the wage negotiations, more particularly the events of the day then drawing to a close. The decision of the men was that matters should be brought to a climax by the men going out.

The negotiations of the last few weeks between the men and the managements have been reviewed at length in the *Electric Railway Journal*. In short, the street railway men are striking for a higher wage than the Surface Lines have offered them and for continuance of the eight-hour day. They were first offered a contract for one year at 60 cents an hour, 20 cents less than they have been getting, and time and a half after nine hours instead of eight. They rejected the offer and a compromise offer of 65 cents was made. This, too, was rejected. The union leaders offered to carry back to the men for approval a wage offer of 72 cents an hour and time and a half after eight hours, but this the Surface Lines rejected.

The elevated union leaders called out their men by reason of an agreement with the street railway union. They were still negotiating with the elevated lines for a wage offer when their meeting was stormed, but none had been made officially up to that time. The elevated lines have said only that they would not offer a contract for a full year at the old scale of 82 cents.

Mayor Thompson, President Henry A. Blair of the Chicago Surface Lines, President Mahon of the Amalgamated Association, President Quinlan of the Surface Lines' Union and President Mylon of the Elevated Lines' Union were all prompt to issue statements. Mayor Thompson referred to the probable policing arrangements and said that he would welcome any effort made to settle the strike.

Mr. Blair said:

> In yesterday's conference with union chiefs, business men, and city officials, I made no newer offer than that authorized several days ago by the board of control of our company. I will be glad to meet with union officials and convey any proposal made by them to the board of control.

Mr. Mahon said:

> As I explained to the Council committee last night, I have made every effort within my power during the last twelve days to bring the officers of the company and the employees together and avert a strike. I am more than sorry at the turn things have taken. I will now leave the situation in the hands of the local officers, with hopes that they may be able to bring about a speedy settlement.

Mr. Quinlan said:

> I held the men as long as I could. We made every effort to avert the walkout. We offered arbitration; we offered to compromise. Our offers were rejected. The men were fully informed as to the situation; they made their decision.

Mr. Mylon said:

> I had an agreement with President Quinlan under which we were to call a meeting Wednesday night to act on the strike; we planned to walk out—if we did go out—Thursday morning. Events of last night left us facing either an immediate strike or going back on the men who are employed on the Surface Lines. I called an emergency meeting; those present decided to go out at once.

Chicago began the second day of the complete tieup of its elevated and surface lines with industry functioning almost normally on emergency methods of transportation. No effort has yet been made to resume local railway service, nor is there any prospect of any attempt being made to restore service for several days. The traffic tangle of the first day in the so-called loop district, where most of the office buildings and stores are located, has largely straightened itself out with auto drivers becoming more familiar with the one-way traffic rules. The jam on Michigan Boulevard, the principal north and south drive, was absent on the second day because many automobilists were diverted to other streets. Conditions in that locality were also benefited by keeping the buses of the Chicago Motorbus Company out of the loop. Very few buses have come into the city from outside towns and the effect of those that have come, upon traffic, is negligible. The vacant seats in private automobiles so completely filled the gap that operators of improvised buses charging 25 cents for a short haul had trouble filling their cars. Some carriers attempted to capitalize the opportunity by charging 50 cents or more for the 6 miles from the downtown district to Wilson Avenue.

The efforts of the steam roads to aid the tangle has been one of the outstanding features. The Chicago & Northwestern carried 90,000 into the loop on Tuesday. The Illinois Central is now prepared for 200,000. All other roads have greatly augmented their service by adding more trains and opening emergency stations. The North Shore interurban is operating over the elevated as usual, but is not carrying any local passengers.

Both sides appear to chalk up the controversy against the politicians. Between the companies and the men there seems to be no particular unfriendliness. The Board of Operation of the Surface Lines announced on Aug. 2 its willingness to sit with the Schwartz local committee on transportation which Mr. Blair on Aug. 1 refused to meet. The latest statement from the Surface Lines says there is no intention of attempting to run the cars with strikebreakers on Aug. 3. The several hundred men who have been employed through various agencies are for adequate watch service. The board also says it will be glad to hold a special meeting to listen to any suggestions that may be calculated to expedite a settlement.

Mr. Blair and the union leaders met on Aug. 2, but the nature of the negotiations was not made public. It is understood, however, that the Chicago Surface Lines insists on a thirty-day cancellation clause being embodied in any agreement since there is possibility that the Illinois State Commerce Commission may order a further reduction in fare. No progress was reported after the meeting on Aug. 3 between the board and union leaders. The company insists it will arbitrate all or nothing. Mr. Quinlan for the men would arbitrate wages between 72 and 80 cents, but not an eight-hour day. So far no attempt has been made by the city to get the representatives of the men and the officers of the company together.

John J. Stanley's Merits Receive Recognition

Friends of John J. Stanley everywhere in the industry will subscribe heartily to the sentiments about him expressed by W. R. H. Hopkins in a recent letter to the Cleveland *Plain Dealer*. Mr. Hopkins said:

> I read with interest your editorial regarding the Cleveland Railway, the prospect of lower fare and the Tayler plan. Clevelanders certainly ought to know and appreciate the fact that we have the best street railway service in America.
>
> I was especially interested in your recognition of the fact that the Tayler plan is not free from defects and presume you had in mind its failure to provide any incentive for good management. This one defect would have gone far to prevent any lasting success under the plan had it not been the good fortune of Cleveland to have the operations under the plan put into the hands of John Stanley.
>
> In any other American city the Tayler plan could not have succeeded as it has in Cleveland, because no other street railway system is managed by a man whose entire life has been devoted to it, whose personal fortune is largely invested in it, whose ability and courage and dogged devotion in management approach his.
>
> When John Stanley undertook to operate the Cleveland railway lines under the Tayler plan, he did so only because he felt in honor bound to do so. He had little reason to like it or want it to succeed, but it was the best bargain his company could get and he gave his honest best to make it succeed.
>
> The result we all know. The Tayler plan plus John Stanley is a great success. It is one of the few things we have that we can safely declare the best of its kind anywhere.
>
> This being so, isn't it about time we quit talking about the Tayler plan as an automatic device of perfection and begin giving some public credit to the man who made it succeed in spite of its defects?
>
> A moment's reflection will suffice to show that the proposed reduction of fare was made possible entirely by his courage and devotion to the general public interest in a situation which must have been officially unpleasant and could not have been personally profitable to him.
>
> Let this one debt be fairly recognized.

Mr. Hopkins promoted and put over the Cleveland Belt Line, a steam railroad proposition. He is well known in financial and traction circles throughout the country. One of his ambitions has been to see Cleveland furnished with rapid transit service by means of a subway.

New Wage Scale in Effect

The new wage agreement affecting trainmen in the employ of the Tulsa (Okla.) Street Railway which became effective in April of this year provides the following rates of pay in cents per hour:

First three months	40
Next nine months	42
Next six months	45
Next six months	48
Thereafter	50

There was practically no other change in the working agreement. The old scale in cents per hour was as follows:

First three months	46
Second three months	48
Third three months	50
Fourth three months	52
After twelve months	55

Consider Trolley Business Getter

Whether or not street cars are a boon to business on streets over which they are operated is the question brought to the fore in Houston, Tex., by the change in routing cars which virtually takes them from the main street entirely and instead puts the majority of the lines on a heretofore "back street." The change was effected in order to overcome traffic conditions and is somewhat in the nature of an experiment, the old tracks being covered with a light cover of tarvia. The slow moving electric cars before looked on as a necessary evil and oftimes considered a fit subject for a sacrifice to the jitney lines suddenly emerged from their obscurity into the limelight as a medium of bringing business right to the marts of trade. Main Street merchants protested to the City Council about the cars leaving their street.

Electrification of the Swiss Federal Railways

The Swiss Government has just appropriated the amount of 11,000,000 francs for the purchase of twenty electric locomotives. Thus far, the electric traffic has proved extremely satisfactory and it is now intended to electrify another 300 km. It is stated that the energy now generated in the large power stations already in operation and partly constructed will be sufficient to supply the current for another 300 km. During the next four or five years another 100 electric locomotives will be required, and as the construction of the twenty locomotives will require a period of about two years it is intended to place the orders for the 100 locomotives in the very near future. All orders will be placed with Swiss electrical works to assist this industry in Switzerland, which is seriously suffering from bad economic conditions. All the above orders will call for electric fast train passenger locomotives of 90-km. per hour maximum velocity.

News Notes

Terminal Railway Improving Its Line.—The Iowa Transfer Railway, of Des Moines, Ia., has applied to the Interstate Commerce Commission for authority to issue $40,000 of capital stock to purchase an electric engine and to extend the electrification of its terminal property in Des Moines.

Will Pay Borough for Paving.—The Borough of Castle Shannon has just closed a contract with the Pittsburgh (Pa.) Railways whereby the company is to pay Castle Shannon $22.57 a year, in lieu of all pole, car, wire and license taxes and liability to clean streets. The borough is to do all paving between car tracks and is to receive $288.24 from the company for this purpose.

Will Care for Employees' Health.—The San Diego (Cal.) Electric Railway recently established a welfare department to care for the health of employees and their families. Claus Spreckels, general manager of the San Diego & Coronado Ferry Company and the Point Loma Railroad, as well as the San Diego Electric Railway, in making this announcement said that the good health of the employees and their families was a matter of first importance to the transportation companies.

Louisville Has Talent.—The Inspectors' Quartet of the Louisville (Ky.) Railway, said to be the only inspectors' quartet in the country, recently was presented as the feature of the weekly luncheon of the local Kiwanis Club. The quartet, composed of George Haley, Andrew Anderson, Samuel Merrifield and Albert Doerer, gave several songs for the edification of its audience. The Inspectors' Quartet also appeared on the radio program broadcasted by the Louisville *Courier-Journal*.

Suggested Trackless Trolley Solution.—No settlement has yet been made by the City Council of Champaign, Ill., and representatives of the Urbana & Champaign Railway in the matter of a franchise. The company and city are to share the expense of paving Church Street. The company maintains that the cost of paving and laying new rails would approximate $150,000, whereas the profit on this line is about $4,000. The railway has offered as a solution of this present stumbling block to a settlement that the company install trackless trolleys on Church Street. Installation of this service would cost about $75,000, it is stated.

Good Time Had By All.—The first annual picnic of the Veteran Employees Club of the Twin City Lines was held July 19 at the company's picnic grounds, Wildwood, White Bear Lake, a suburban district to St. Paul. Men eligible have been twenty years or more in the service of the company. St. Paul and Minneapolis played a ball game, fat men had a tug of war and best of all was a boxing match between Jerry Hagerty of the Stillwater division and E. E. Smock of the North Side division, two tallest men in the club. President Horace Lowry, Treasurer A. E. Crosby and E. H. Scofield, superintendent of the power and light department, are members.

Bill to Increase Utility Tax.—A bill has been introduced before the present session of the Georgia State Legislature that, if passed, will increase the taxes of all public utilities in the State, this additional amount to be used for the financing of the work of the State Railroad Commission. The bill has already been favorably reported upon and its passage now seems a certainty. The measure presumes that since the commission regulates the utilities of the State, the utilities themselves should be made to bear the costs rather than the state, and therefore under the terms of the bill there will be an additional tax levied to take care of this fund in proportion to the assessed tax value of the properties owned by the said utilities. As the annual amount required, which will include the pay of rate experts, appraisers, engineers, accountants, etc., is something less than $40,000, the added tax will not act as a burden upon the utility corporations.

Financial and Corporate

Surplus in June

Community Traction Reduces Operating Ratio — Stabilizing Fund Reaches $137,209

Decrease of operating ratio, accumulation of surplus for fare stabilizing fund, and the successful initiation of one-man car service on the Bancroft line, were features of the report of the Community Traction Company made by Street Railway Commissioner Wilfred E. Cann to the board of control at Toledo for the month of June. The June surplus was $9,574, somewhat smaller than the previous month, but maintaining the increase in the fare stabilizing fund and assuring the continuance of previous wage scale for another six months. Last June the operations of the railway showed a deficit of $52,963.

JUNE REVENUE $293,835

The total revenue for the month of June was $293,835, which was $10,577 less than the revenue in May, due to a shorter month and a slight decrease in passenger carrying.

Revenue passengers carried for the month amounted to 4,911,677, a decrease as compared with the same month last year of 358,797.

Cash in the municipal ownership fund now amounts to $150,894 and in addition $150,000 in bonds have been purchased. The bonds are earning $745 in interest each month which is credited to the fund. The stabilizing fund is now $137,209.

The company is now converting sixty more of its cars to be operated on the one-man plan and several other lines will soon be placed on a better paying basis through the change.

IMPROVEMENT CAMPAIGN UNDER WAY

The company now has on a big improvement campaign which will include the laying of many miles of new steel track and general improvements to total about $750,000. This work is being financed through use of the cash balances in several of the funds set up.

For comparative purposes the commissioner set up the figures for the last six months showing that for the half year ending June 30 passenger revenue has amounted to $1,672,923 and total revenue was $1,674,458. The operating expenses were $1,017,658 which left net earnings $656,799.

Other revenue was secured from rent of tracks and terminals amounting to $83,413; rent of equipment, $7,902; station and car privileges, $9,961; credit on power, $11,592; and miscellaneous revenue, $8,451.

With other revenue the gross income from all sources amounted to $778,122. For the depreciation fund, $21,250 was set up, for the maintenance and repair fund, $220,000; for sinking fund—municipal purchase—$106,250; for taxes, $99,718. Bond interest and dividends on preferred stock amounted to $260,000.

1921 Satisfactory Year for Illinois Traction

The highest gross and net earnings in the history of the Illinois Traction System, Peoria, Ill., are recorded in the eighteenth annual report recently presented by the board of directors to the shareholders. It is stated in the report that the showing for the year may be considered as highly satisfactory. The statement of earnings for the year ended Dec. 31, 1921, is shown in the following table.

Year ending Dec. 31, 1921		
Gross earnings from operation:		
Electric light and power	$8,139,355	
Interurban lines	7,161,772	
City lines	4,564,507	
Gas	1,555,134	
Heat	498,039	
Water	19,032	
Miscellaneous	663,052	
Total earnings		$22 600,894
Expenses and taxes:		
Operating expenses	$11,950,260	
Maintenance	2,937,391	
Taxes	1,200,963	
		$16,088,615
Net earnings from operation		$6,512,279
Less fixed charges:		
Interest charges, etc.	$3,386,514	
Bond discount amortized	135,865	
		$3,522,380
Surplus available for depreciation and dividends		$2,989,898
Dividend on preferred stocks:		
Subsidiary companies	$880,445	
Ill. Traction Company	437,370	
		$1,317,815
Balance		$1,672,083
Appropriated for depreciation		1,504,037
Balance surplus year 1921		$168,045
Surplus Dec. 31, 1920	$1,245,457	
Less: miscel. charges	24,925	
		$1,220,531
Surplus as shown on balance sheet		$1,388,577

The gross earnings increased nearly 6 per cent over the gross earnings of 1920. Operating expenses and taxes, however, increased 4 per cent and of this amount increased taxes of nearly $300,000 are responsible for one-half. Net earnings from operation show an advance of more than 11 per cent. Operating economies are reflected in wage reductions amounting to $233,410.

The number of revenue passengers carried on the interurban lines decreased approximately 14 per cent and on the city lines 10 per cent. The receipts from freight traffic, however, increased nearly 9 per cent.

W. B. McKinley, who is president of the board, referred to the practice of selling the securities of the subsidiary companies directly to the consumers in connection with the financing of improvements. He states that the offerings of notes, bonds and stocks were readily absorbed by the different communities.

Time for Making Deposits Extended

Grayson M. P. Murphy, chairman of the Interborough-Metropolitan 4½ per cent bondholders committee, has issued a notice stating that the time for the deposit of the 4½ per cent bonds and certificates of deposit has been extended to Aug. 15, 1922, after which time no further deposits will be accepted. The deposits are to be made under the Interborough-Manhattan plan of readjustment. Approximately 89 per cent of the total outstanding bonds of the issue have been deposited with the committee, and about 94 per cent of the depositors have elected to purchase new Interborough ten-year 6 per cent notes pursuant to the plan. It is understood that bondholders who fail to deposit their bonds or certificates of deposits will forfeit the right to make further deposits and to purchase the new Interborough notes, unless under the conditions the committee may impose.

Alvin W. Krech, chairman of the stockholders protective committee of the Manhattan Railway, has issued a notice that although an insufficient number of deposits have been made to make the plan approximately 78 per cent of the stock has been deposited. In view of the fact that so large a number of stockholders have indicated their desire that the plan be carried out, he said that the committee feels that it should continue to accept deposits up to Aug. 15, 1922, after which time no further deposits will be accepted.

Issues First Mortgage Bonds

A syndicate headed by H. M. Byllesby & Company, Chicago, recently offered $6,000,000 of the Southern Colorado Power Company's first mortgage 6 per cent gold bonds, series "A" to be dated July 1, 1922. The bonds which will fall due July 1, 1947 were offered at 94 and interest to yield approximately 6.50 per cent. The Continental and Commercial Trust and Savings Bank, Chicago, will be trustee. The proceeds from the sale will be used partly for redeeming the bonds and notes of the Pueblo & Suburban Traction & Lighting Company and The Arkansas Valley Railway, Light & Power Company.

Property Sold for $1,000,000

Under an order of the United States Court, George B. Tripp, receiver for the South Carolina Light, Power & Railways, Spartanburg, S. C. on July 31 sold all the property of the company including the railways, hydro-electric plant, gas and steam electric plants at auction. The property was bought in by the reorganization committee for $1,000,000, there being but one bid. Plans for the reorganization of the company have been completed and the properties sold will shortly be taken over by the South Carolina Gas & Electric Company. Mr. Tripp will probably be the president of the new company.

Preliminary Valuation Presented

Expert for City Thinks Five-Cent Fare Adequate to Needs of Minneapolis Company

In a thirteen-page document which is preliminary to his final report on the valuation he has been making of the property of the Minneapolis Street Railway as expert for the city, Delos F. Wilcox recently estimated that with a fare of 5 cents the company could continue to finance its extensions and improvements to the same extent as it has been doing for seven years, pay all operating expenses and taxes, and have left an operating income of $225,000 in excess of a 6 per cent return on the amount of the investment contributed to the company by the holders of its securities.

This preliminary report deals largely with the financial history of the company. It estimates the amount investors have put into the Minneapolis Street Railway as $15,257,273. Mr. Wilcox is acting for the city in the case brought before the Railroad & Warehouse Commission to determine the basis for ascertaining a proper rate of fare for the railway to charge.

The report says that the issue of a reduction in the fares to be charged rests squarely on the conflict in theories as to whether the company under all circumstances of its history is entitled to have its property valued for rate purposes on the purely theoretical basis of estimated reproduction costs at abnormal and unstable present prices to make good the water in its capitalization. On the prudent investment basis of valuation the company can get by with a 5-cent fare and finance itself out of its earnings. The report says that this means the end of the Twin City Rapid Transit Company dream of 6 per cent dividends on its common stock.

In speaking more particularly of the part of the report that concerned the finances of the company Vice-president T. Julian McGill said:

> Any comment on the latest Wilcox report can be only speculative opinion in answer to the highly speculative deductions proposed by Dr. Wilcox. The agreed value in 1919 was $24,000,000. Since that time several million dollars have been added to the road in the shape of improvements. It is self-evident that a 5-cent fare will not at this time produce a fair return on the value of the property. The company desires merely a fair rate of return on a fair valuation. The public can expect realities to supplant theories and speculations only after the valuation is determined.

In another part of the analysis report to the Minneapolis City Council its valuation authority, Delos F. Wilcox, on July 15, holds that the Minneapolis (Minn.) Street Railway's "opening" valuation figure of $12,867,320 is about $6,000,000 too large. And for that reason he holds that all valuations projected on the company's opening basis are that same amount too large.

The Wilcox report holds that the company's property cost as of Jan. 1, 1900, was less than $8,000,000 even including the superseded property charged to capital, and had been made up by surplus earnings. The company's books show additions to construction of $15,699,379, so that the whole would make a total valuation by the company of about $28,000,000.

President Horace Lowry said:

> The law requires that the city of Minneapolis and the Minneapolis Street Railway before the State Railroad and Warehouse Commission show a value of used and useful property for street railway purposes. The discussions, relative bookkeeping methods, value of securities and other irrelevant issues merely consume time and have made a most unusual expense for the car riders in Minneapolis.
>
> The public can be assured that there will be no excessive valuation of the property. The company merely desires a reasonable return on a fair value, and it will continue to give the highest standard of service and institute every economy to bring about the lowest possible fare.
>
> We would add that except for the fact that every department of the street railway has been constantly working and studying to introduce operating economies it would be impossible today to give the service being rendered at a 6-cent fare, which is lower than any other city having service comparable to Minneapolis.

Another installment of the Wilcox report was issued on July 29. This latest installment adds that the Cappelen valuation estimate of some years ago, prepared by the city engineer at that time and considered a standard work, was an appraisal of the property which would imply "friendly exaggeration" if made today. This attributed a 94 per cent condition and described the property as "strictly modern and of the highest grade throughout."

The present Wilcox report is to the effect that "evidence of depreciation, deferred maintenance and deferred renewal are now visible at many points." Mr. Wilcox says:

> Whatever the true cost of the physical property may have been up to 1900, there is only about $350,000 of it left in service. The rest has disappeared. It could not have been very old at that time. A storehouse and a blacksmith and millshop still survive at the Nicollet station. Of all the cars that were running at the beginning of 1900 only two are found in their original form in the inventory of Jan. 1, 1922, and a few others have been reconstructed and are now in use as trailers. Of the 125 miles of track and pavement "of the highest grade construction" less than 2 miles has survived the wear and tear. All the rest has been rebuilt.

The report contends that the car riders have paid several times over for the superseded or obsolete property of the company and the expert will deduct $5,536,000 from the cost of the property now in existence, instead of adding this sum for property that does not exist, which will bring the valuation in the neighborhood of $15,000,000. This $5,536,000 represents the depreciation of the existing property, as the amount collected since 1904 for depreciation and used in extensions and improvements, in lieu of new capital. Mr. Wilcox will deduct from the company's figure of $25,676,189, the amount of the unaccounted-for portion of the original entry, $6,858,000, as "water," as well as the company's renewal reserve of $5,536,000, leaving a total of $13,282,189 as the cost of the existing property, less book depreciation. He criticizes the Cappelen report of Jan. 1, 1916, for deducting only $1,279,851, or about 6 per cent, of his estimated cost new for accrued depreciation. Mr. Wilcox says:

> Depreciation is one of the factors in the street railway business that cannot be ignored without financial disaster. The Minneapolis Street Railway has been exceedingly prudent in this respect. Beginning at the end of 1904 it has built up renewal reserves which now amount to upwards of $5,500,000, which represents the company's own measure of the accrued depreciation on the existing property. These funds do not exist in cash, but they represent cash that actually has been collected from the car riders and charged from year to year to operating expenses. The company has used the money, practically the entire amount, in extensions and improvements in lieu of capital.
>
> This is a proper use for depreciation funds, for it has the effect of maintaining the integrity of the original investment by the provision of new property out of earnings to offset the depreciation in the property originally provided from capital funds furnished by the security holders. In a growing street railway system it is much simpler to maintain the integrity of the original investment in this way than it would be to reduce the capitalization on account of accrued depreciation and then restore it again in order to procure the necessary funds for extensions and betterments. It is perfectly clear, however, that the company is not entitled to include in the rate base its undiminished original investment and also the amount of the funds provided from the renewal reserves to maintain the integrity of that investment. The United States Supreme Court ruled upon that question in the Cumberland Telephone case in 1909.

Court Authorizes Inspection of Corporate Records

An order signed July 25 by Judge F. M. Nye of the Hennepin District Court following a two-day hearing which closed July 22 requires officers and directors of the Twin City Rapid Transit Company, Minneapolis, Minn., to give Neil M. Cronin, city attorney, and Delos F. Wilcox, the city's appraisal expert, information concerning a certain fund of $227,000 deposited in New York and the stock book records of the company. The order calls for a return at 10 a.m. on Aug. 21, but on argument by the attorneys for the railway time for appeal was granted by stay of proceedings to 10 a.m., Aug. 14. This order follows a series of legal steps by the city to obtain this information through mandamus and peremptory mandamus proceedings, preliminary to the presentation before the State Railroad & Warehouse Commission of facts in a hearing at which is to be determined a rate of fare in Minneapolis, which is now 6 cents temporarily.

The company must give a letter of instruction to the American Exchange National Bank, New York, to produce all records concerning the disposition of $227,000 deposited therein, whether in the name of Horace Lowery, president of the company, or any other individual. The railway must also instruct the Commercial Trust Company, New Jersey, to give access to records concerning the company's accounts since Jan. 1, 1919.

In the hearing on July 22 Judge Nye held that the records demanded by the city were within the mandates of a previous writ and judgment, which were broad in scope, and that everything that could be construed as a record, by which the examination of the company's properties could proceed, must be produced. On the first day he denied a motion for dismissal of the mandamus proceedings.

Time for Completing Reorganization Extended

The finance committee of the City Council of Pittsburgh, Pa., has voted unanimously to authorize C. K. Robinson, special city counsel in charge of public utility legislation, to join, on behalf of the city, in the railways company's petition to the Public Service Commission for an extension of time in which to reorganize the traction concern under an agreement recently made by the city, the Philadelphia Company and the railways company. Because of difficulty in financing, Mr. Robinson told the committee, it will be impossible to complete the reorganization of the company by Sept. 1, the date fixed by the commission. His advice that the city agree to an extension of time until Nov. 1 or later was accepted, the Councilmen's action being predicated on probable relief from present transit conditions.

The plan for the reorganization of the Pittsburgh Railways as agreed upon between the city and the Philadelphia Company was approved by the Public Service Commission last winter.

$1,385,211 Profit for Boston "L"

The fourth year of public operation of the Boston (Mass.) Elevated Railway ended on June 30, 1922. June operation resulted in an increase of 1,090,810 revenue passengers and a loss of $121,007 in total revenue but an excess of revenue over cost of service of $87,529.

The reserve fund created under the 1918 Act now totals $1,517,196, and $517,196 has been paid over to the Treasurer of the Commonwealth for distribution to the cities and towns that contributed to the loan assessment in 1919. The comparative revenue and cost of service figures for the four years as included in a recent bulletin of the company are reproduced in the accompanying tables.

BOSTON ELEVATED RAILWAY ACTUAL RECEIPTS AND COST OF SERVICE DURING FOUR YEARS OF PUBLIC CONTROL

"RECEIPTS"

	Year Ended June 30, 1922	Year Ended June 30, 1921	Year Ended June 30, 1920	Year Ended June 30, 1919
From fares	$31,690,852	$33,122,199	$31,899,420	$24,472,429
From operation of special cars, mail pouch service, express and service cars	70,901	88,518	105,554	115,623
From advertising in cars, on transfers, privileges at stations, etc.	308,161	303,046	297,036	293,079
From other railways for use of tracks and facilities	29,314	30,024	47,636	48,814
From rent of land and buildings	107,596	115,808	87,258	73,099
From sale of power, etc.	98,293	121,566	115,187	125,534
Total "Receipts" from direct operations of the road.	$32,305,120	$33,781,164	$32,551,994	$25,128,581
Interest on deposits, income from securities, etc.	393,844	419,121	119,520	96,904
TOTAL "RECEIPTS"	$32,698,965	$34,200,286	$32,671,515	$25,225,575
Profit and loss, delayed items	82,528	23,863	17,685	*2,079*
	$32,781,493	$34,224,149	$32,689,200	$25,223,495
"COST OF SERVICE"				
Operating expenses:				
Maintenance of track, line equipment and buildings	$2,695,807	$2,516,330	$3,524,506	$3,583,056
Maintenance cars, shop equipment, etc.	2,591,142	2,857,114	2,736,249	2,519,484
Power	2,541,441	3,390,704	2,930,267	2,809,631
Depreciation	2,004,000	2,004,000	2,004,000	2,004,000
Transportation expenses	10,223,043	11,506,156	10,781,788	9,293,160
Salaries of administrative officers	82,999	79,749	83,761	94,060
Law expenses, injuries, damages, insurance	996,301	1,158,093	1,107,005	1,162,547
Other general expenses	979,046	1,106,880	963,643	896,232
Back pay	....	65,527	200,000	....
Total operating expenses	$22,113,783	$24,684,558	$24,331,221	$22,362,171
Taxes—Federal, State and Municipal	1,610,096	1,306,736	1,075,496	941,611
Rent for leased roads	2,549,625	2,673,166	2,607,565	2,587,129
Proportion of rent of subways and tunnels paid to City of Boston	1,575,866	1,543,324	1,531,473	1,491,999
Proportion of rent of Cambridge Subway paid to Commonwealth of Massachusetts	398,274	404,639	59,850	....
Interest on Boston Elevated bonds, notes and bills	1,483,786	1,483,625	1,593,257	1,423,142
Miscellaneous items	58,475	54,479	69,284	37,372
Proportion of dividend rental under acts of 1918	1,606,371	1,523,367	1,403,970	1,360,220
"Total cost of service"	$31,396,281	$33,673,896	$32,672,120	$30,203,647
Net profit or loss	$1,385,211	$550,253	$17,079	*$4,980,151*
Back pay applying to May and June, 1919, which had not been determined at time deficit was assessed	....	....	....	*435,348*
				$5,416,500

REVENUE

	Fourth Trustee Year Ended June 30, 1922	Third Trustee Year Ended June 30, 1921	Second Trustee Year Ended June 30, 1920	First Trustee Year Ended June 30, 1919	Year Ended June 30, 1918
Revenue from fares	$31,690,852	$33,122,199	$31,899,320	$24,472,429	$18,781,370
Revenue passengers	345,545,009	337,381,994	324,192,374	331,348,124	376,466,229
Rate of fare (cents)	5 and 10	10	10	5, 7 and 8	5
COMPARATIVE DIVISION OF EXPENSES					
Wages	$14,920,406	$16,753,667	$13,681,206	$13,554,684	$9,147,757
Materials and supplies	3,056,520	2,899,983	3,321,672	4,096,538	2,680,424
Injuries and damages	476,844	627,629	627,626	805,353	817,227
Depreciation	2,004,000	2,004,000	2,004,000	2,004,000	352,670
Fuel	1,656,012	2,399,277	1,996,717	1,901,597	1,381,957
Taxes	1,610,096	1,306,736	1,075,497	941,612	905,033
Rent of leased lines	2,549,625	2,673,166	2,607,565	2,587,129	2,547,421
Subway and tunnel rentals	1,974,141	1,947,963	1,591,324	1,491,999	991,551
Interest on borrowed money	1,483,786	1,483,625	1,593,258	1,423,142	1,238,374
Miscellaneous items	58,475	54,479	69,285	37,373	16,050
Dividends	1,606,371	1,523,367	1,403,970	1,360,220	None
Profit or	1,385,211	550,253	17,080	....	....
Loss	....	....	....	4,980,152	598,442
				Back Pay 435,348	
				$5,415,500	

Italics denote deficit.

Financial News Notes

Lines to Shut Down.—It was announced by the Aberdeen (S. D.) Railroad that railway service would be suspended on July 31. The company has been operating at a loss for several years. It is said that the company will give up its franchise and retire from business.

Brooklyn City Reports Net Income.—For the twelve months ended June 30, 1922, the Brooklyn (N. Y.) City Railroad reports a net corporate income of $1,812,581 against a deficit for the same period a year ago of $350,858. Passenger revenue for the 1922 period was $11,413,651 against $10,180,244 for the twelve months period ended June 30, 1921.

Pennsylvania Line Sold.—The Pottstown & Phoenixville Railway, Pottstown, Pa., was recently sold to John J. Taylor, of Philadelphia, chairman of the bondholders' protective committee, at a public sale for $75,000. The sale was the result of a foreclosure by the Norristown Trust Company, trustee, for a first mortgage of $1,000,000. The line has been in receivers' hands.

Gold Notes Offered.—Harris, Forbes & Company and the National City Company, both of New York, are offering $6,500,000 of the Toledo Traction, Light & Power Company's three-year 6 per cent secured gold notes. The notes due on Aug. 1, 1925, are offered at 98 and interest to yield 6¾ per cent. The purchase or call of these bonds will be effected through a sum exceeding $200,000 per annum accruing to the trustee through the operation of a sinking fund. The corporation owns $7,671,000 first mortgage 6 per cent bonds of the Community Traction Company and $13,135,400 par value, or more than 94 per cent of the outstanding common stock of the Toledo Edison Company, as well as large blocks of preferred stocks of these corporations.

Will Contest Sale.—Receiver for the New York & North Shore Traction Company, Roslyn, L. I., whose property was sold at auction in Mineola recently for $15,000, will try to have the sale thrown out by the court on the ground that the bid was insufficient. The property was said to have cost considerably in excess of $1,000,000, the power house alone costing $325,000. The receiver believes the property would bring much more if the various items were sold piecemeal. An attempt was made to find a private buyer some time ago, but since negotiations were begun, the Board of Estimate passed a resolution annulling its franchise. The prospective buyer, it was learned, was willing to undertake the rehabilitation of the property if he could secure better than the five-cent fare formerly in effect.

Traffic and Transportation

Investigation Still On

Committee To Look Into Affairs of Cincinnati Property Told to Reach a Conclusion

What will be the final outcome of the investigation being made by a committee appointed by Mayor George P. Carrel of Cincinnati into the affairs of the Cincinnati (Ohio) Traction Company? Will the traction company be permitted to operate its railway system in the manner its officials think it should be operated, or will the company be compelled to operate as a few individuals, who have no knowledge of electric railway transportation, think it should be conducted? When these questions are answered the traction question in Cincinnati will be solved. The investigation being made by the committee was not asked for by the traction company, nor has it requested aid in the settlement of its problems.

MAIN CONTROVERSY AROUND SERVICE AT COST FRANCHISE

A few individuals are of the opinion the valuation of the company is excessive and the fares too high, and this minority is responsible in a large measure for the present probe. It might be said that the whole controversy hinges on the service-at-cost franchise, although there are several other questions involved since the committee's investigation has been started.

In the early part of this year an ordinance was passed by the City Council providing that the city franchise tax against the Cincinnati Traction Company of $350,000 should not be taken into account in determining the cost of operation under the service-at-cost franchise. While the ordinance was under discussion the suggestion was made that a number of provisions of the service-at-cost ordinance, which has been in operation four years, might be changed in view of experience during the time which indicated that such changes might be advisable.

COMMITTEE APPOINTED

The City Council then requested Mayor Carrel to appoint a committee of citizens, and W. Kesley Schoepf, president of the traction company, agreed to meet with that committee and consider the points raised. These matters were the consideration as to the amount of capitalization of the several companies involved in operating and financing the local properties and the consideration of the possibility of simplifying the intercorporate relations of these companies.

So far the work of the committee has consisted of hearing suggestions from those who might be in a position to enlighten it on the subjects under consideration and particular attention has been paid to the question of the valuation of the company's property as written into the service-at-cost franchise.

The traction company's position in the matter is that it has no complaint to make regarding the working of the service-at-cost franchise and that the fares as well as the service in Cincinnati compare favorably with other cities. This, the company believes, answers the suggestion that the return to its stockholders is too high and also the suggestion that the property might be more economically operated.

The traction company in its statement filed with the committee on July 27, gives a complete history of the franchise, financings and operations of the local railway transportation system, presents detailed figures to show how the valuation was arrived at, what this valuation is as of today, and what the city would have to pay for the property in case it should buy, and makes some suggestions to the committee concluding as follows:

> Asked specifically what they would suggest this committee might do in the premises, the officials of the traction company confess that they find it difficult to make suggestions that would fall under either of the two heads that constitute the committee's program. It must also be remembered that the company has not asked for assistance, nor for the settlement of any question. The chief executive of the company has, however, stated to Mayor Carrel that he would gladly discuss the questions referred to and give any information that is desired and available.
>
> If there is any question unanswered or any problem unsolved, then by all means the traction company desires to have it answered or solved because without any reflection on the committee, which is earnestly trying to get full and valuable information and to discharge a public duty, the most important thing of all is for the committee to reach a conclusion that will be final and determinate so that the traction company will not have continually to face the discussion of "how the traction question can be settled."
>
> It is, to say the least, disturbing to the company. It takes time and effort from the ordinary operations and is very disturbing to the company's credit and more than once the public discussion of this ever recurrent question has interfered with important financing that would have been a great benefit to the company's patrons.
>
> If the committee therefore, can take such action as will aid in the direction of future financing it will have done a distinct service to the public. By this it would also aid largely in bringing about the second of things on its programme, and that is the simplification of the intercorporate relations of the companies engaged in street railway operations and other lines of endeavor in Cincinnati.

Mr. Schoepf appeared before the committee on July 27 and presented a prepared statement of the general traction situation and offered several suggestions which he said might assist the committee in its work. Mr. Schoepf told the committeemen that although receipts of the company have fallen off $1,000 a day the present 7½-cent fare is sufficient to meet all the ordinance requirements exclusive of the city franchise tax and will take care of about half the deficit in the earnings of $416,000 a year allowed the company.

Wants Action Deferred on Five-Cent Fare

Mayor E. J. Brown of Seattle, Wash., has urged the City Council to delay action looking toward a 5-cent fare on the Seattle Municipal Street Railway lines. Nothing further will be done about the matter until after the Circuit Court, to which the case has been appealed, renders a decision in the "specific performance" suit instituted long ago by the Puget Sound Power & Light Company, in which the company demands specific performance by the city of the terms of the railway purchase contract. The Circuit Court will hear the case early next fall.

In referring to the specific performance case, the Mayor said that if the contract was impossible of performance, it was a matter of vital interest to the people as well as the bondholders and that it would be unwise to tamper with the carfare until the case had been settled. Mayor Brown stated further that he would sign the proposed 5-cent fare ordinance if passed by the Council, but that he wished the Council to assume the responsibility for it at this time. He expressed himself as much impressed with the weekly pass system and stated "this is one of the plans we will have to consider."

George F. Russell, superintendent of public utilities, states that in his opinion, the one-man, two-truck street car is the solution of the railway problem in Seattle.

Five-Cent Fare Restored in Cleveland

Directors of the Cleveland (Ohio) Railway, at their meeting on July 27, ordered a fare reduction to 5 cents a ride or 5 tickets for 25 cents, to be effective on Aug. 1. This action was taken following receipt of the report of the company's operations for June. This report showed that the interest fund, the fare barometer, contained on July 1 $716,690 or $16,690 in excess of the $700,000 required for a reduction.

City Traction Commissioner James W. Holcomb predicts that within a few months, providing business conditions continue to improve, there will be another fare reduction, next time to eleven tickets for 50 cents.

The directors also at their meeting approved the purchase of fifty new motor cars and fifty trailers for the improvement of service in Cleveland.

Earnings for the company in June showed an increase of 1.54 per cent over the same month a year ago. The company carried 33,554,963 riders in June.

Everett Will Try Motor Buses

City Commissioners of Everett, Wash., and officials of the Puget Sound International Railway & Power Company have under discussion the question of amending the franchise of the company so as to permit it to resort to the use of the trackless trolley or the motor bus in supplying transportation in the future in Everett.

Springfield Returns to Five-Cent Fare

Under a recent order of the Illinois Commerce Commission fares in the city of Springfield will be reduced to 5 cents. The ruling affecting the Illinois Power Company will become effective on Sept. 1. Under the new schedule forty-ride tickets will be sold for $2 or at a 5-cent rate good for the use of any member of the family for the calendar month; school tickets to be used by children over twelve who attend school, thirty tickets for ninety cents or 3 cents a ride; children, six to twelve years old 3 cents cash fare; children under six years free when accompanied by adult; four tokens purchased in car, 25 cents and single cash fares 10 cents. The present cash fare is 7 cents with four tokens for 25 cents or 6¼ cents a ride.

The regular rider benefits by the new arrangement, that is by the use of the forty-ride tickets. Provision is also made for a fifty-ticket book for $2.50 and a sixty-ticket book for $3. The forty, fifty and sixty-ride tickets will be placed on sale at numerous places in the city while the tokens will continue to be sold by all conductors on the cars.

A. D. Mackie, president and general manager of the Illinois Power Company, stated that the experimental order would be given a faithful tryout. He said that the ruling was a fair one in that daily users pay the minimum fare while the intermittent rider pays the higher rate.

Weekly Pass in Use in Tacoma

The weekly pass system is now in use on the railway lines of the Tacoma Railway & Power Company, Tacoma, Wash., having been placed in force July 24. The passes sell for $1, and provide unlimited transferable weekly service. They are on sale on all street cars and at various public places in the city.

Richard T. Sullivan, manager of the company, was permitted to put the system in use without statutory notice, because it was deemed an additional privilege to the riding public. It is believed that by removing the necessity of making changes, issuing transfers, etc., service will be speeded up. The city of Tacoma is the first on the Pacific Coast to install the pass system.

Mayor A. V. Fawcett, who is advocating a straight 5-cent fare for Tacoma, says:

> The weekly pass is not a substitute for a 5-cent fare for the majority of people. Many would pay more than at present under the pass system. The buses will have a weekly pass at $1, too. The buses will soon be giving service on practically all lines in the city. These are the finest buses in the State, and the men operating them know their business.

Ten-Cent Fare Approved

The Indiana Public Service Commission has approved orders establishing a 10-cent fare for city passengers on three interurban lines operating in Indianapolis. The orders became effective on July 1. The companies affected are the Indianapolis & Cincinnati Traction Company, the Terre Haute, Indianapolis & Eastern and the Interstate Public Service Company. The orders are the first to be issued following the suggestions of the citizens' committee for improvement of the financial condition of the Indianapolis Street Railway. The company has been losing several thousand dollars annually in revenue as a result of persons using the interurban cars for city rides. The order is expected to be of benefit to the interurban companies in that it probably will result in relieving congestion on some of the cars caused by a large number of persons using them for city rides.

Selling Transportation to Soldiers

The Portland Railway Light & Power Company operates an interurban line from Portland, Ore. to the United States Army barracks at Vancouver, Wash., which competes with motor bus service between these points. In accordance with the usual custom the credit of enlisted men is good at the post exchange up to a given amount each month. Arrangements have been made by the railway company whereby the post exchange sells interurban tickets, charging the men's accounts when credit is desired. This is said to be a convenience to the men and has resulted in ticket sales through the post exchange amounting to about $250 per month or considerably more than the proportion of the business done by the railway when tickets had to be purchased in the same way from both railway and bus lines. A commission of 7 per cent is allowed the post exchange for handling the business. The railway fare from Vancouver to Portland is 17 cents.

Transportation News Notes

Extension of Seven-Cent Fare Announced.—The United Railways, St. Louis, Mo., has been authorized by the Public Service Commission to extend the 7-cent fare until Dec. 31. The valuation of the company's property which is being made by the commission probably will not be completed before Jan. 1.

Railway Situation Improved.—Regulation of the jitneys in South Bend, Ind., including their elimination from streets on which the electric railway cars operate, has resulted in placing the South Bend electric lines on a paying basis for the first time in many years, according to company officials. With the extensions proposed to the lines to new residence sections, it is probable that the street car business in South Bend may become more profitable.

Hearing on Lower Fare Scheduled.—The question of lower fares on the line of the Boston (Mass.) Elevated Railway will be discussed at a public hearing in the State House on Sept. 18. An announcement to this effect was made at a recent preliminary hearing before the Public Utilities Commission at which nearly 100 people were present including city officials and officials of the Eastern Massachusetts Street Railway and Boston Elevated Railway.

Again Wins Safety Prize.—The safety prize awarded by the Louisville (Ky.) Railway for the smallest number of accidents again goes to the trainmen of the Chestnut Street line. The record of this line for June was 4,500 miles for each accident. This same line captured the May prize. It is the first time since the contest was started some fifteen months ago that one line won the prize twice in succession.

Orders Freight Reduction.—The Public Utilities Commission of Idaho has issued an order authorizing all railroads in the State of Idaho to make a reduction in intrastate freight rates, comparable with the reduction ordered recently by the Interstate Commerce Commission on interstate rates, of 10 per cent, except on hay and grain. The order permits the railroads to make the change on ten days notice. The new rates are effective July 1, 1922.

Riding Habit on the Increase.—A conclusive argument against electric railways outliving their usefulness is given in a recent issue of "*Whys and Other Whys.*" The Public Service Railway, Newark, N. J., in 1904 carried 215,400,000 passengers, an average of 588,525 a day. In 1921 the riders had increased to 435,679,801, an average of 1,193,643 a day more than twice as many. In 1904 the number of rides per inhabitant was 158.6 and in 1921, it was 187.1.

Reduced Rates Announced.—To meet competition with automobile bus lines now operating throughout the State, and especially between Cincinnati and Hamilton Ohio, the Cincinnati, Dayton & Toledo Traction Company has announced a reduction in commuter passenger fares. Rates which have been 2 cents a mile have been reduced to 1½ cents a mile, with special commuter rates between Hamilton and Cincinnati effective from June 1.

Will Oppose Fare Petition.—Preston S. Arkwright, president of the Georgia Railway & Power Company, Atlanta, Ga., has announced that the company will oppose a petition filed before the Georgia Railroad Commission by the Atlanta Board of Education and various parent-teacher associations of the city, requesting the commission to compel the company to reduce fares for school children. The company, which some time ago declined to grant a reduced fare to school children, will oppose the petition on the grounds that such a reduction would be discriminatory. The rate sought is one-half fare, or 3½ cents. The commission will hear the petition on Aug. 8.

Personal Mention

W. F. Tshudy Tranfers to Easton

Walter F. Tshudy, general superintendent of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., and associated companies, has resigned to accept a similar position at Easton, Pa. His resignation was effective Aug. 1. He will be succeeded in Trenton by Charles W. Wilson, night dispatcher of the company. Mr. Tshudy has been in the street railway business for twenty-four years, serving as general superintendent of the New Jersey & Pennsylvania company for the past ten years. He went to Trenton from Newtown, where he had charge of the lines operating between Bristol and Doylestown. He served as dispatcher for the first year and then was advanced to the present position. Prior to going to Newtown he was employed by traction companies in Wilkes-Barre, Philadelphia and Lancaster. Mr. Wilson has been dispatcher for the Trenton company for the past nine years. He has had wide experience in street railroading and prior to going to Trenton was employed by the Philadelphia Rapid Transit Company.

Division Superintendents Named

Several changes in official personnel have been recently announced by the Georgia Railway & Power Company, Atlanta, Ga. W. F. Edwards, superintendent of employment and instruction for some time, has been named assistant superintendent of transportation, succeeding E. C. Grambling. J. J. Duncan, a former instructor, succeeds Mr. Edwards. C. M. Edison, a starter, has been appointed superintendent of Division C, to succeed J. A. Robinson; C. H. Meaders has been appointed superintendent of Division A, to succeed J. R. Leach; F. G. Simpson has been appointed superintendent of Division B, to succeed B. S. Jones. The former superintendents of these divisions have been transferred to other duties.

P. G. Gossler Acting President

P. G. Gossler, who has been chairman of the board of directors of the Columbia Gas & Electric Company, Charleston, W. Va., is now acting as president. This office was previously held by A. B. Leach. Mr. Gossler is president also of the Helena Light & Railway Company, Helena, Mont., and vice-president of the Macon Railway & Light Company, Macon, Ga.

Joseph A. Yager is now receiver, with Harry A. Dunn and J. Frank Johnson, for the Toledo & Western Railroad, Sylvania, Ohio. N. D. Bushong, secretary and treasurer of the company, is also auditor now, this position formerly having been held by H. R. Rondebush. J. W. Anderson, who was acting general freight and passenger agent, is now also traffic manager. W. H. Seed takes the position of acting freight and claim agent. A. H. Blunk, as roadmaster, fills the position previously held by John Knepper. He is also trainmaster.

V. O. Law Succeeds W. O. Clure as General Passenger Agent

Vincent O. Law, St. Paul newspaper man, has been named by President Horace Lowry as general passenger agent for the Twin City Rapid Transit Company, Minneapolis, Minn., succeeding W. O. Clure, who resigned to go to Chicago in February.

In 1915 Mr. Law, who had attended the University of Wisconsin, went to St. Paul as reporter on the *Daily News*. He later was police reporter on the *Dispatch* until he enlisted and went overseas with the Third Field Artillery. While in France he was chosen a member of the party of 160 newspaper men in the army who were taken to various camps, battlefields and fronts and into the Rhine country that they might gain a broad background of the war. He was then chosen to relieve a member of the staff of *Stars and Stripes*. Upon his return to the United States in 1918 he became associated again with the *Dispatch*, as reporter and rewrite man. He began his new work on July 21.

V. O. LAW

Agnes Noon, telephone operator for the Louisville (Ky.) Railway, has been elected to the general committee of the Employees' Co-operative Welfare Association. Miss Noon is the first woman to be elected to this committee, although several of the local committees have women members. As a member of the general committee Miss Noon is eligible for election as director of the company at the annual meeting of stockholders.

Polk Lafoon, who has been for some time secretary and treasurer of the Columbia Gas & Electric Company, Charleston, W. Va., has been elected a vice-president of the company.

James Lawrence, who is auditor of the Muskegon (Mich.) Traction & Lighting Company and auditor and vice-president of the American Light & Traction Company, has been made vice-president of the San Antonio (Tex.) Public Service Company.

Obituary

Colonel B. A. Enloe, chairman of the Tennessee Railroad & Public Utilities Commission at Nashville, died at his home in Nashville recently. For forty years he was prominent in politics in Tennessee and for almost a score of years was a member of the commission. He served in Congress, and was commissioner from Tennessee to the World's Fair at St. Louis. He was at one time editor of a daily paper at Jackson, Tenn.

Charles Butler Holmes, a former president of the American Electric Railway Association, died in Chicago on July 8. He was a leader in the industry through the period of transition from horse-drawn vehicles to cable cars and later to electric cars. As president of the Chicago City Railway, which in 1887 was operating 130 miles of track and more than 800 cars, he was instrumental in replacing the horse cars with cable cars. To advocate this method at that time took courage and vision. His presidency of the American Street Railway Association, as the national organization of street railway men was then known, was from 1887 to 1888. Mr. Holmes was a native of Vermont.

Frank W. Frueauff, junior member of the firm of Henry L. Doherty & Company, New York, N. Y., and vice-president of the Cities Service Company, died suddenly at his home in New York City on July 31. He was a partner in the Doherty company from its organization in 1905, and was especially interested in public relations. Under the direction of Mr. Frueauff the Cities Service Company, a Doherty holding corporation, increased its business in a few years from $1,000,000 to $100,000,000. Before joining in the formation of the Doherty company, Mr. Frueauff was president of the Denver Gas & Electric Light Company. He had served as meter reader of the Denver Consolidated Electric Company in 1899, and served in various capacities, including those of secretary, vice-president, and general manager, after its consolidation with the Denver Consolidated Gas Company into the Denver Gas & Electric Light Company. This change was effected by Henry L. Doherty, who was president of the company preceding Mr. Frueauff.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES · BUSINESS ANNOUNCEMENTS

Car Loading Still Heavy

Reports received by the Car Service Division of the American Railway Association from the carriers of the country show that despite the railway strike the total loading of all commodities, other than coal, during the week which ended on July 22, was the heaviest for this season of the year of any in the history of the carriers, and within nine-tenths of 1 per cent of the peak of October 15, 1920.

During that week 861,124 cars were loaded with revenue freight, an increase of 217 cars over the preceding week and an increase of 73,090 cars over the corresponding week last year. Grain and grain products totaled 57,566 cars, an increase of 8,655 cars over the previous week. This was a decrease of 7,149 cars compared with the corresponding week last year, but an increase of 22,089 cars over the corresponding week in 1920. Loadings for the week, however, were the highest since the week of September 3, 1921.

Coal loadings totaled 76,060 cars, a reduction 1,274 cars under the previous week. Compared with the same week last year this was a decrease of 73,745 cars, and with the same week two years ago a decrease of 125,530 cars. Coke loadings amounted to 9,949 cars, a gain of 251 cars over the preceding week. It also was an increase of 6,179 over the same week last year, but 3,178 below two years ago.

Merchandise and miscellaneous freight, which includes manufactured products, totaled 567,165 cars, 300 cars less than the week before. This exceeded the corresponding week last year by 98,342 cars, and the corresponding week in 1920 by 50,480 cars.

Coal Shortage in Northwest Serious

The steadying influence of the government on the price and distribution of coal is now making itself felt. Production is again on the increase as the tangles caused by the rail strike are being straightened out. The Geological Survey estimates the output last week at 3,900,000 tons, a gain of 200,000 tons, or 5 per cent over the previous week. This increase came mainly from the non-union fields in the South, but Pennsylvania contributed some.

Prices continue strong. *Coal Age* Index of spot prices of bituminous coal at the mines rose 96 points to 556 on July 31. This corresponds to an average spot price of $6.73. Prices on Western coals, particularly those from Kentucky, declined with the collapse of the boom on the Chicago market a week ago. Cincinnati, Columbus, Cleveland and Boston were the most active markets as the week opened.

Washington's machinery for handling the details of distribution is in the making and the control over prices is yet but a moral influence. The structure is being built from the top down, but it is being well built, extending into the states and cities through the co-operation of state commissions and local fuel administrators. Secretary Hoover is getting ready to meet a situation that is more than transient, a shortage that is yet to be fully felt and that will not be over until next spring.

The railroads are the only consumers that have found it necessary so far to take advantage of the priority orders—the Pennsylvania is taking 20 per cent of output on its lines. These orders were primarily for their protection and they are now using them to get coal. Where the roads demand the coal, shippers are letting them have it below the market rather than have it confiscated.

Buying of British coal has abated somewhat, mainly because both coal and ships have become scarce if wanted for immediate delivery and because prices advanced sharply. Whereas two weeks ago English coal could be had c.i.f. New York for around $7.50, it is now obtainable for late August and September delivery at around $10.

A survey just completed by officials in Washington of the Lake coal situation indicates that it is physically possible to move enough coal to give the Northwest reasonable supplies if the Lake movement is begun by Sept. 1. Such a program, however, presupposes full co-operation on the part of ship owners and that there will be no delays to vessels in obtaining coal for loading at the lower ports. Car and coal shortages have lowered the Lake dumpings. The needs of the Northwest are fast becoming urgent and a few weeks more delay will spell a certain coal famine for that section next winter.

Public Service Railway Has Ample Coal Supply

A recent announcement by officials of the Public Service Corporation, of New Jersey, states that its subsidiaries have ample supplies of coal. Operations could be continued at least for three months even if not another ton of coal were received. Public Service Gas Company and Public Service Electric Company are large consumers of coal, using about 2,000,000 tons annually. The traction subsidiary gets its power from the electric subsidiary.

In anticipation of a strike, company began to accumulate large stocks as far back as last winter and has recently been augmenting its supplies by shipments of English and Welsh coal.

1,250,000 Men Idle Through Strikes

According to the National Industrial Conference Board, there are approximately 1,250,000 persons in the United

ELECTRIC RAILWAY MATERIAL PRICES—AUG. 1, 1922

Metals—New York

Copper, electrolytic, cents per lb	13.975
Lead, cents per lb	5.775
Nickel, cents per lb	39.00
Zinc, cents per lb	6.55
Tin, Straits, cents per lb	32.625
Aluminum, 98 to 99 per cent, cents per lb	19.20
Babbitt metal, warehouse, cents per lb.:	
Fair grade	24.50
Commercial	11.125

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$8.125
Somerset mine run, Boston	6.00
Pittsburgh mine run, Pittsburgh	....
Franklin, Ill., screenings, Chicago	....
Central, Ill., screenings, Chicago	....
Kansas Screenings, Kansas City	4.25

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$40.00
Standard open hearth rails, gross ton	$40.00
Railroad spikes, drive, Pittsburgh base, cents per lb	2.30
Tie plates (flat type), cents per lb	2.125
Angle bars, cents per lb	2.40
Rail bolts and nuts, Pittsburgh base, cents, lb.	3.625
Steel bars, cents per lb	2.25
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	1.35

Hardware—Pittsburgh

Wire nails, cents per lb	2.40
Sheet iron, (24 gage), cents per lb	4.20
Sheet iron, galvanized, (24 gage), cents per lb	4.90
Galvanized barbed wire, cents per lb	3.10
Galvanized wire, ordinary, cents per lb	2.75

Waste—New York

Waste, wool, cents per lb	15.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	14.00
Colored	12.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	91.50
White lead, (100 lb. keg), cents per lb	12.25
Turpentine, (bbl. lots), per gal	$1.19
Car window glass, (single strength), first three brackets, A quality, discount*	84%
Car window glass, (single strength), first three brackets, B quality, discount*	86%
Car window glass, (double strength, all sizes, A quality), discount*	85%
Putty, 5 lb. tins, cents per lb	5.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	15.625
Rubber-covered wire, cents per lb	5.85
Weatherproof wire base, cents per lb	16.00

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd	$3.20
Common, per sq.yd	3.00
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.17
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	2.05
Gravel, ¾-in., cu.yd., N. Y	1.75
Sand, cu.yd., N. Y	1.00

Old Metals—New York

Heavy copper, cents per lb	11.25
Light copper, cents per lb	9.00
Heavy brass, cents per lb	6.25
Zinc, old scrap, cents per lb	3.25
Yellow brass, cents per lb (heavy)	6.50
Lead, heavy, cents per lb	4.50
Steel car axles, Chicago, net ton	$17.00
Old car wheels, Chicago, gross ton	19.75
Rails (short), Chicago, gross ton	17.75
Rails (relaying), Chicago, gross ton	25.00
Machine turnings, Chicago, gross ton	8.75

States out of employment as the direct result of strikes. The board calculates that this represents the loss of 10,000-000 man hours of work daily.

In reviewing the situation, the Board says:

"With each day that this strike condition exists, more and more persons engaged in secondary or allied industries, which are dependent on the major industries, are thrown into involuntary unemployment, thereby imposing an additional burden on the community."

Rolling Stock

British Columbia Electric Railway, Vancouver, B. C., has added ten more cars to its equipment. The cars came from Victoria and were replaced there by ten new safety cars.

Kentucky Traction & Terminal Company, Lexington, Ky., announces under date of July 26 that it has just closed a contract with the Cincinnati Car Company for the purchase of two light weight freight cars—length 40 ft., motor equipment 25 hp.

Cleveland (Ohio) Railway announces that at a meeting of the directors July 27 approval was given for the purchase of fifty new motor cars and fifty trailers for increasing service in Cleveland. It is understood that bids have been asked from the McGuire Cummings and Kuhlman Car Companies for motor cars of the Peter Witt type. It is stated, however, that if the bids are found too high the company may decide to build the cars in its own shops.

Track and Roadway

Omaha & Council Bluffs Street Railway, Omaha, Neb., has awarded the contract for the widening and double-tracking of the toll bridge connecting Omaha in Nebraska and Council Bluffs in Iowa.

Trenton & Mercer County Traction Company, Trenton, N. J., is having double tracks laid on Pennington Avenue and the ties are being "treated" along the thoroughfare. The improvement will mean the saving of time for the company.

Los Angeles (Cal.) Railway is to reduce the west span of the Macy Street bridge from 154 ft. to 100 ft. according to B. H. Eaton, engineer of way and structures. This work will strengthen the bridge.

San Diego (Cal.) Railway, through President Speckels, has announced the sending out of orders for materials for reconstruction of the University Avenue line of the company and the work is to be started about Sept. 1. The line is to be reconstructed from Park Boulevard, San Diego, to the end of the line in East San Diego, involving the laying of about four miles of track. Twin steel ties laid in concrete and 93-lb. rails will be used. The estimated cost of the work is $350,000.

Portland Railway, Light & Power Company, Portland, Ore., under a proposed franchise will install tracks in the middle of Foster Road instead of at one side as at present. Passage of a franchise for the operation of street cars in Foster Road was favored by members of the City Council recently, when copies of the ordinance were ordered advertised for the required sixty-day period. The company has been operating its cars in Foster Road over a private right of way, which was relinquished to the city when plans were drawn for this improvement.

Shops and Buildings

Charlottesville & Albemarle Railway, Charlottesville, Va., is now asking for bids and expects to install one 1500 kw. horizontal 2300 v. steam turbine with condenser and switch-board equipment.

Los Angeles (Cal.) Railway has overhauled eighty-two transformers for motor generator sets in substations with the oil filtered and the water coils cleaned. The work was completed in four months.

Boston, Mass.—Engineers of the Boston Transit Department have sent a plan to the Boston (Mass.) Elevated Railway for relieving the overcrowding at the Park Street station of the Tremont Street Subway. The plan provides for the building of an additional platform on the easterly side of the north bound track. The proposed platform would probably cost about $250,000.

Portland Railway, Light & Power Company, Portland, Ore., through C. M. Clark of Philadelphia, chairman of the Board of Directors, states that more money will be available this year for improvements than for some time. The new development of the projected Three Links Station at the Oak Grove site on the Clackamas River was recently inspected. Preliminary construction work will start about October. There will follow a long term of construction of the reservoir, power house and pipe lines and it will probably be 1924 before the new station is placed in operation.

Trade Notes

The Supply Men's Association will meet jointly with the Chief Interchange Car Inspectors' and Car Foremen's Association of America at the Sherman Hotel, Chicago, Aug. 22, 23, and 24. Exhibits will also be held.

The Safety Car Heating & Lighting Company, New York, N. Y., is completing plans for the construction of a one-story 106 x 115 ft. brick and steel addition to its works at Hamden, Conn., and also for the erection of a new battery plate production building, one-story high and 194 x 100 ft. of brick and steel.

The Associated Engineers, Milwaukee, Wis., announce that they will move to larger quarters at 373 Broadway, Milwaukee, on or about Aug. 1.

Railway Audit & Inspection Co., Inc., Philadelphia, Pa., announces the appointment of C. H. G. Larrimore as general manager in charge of all operations, vice T. C. Cary, deceased.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., recently held its annual meeting of the sales managers of the various departments of the company and of the various district officers at Lakewood, N. J. H. D. Shute, vice-president of the company, presided.

Conveyors' Corporation of America, Chicago, has appointed the Mid-West Engineering Sales Company, Masonic Temple, Cedar Rapids, Iowa, as representatives in eastern Iowa for the sale of American trolley carriers, which are coal-handling equipment of the monorail type.

Johns-Pratt Company, Hartford, Conn., whose selling arrangements through Johns-Manville, Inc., were recently dissolved by mutual consent, have established a Boston office at 161 Summer Street, which is in charge of Daniel Fitts and Harold E. Morse. It is intended to have complete representation at this office for the following products of the company: Noark fuses, meter protective devices and moulded products.

New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has just issued catalogs on panel boards, knife switches, radial switches, harpoon guy anchors, projectors and reflectors.

Westinghouse Electric & Manufacturing Company has reprinted an article by Prof. Chas. F. Scott of Yale University on "The Question of Inductive Interference and Electrolysis as Related to Railroad Electrification." It reviews the experience along these lines of several railroads having electrified sections, with particular reference to single-phase electrification.

The McAlear Manufacturing Company, Chicago, Ill., has ready for distribution a new 128-page catalogue, known as No. 27, which illustrates many new devices, including an individual temperature control valve, specialties for all power plants, vacuum and vapor heating systems, oil refining and water works plants, plumbing systems and marine service, together with illustrations showing their application and use. The individual temperature control valve is self contained and can be applied to any radiator, old or new, without additional piping other than the supply and return. When the thermostatic member is set for the desired room temperature, it automatically controls the opening and closing of the valve. The catalogue describes all the specialties of the company.

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ELECTRIC RAILWAY JOURNAL
Consolidation of Street Railway Journal and Electric Railway Review
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Individual Labor Agreements More Practical than National Ones

DURING the last ten years the electric railway industry has sounded the depths of tribulation. When the costs of operation went up by leaps and bounds, adequate increases in fares were not permitted. The companies have been harassed by unfair jitney competition, burdened with inequitable taxes and frequently made the football of politics. But one burden they have been spared. There has been no national labor agreement. This has been a good thing for the companies, for the men and for the public.

During the past four months one of the important and necessary utilities of the country has been paralyzed and another threatened because of national agreements. Numerous conferences have been held, federal and state authorities have endeavored to assist in the bringing about of a settlement, and the continued progress of industry and commerce has been threatened with interruption. A national agreement for any industry does not take into consideration the great differences in living conditions which exist in various parts of the country. What would be a hardship in wages and working conditions in one part of the country might easily be very satisfactory in another part. Moreover, if industrial relations become mutually satisfactory on one property, they should not be forced artificially to remain strained because others at a distant point cannot agree on what is best to do. This practice on electric railways of individual labor agreements should be borne in mind with any consideration of electric railway securities as investments.

The Coal Situation Requires Close Attention

THE Federal Fuel Distributor has now completed his organization and in order to co-operate with the government, the American Electric Railway Association has combined with the National Electric Light Association and the American Gas Association in the appointment of an executive representative at Washington to handle coal matters. This is one of the ways in which the association is endeavoring to look out for the requirements essential to uninterrupted operation of the electric railways.

It is evident that John Lewis has scored a triumph by keeping his forces intact through the summer until the public necessity for coal has made a resumption of work imperative. For the general situation is becoming alarming, though at the moment the electric railways do not seem to be in imminent danger of a shut down from lack of coal. The present situation in the coal strike seems to be that of marking time while results from the Cleveland conference are awaited. The plan of settlement being discussed includes the resumption of operation by mine workers and operators on a status quo basis under the conditions of March 31, 1922. It is planned that by Oct. 31 an advisory committee is to be elected, composed equally of operators and miners, which committee is to make a complete investigation of the coal situation and report its recommendations as to the best way to conclude future wage scales, etc. This committee, it is understood, is designed to take the place of the commission that President Harding has been proposing to accomplish the same ends. The difference would be that in the one case the entire matter would be retained within the industry and in the other the government would be a party.

Coal stocks are now lowered to a point where close co-operation by all utilities is necessary in order to prevent closing down of service. The appointment of the Washington representative should do much to speed up the various operations necessary in order to secure prompt assignment and delivery. His services should be freely used by the electric railways if their local situation becomes acute.

Advance in Underfeed Stoker Design

THE pioneer installation of a new design of underfeed stoker for burning Northern Illinois, high-ash, clinkering coal recently completed its first year of service in the power plant of the Twin City Rapid Transit Company, Minneapolis, Minn. During this time it has successfully performed the service for which it was designed—an accomplishment of considerable credit to the originator, E. H. Scofield, who evolved the special features that adapt an ordinary underfeed stoker for the combustion of fuel having clinkering tendencies.

The stoker is described elsewhere in this issue. Two factors were recognized as prerequisites in obtaining fuel-bed conditions which would minimize the undesirable characteristics of this coal. The first of these, a slightly agitated and uniformly progressive fire bed, was brought about by the addition of a secondary ram to each retort. By the action of these rams the force for advancing the burning fuel is applied at two points along the fire bed instead of one, with a consequent reduction in disturbance to fuel, the clinkering tendency of which is aggravated by excessive agitation. The other beneficial condition is a low fuel-bed temperature. This was provided in the design of the setting by creating circumstances particularly favorable to a high heat absorption directly from the fuel by the exposed boiler heating surface.

In considering the results accomplished in the latest design, due credit must be accorded the working out of boiler and stoker installation as a unit. In other words, beneficial furnace and boiler conditions contribute materially to the high average efficiency of 70 per cent which has been obtained in Minneapolis. This performance is exceptional with coal averaging 9,500 B.t.u. per pound. It is difficult, of course, to determine what part of the increase in efficiency over the old installation can be credited to the stoker and what to the redesigned boiler setting and baffling. But the value of the co-ordination between the two is evident.

A solution of the problem of burning low-grade clinkering coal in underfeed stokers would put fuel of this variety on a basis comparable with high-grade coals in respect to the high rates of combustion possible and the satisfactory behavior of the fuel while burning. This would mean a distinct saving in energy costs to generating companies in the clinkering coal regions. That power plant engineers have been awaiting equipment which could do this seems to be demonstrated by the fact that a number of installations of this type of stoker are now under way in the territory where fuel having high percentages of moisture, ash and sulphur prevails. These installations are based on the excellent performances of the Twin City plant.

The Six-Day Traction Strike in Chicago

AFTER the longest complete tie-up of both elevated and surface lines ever experienced in Chicago the trainmen have won a wage 7 cents an hour higher than is paid any other surface electric railway employees in the country. They also retain the eight-hour day. Yet Mr. Blair was severely criticized locally for his alleged unwillingness to concede a point here to gain a point there. In the end it was he who conceded nearly everything. There was a conspicuous absence during the negotiations of evidence showing why a 65-cent scale, the company's initial compromise offer, was not a fair wage. The union officials side-stepped the fair living wage issue. They pointed repeatedly to the magnitude of the 15 cent reduction. It meant $8 to $10 a week to each trainman, which would be quite a sum to lose at one cut. Had the 15-cent reduction been arrived at by small steps begun earlier it might have seemed less formidable to the men.

The trainmen ignored the fact that a street railway must be conducted on a business basis. Mr. Blair showed from the first forty-five days' operation under the 7-cent fare that the 1-cent reduction from 8 cents had caused a $17,300 decrease in daily revenue—equivalent to about $6,300,000 a year. The wage reduction will absorb only about $4,000,000 of this. If there is to be any profit in the business, therefore, the company will have to find ways and means of making large operating economies. Substantial savings are not impossible provided the co-operation of the trainmen is had. Having won so liberal a wage settlement the men should be in the frame of mind and have the good sense to agree wholeheartedly to plans for better operation that will possibly enable the company to continue the present scale without bankruptcy.

The situation of the elevated railway employees in this strike was unique. They had no quarrel with the management. No contract existed, as the previous contracts, Surface and "L," had expired on June 1, 1922. There was no plan on foot to cut wages as long as the present rate of fare prevailed. But to make an issue for standing with the surface lines union, the elevated union demanded that the company sign up for a year at the old 82-cent rate. Of course this could not be done. A small meeting stormed by strike advocates precipitated a strike simultaneous with the surface strike. The outcome of the strike was an agreement on a new wage 10 cents an hour lower. The men hastened a cut in their own wages by striking. They deserved to suffer the reduction at once. But President Britton I. Budd ignored their poor judgment and continued the 82-cent rate until such time as the fare is cut by the Illinois Commerce Commission. This evidences a consideration for the viewpoint of the employees that is too seldom seen. It accounts in part for the unusually high morale on the Chicago Elevated Railroads and on the Chicago, North Shore & Milwaukee Railroad.

Putting It Up to the Surface Lines

NO ORDERS will be issued by the New York Transit Commission fixing standards of service for the surface lines of Greater New York. Responsibility for improved service on these lines will be placed primarily with the operators, with the commission maintaining regulatory supervision. This is the decision of the commission following its inquiry into the conditions affecting the surface lines and is in accordance with the suggestion made to the commission by Gen. Lincoln C. Andrews, chief executive officer. Representatives of the sixteen companies who appeared before the commission on Aug. 3 have agreed on their part to meet with the members of the commission once a month with a view to exchanging ideas and suggestions looking to a general improvement in equipment, plant and schedules.

Here is an instance of frank recognition by a public regulatory body of the adverse conditions under which surface railways have operated during the war-time period and of the efforts that are now being made to restore the physical properties to something like their normal state. Conditions were particularly unfortunate for the surface companies in New York City in that many of them were cast adrift from the properties of which they were formerly a part and that none of them was permitted to increase its fares, except as an increase resulted indirectly from dismemberment and the curtailment of transfer rights to the passengers. The surface lines in New York survived at all only because of economies which were put into effect that for the most part resulted in deterioration of the physical properties and at the same time—necessarily so—worked to the detriment of the traveling public. During the last year, however, within the limits of their financial condition, the companies have materially improved their efficiency of operation. This the commission knows to be the fact, while the change for the better is also readily apparent to the riding public in the shape of better service and in fewer decrepit cars.

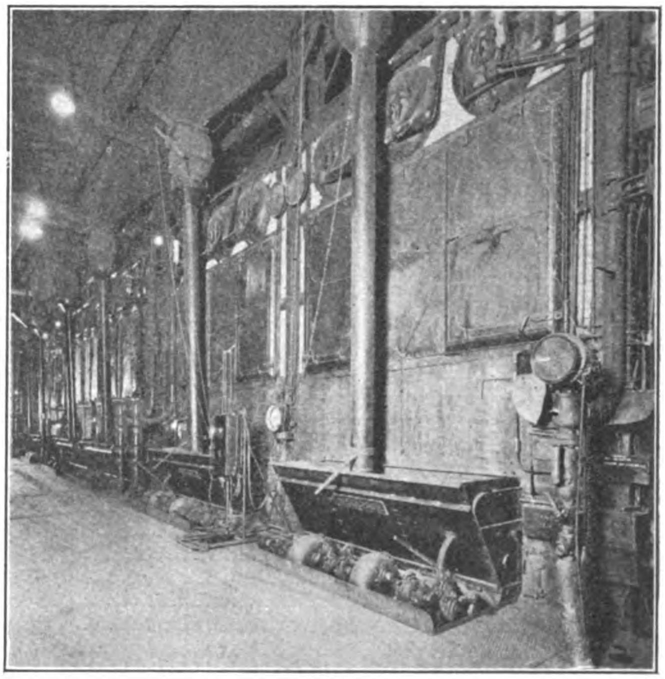
The attitude of the commission is that by interfering least with the companies it is helping them most in working out their own salvation. As General Andrews expressed it, the commission may be expected to secure far better service for the public from the surface companies by leaving the responsibility upon the operator and holding him to it than by issuing orders. The commission is, of course, in a position to judge from its records what the financial conditions of the companies will permit them reasonably to do and to determine for itself as a guide proper standards of service to be met by progressive steps as rapidly as the condition of each company permits. Thus are the companies really put on their mettle.

The Underfeed Stoker Successfully Burns Low-Grade Fuel

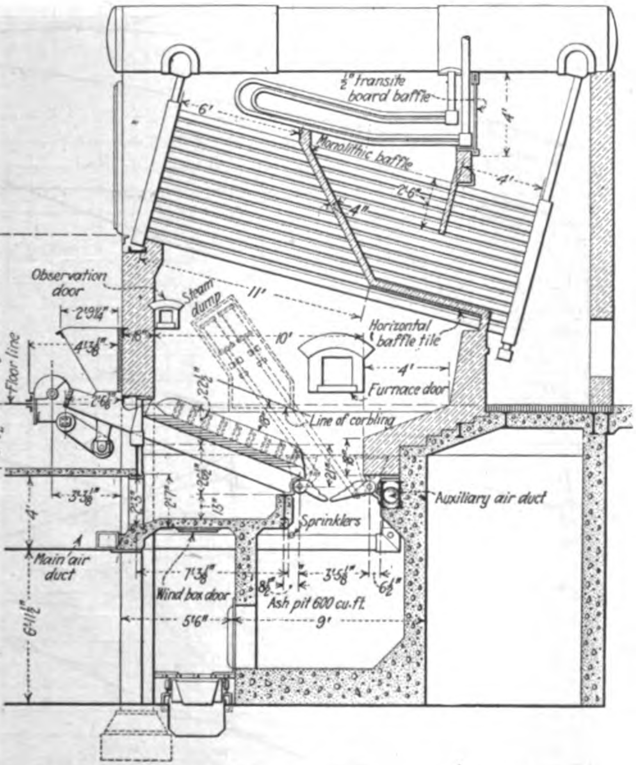
High-Ash, Clinkering Coal Burned in Specially Designed Underfeed Stokers in Twin City Plant — Operation Featured by Flexibility, High Efficiency, Capacities Up to 350 per Cent, Uniform Thickness of Fuel Bed and Minimum Clinker Formation

OVER a year ago the Twin City Rapid Transit Company, Minneapolis, Minn., installed underfeed stokers under six 5,560-sq.ft. B. & W. boilers in its steam station located at Sixth Avenue, S.E. and the Mississippi River. These stokers replaced six of the chain grates with which all twenty-eight boilers in the station up to that time had been equipped. The requirements were severe in both capacity and efficiency incident to the demands of a station feeding a widely fluctuating electric railway load. The load characteristics of this plant are still further aggravated by its interconnection with several hydro-electric plants which are kept loaded always to the limit of the water available. The older installation left considerable to be desired in the way of flexibility and economy in addition to being handicapped by a power demand varying between extreme limits and a clinkering fuel of low grade, high in ash, moisture and sulphur. When it was decided several years ago that the performance of the plant must be bettered, doubt was expressed at the possibility of accomplishing such a result with any type of underfeed stoker then designed or in operation, in the belief that the problem of continuous and satisfactory combustion of coals with high percentages of ash, moisture and sulphur had never been completely solved. The working out of these difficulties in the Twin City plant during the past four years has culminated in the use of a specially designed stoker and the redesigning of the boiler setting.

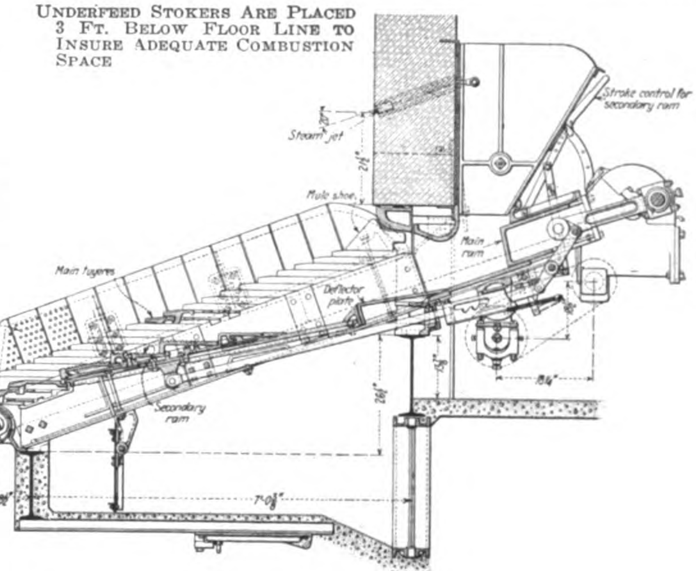
Each of the six installations consists of a Westinghouse six-retort stoker, 10 ft. 8¼ in. in width and 10 ft. ⅞ in. from front wall to bridge wall. The front is set flush with the boiler front, thus eliminating all overhanging brickwork. No ignition arches are used. As the bottoms of the front tube headers are only 8 ft. above the floor line, it was necessary to set the stokers



UNDERFEED STOKERS ARE PLACED 3 FT. BELOW FLOOR LINE TO INSURE ADEQUATE COMBUSTION SPACE


½" transite board baffle
6'
4'
Monolithic baffle
4'
2'6"
4"
Observation door
Steam dump
11'
2'9¼"
4'13⁄8"
16"
10'
Horizontal baffle tile
4'
Furnace door
8'
Floor line
3'-0½"
2'6⅛"
22½"
Line of corbling
3'3⅜"
26½"
21"
Auxiliary air duct
Sprinklers
4'
Main air duct
7'3⅛"
8½"
3'5⅛"
6½"
Wind box door
Ash pit 600 cu.ft.
5'6"
9'
6'11½"

ABOVE, SECTIONAL ELEVATION OF BOILER SETTING AND STOKER INSTALLATION SHOWING LARGE COMBUSTION SPACE, REDESIGNED BAFFLING, AND LENGTHENED SUPERHEATER.


Stroke control for secondary ram
Steam jet
Mule shoe
Main ram
Main tuyeres
Deflector plate
Extension side wall tuyere
Front dump grate
Rear dump grate
Secondary ram
7'0⅜"
3'5⅝"

AT RIGHT, SECTIONAL SIDE ELEVATION OF UNDERFEED STOKER FITTED WITH SECONDARY RAMS, DEFLECTOR PLATES AND FRONT AND EXTENSION SIDE WALL TUYERES

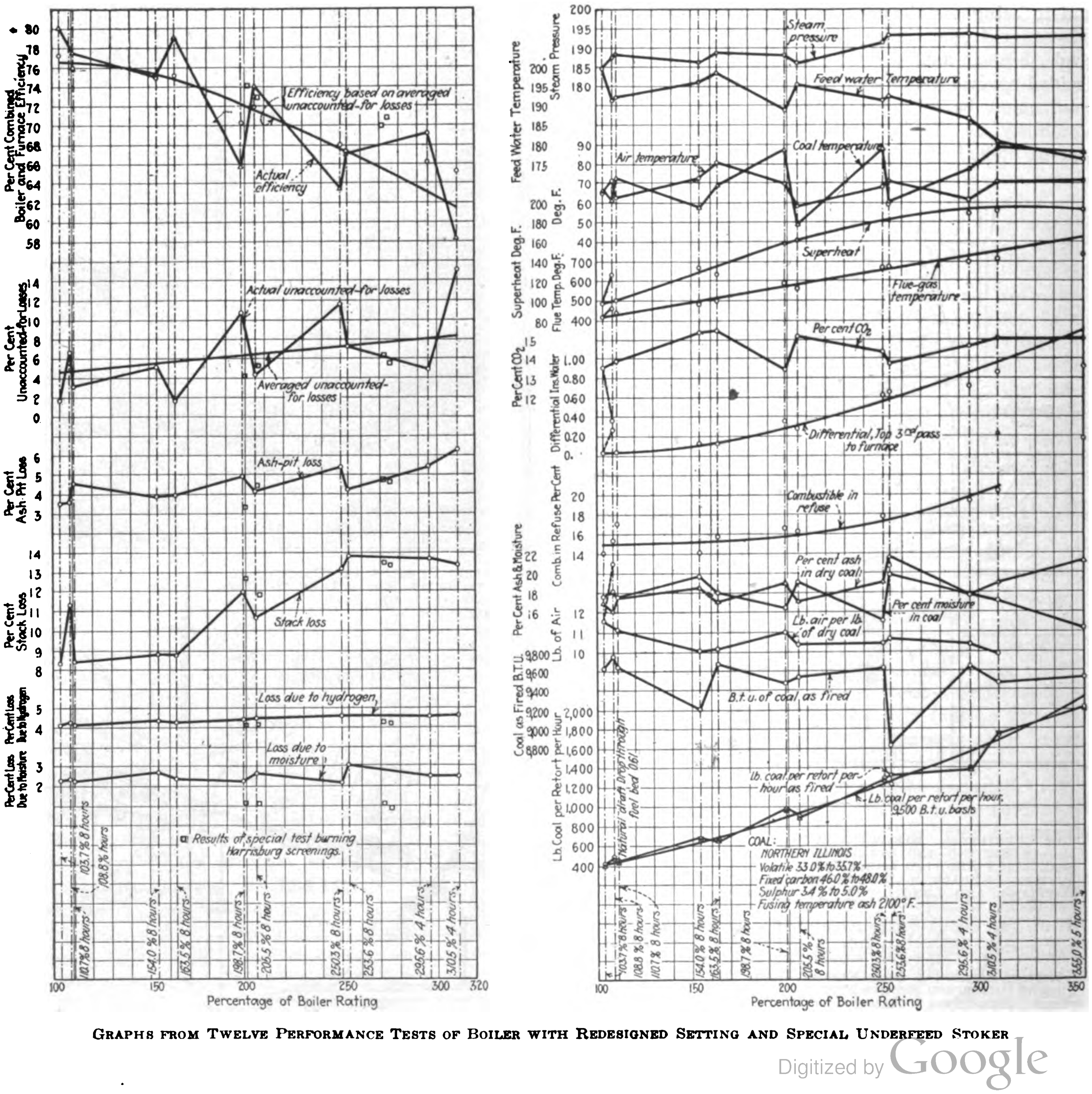
3 ft. below the floor level to secure the desired furnace volume of about 1,300 cu.ft. Each boiler is a thirteen-tube-high, twenty-one-tube-wide, parallel drum, 5,560-sq.ft. B. & W. unit, having 900 sq.ft. of superheater surface but no economizer. The steam conditions at which the boilers work are 190 lb. per square inch pressure and 100 deg. F. superheat at nominal rating. An accompanying illustration shows the general scheme of the stoker setting and the boiler baffling.

FUEL BED CONTROLLED WITH SECONDARY RAMS

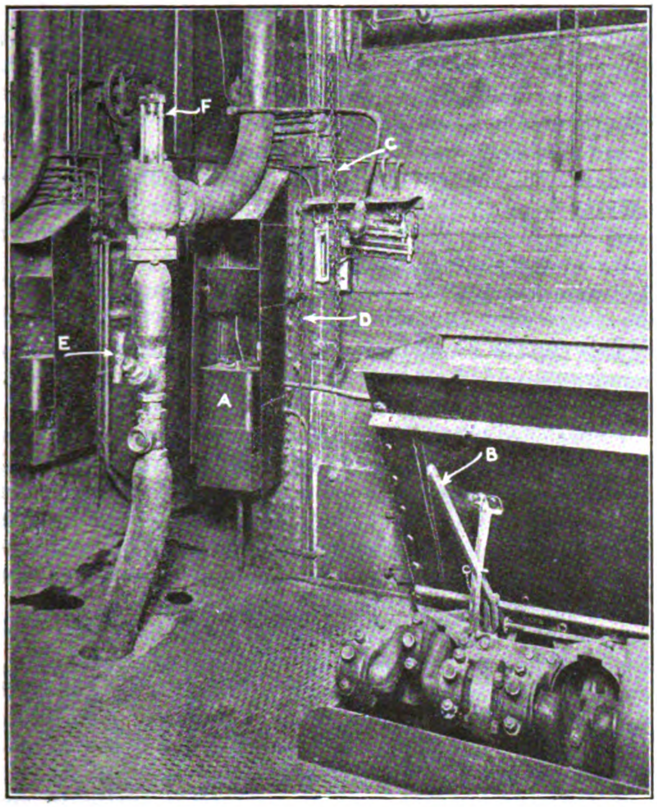
In the working out of the stoker design, several most desirable features were originated to meet the conditions required for the proper burning of Northern Illinois coal. The fuel, as it is introduced from the retorts by the rams, is spread laterally by deflector plates so as to cover the surface of the tuyeres. The action of these plates also loosens the fuel, which, when containing large percentages of moisture and dirt, becomes densely packed under the action of the rams. Secondary step-shaped rams, located midway between the deflector plates and the grate tuyeres, insure a continuous movement of the fuel bed. These rams, under independent control, extend in their action practically to the dump grate, filling in blowholes which may start and also building up the fuel bed to a uniform thickness. Thus the auxiliary rams furnish means for controlling the distribution of coal over the fuel bed and for agitating slightly the lower fuel bed. At the same time all grate surface is made effective for combustion. Thus it is seen that a fuel bed of uniform thickness is made to travel steadily toward the rear with suitable agitation. In practice the stoker has been found to maintain these conditions, an accomplishment to which are credited the beneficial combustion conditions.

SECONDARY RAM ADJUSTMENT

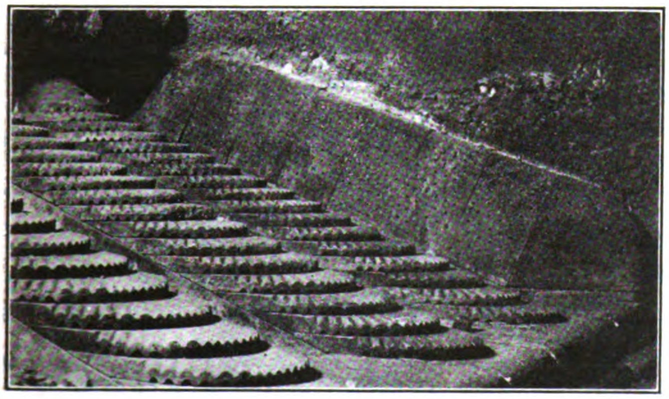
Each secondary ram is driven by its individual feed ram, although the length of stroke of all secondary rams is regulated by one adjustment lever shown in one of the accompanying illustrations. On the upper end of the auxiliary ram driving rod is a block with four notches which is engaged by a pin driven through a fixed stroke by a series of links from the primary ram. According to which of the four notches the pin engages, the lost motion of the link movement is taken



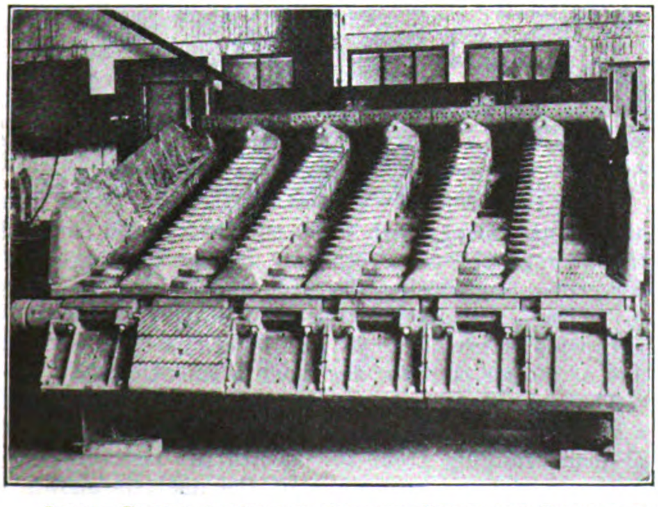
GRAPHS FROM TWELVE PERFORMANCE TESTS OF BOILER WITH REDESIGNED SETTING AND SPECIAL UNDERFEED STOKER



Control for Each Boiler Is Localized. *A*—Stoker Speed Control. *B*—Stroke Control for Secondary Rams. *C*—Uptake Damper Control. *D*—Wind Box Damper Control. *E*—Feed Line Valve. *F*—Gage Showing Rate of Feed-Water Flow



An Extension Side Wall Tuyere with Perforated Cover Plates in Place. (Not Twin City Installation)



Stoker Partly Assembled, Showing Details of Construction

up so as to vary the stroke of the secondary ram from zero to 6 in. The control of the lost motion is effected by the use of a selector block, which slides under the pin and prevents it from engaging any but the desired notch. The details of this construction are shown in an illustration.

Another refinement required was the use of extension side wall tuyeres, which extend approximately to the top of the fuel bed. They are so designed that there are no dead pockets for the lodgment of partially burned coal or clinkers and they protect the walls from the direct heat of the fuel bed and prevent clinkers from forming on the side walls. Both the side-wall tuyeres and front-wall air boxes admit a limited amount of air underneath and near the surface of the fuel bed, tempering the gases and forming a cool blanket over the lower furnace walls. The reduced temperature in that region is helpful in protecting the brickwork. A battery of high-velocity steam jets, placed in the front wall about 18 in. above the fuel bed surface and directed parallel to that surface, insures complete combustion by thoroughly mixing the gases before they enter the tubes. These jets also divert the gas flow toward the back wall of the furnace, providing for a sweep of the gases over the full length of the exposed boiler tubes.

Two sets of dump grates are provided for emptying the ashes into the ashpits. One of these is hinged to the lower end of the stoker and the other to the rear wall support. Each is actuated by an individual steam ram located on the outside of the boiler setting. The stroke of these rams can be controlled by the setting of a collar located on the piston. The front dump grate, by its lifting action, may be used to break up clinkers as they pass to the rear dump and also to hold back the fuel bed when the rear dump is dropped. Air for combustion is supplied under control to both front and rear dump grates. This auxiliary air supply enters through a duct inclosed in one of the steel members that support the lower end of the bridge wall. The entire grate surface thus becomes active when required and the carbon is burned down to a low percentage of the refuse before dumping. Also ashes may be dumped frequently on heavy loads without interfering with the output or efficiency and refuse is disposed of before it builds up into large clinkers.

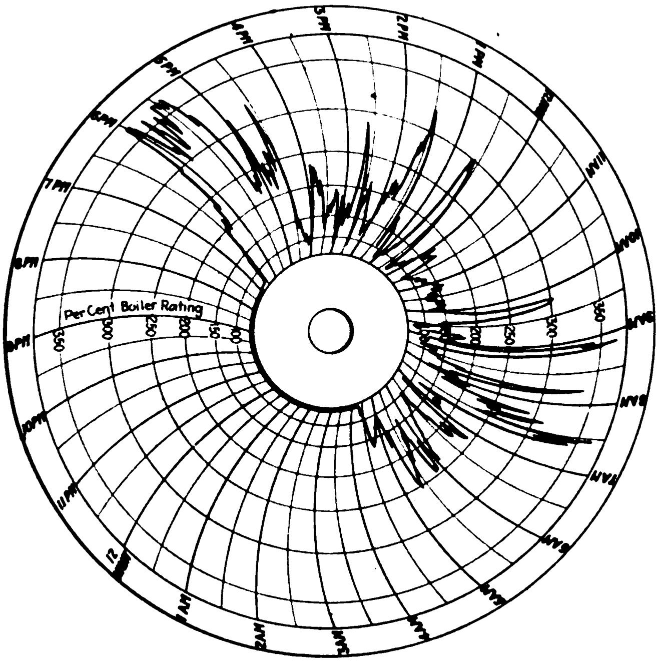
Baffling Gives Uniform Gas Velocity and Exposes Lower Tubes to Radiation

With the installation of the underfeed stokers special baffling was designed to give a cross-section of passage through the boiler approximately proportional to the volume of the gases. In other words, practically a constant gas velocity is established by decreasing the cross-section of the passes in the same ratio that the gases contract due to the abstraction of the heat by the tubes.

The bridge wall and baffling are so located as to expose 90 per cent of the tube length, giving a tube area double that of the grate to absorb heat by the direct radiation from the fire. The bridge wall rises from the dump grate to a level with the surface of the rear of the fuel bed and then recedes to the rear, meeting the tubes at the back end of the boiler. With this condition of tube exposure it is estimated that more than 50 per cent of the total heat is absorbed in the first two rows of tubes. The high heat absorption directly by radiation accounts largely for the low furnace temperature and consequently a minimum of clinker formation. The ashes as they are raked from the ash pit contain only lumps of moderate size. That this should be so is highly important because before dropping onto the bucket conveyor the ashes must pass through an 8x8-in. cast-iron grid.

If it resulted in excessive clinkering this system would be objectionable because the refuse would have to be reduced to the proper size before it could be handled in the conveyor.

In connection with the design of the furnace it might well be mentioned that the angles of the stoker, the front wall and the bridge wall are so arranged that the radiant heat which does not enter the tube surface directly reaches the boiler with but one reflection. Such a condition means that the maintenance of furnace walls and other brickwork is considerably lowered by the elimination of double and triple reflections. After eighteen months' operation the furnace settings have received no repairs of brick linings and there is practically no accumulation of slag on the walls.



STEAM FLOW CHART SHOWING WIDELY FLUCTUATING LOADS

SUPERHEATER SURFACE INCREASED

Because of the large proportion of heat absorbed directly from the fuel bed by the first two rows of tubes and because of the redesigned baffling, it was thought that the area of the old superheaters would be insufficient to maintain the required degree of superheat. Under the new conditions it was estimated that the temperature of the gases as they entered the second pass would be considerably lower than formerly. The superheater, consequently, was lengthened so that the bends extended over the first pass instead merely of just up to the first baffle. This gives the effect of a double-pass superheater. Its area was increased from 550 to 900 sq.ft. by this extension to insure that at least the same superheat would result. With the boiler operating at about 170 per cent of rating the superheat formerly averaged about 100 deg. F. An accompanying chart shows how it was increased to 140 deg. F. at this rating and also how it continued to increase as the boiler was forced to higher ratings.

In connection with the redesigning of the superheater, an improvement in the construction of the rear baffle was worked out which made it unnecessary to utilize the superheater headers to support the baffle tile. Instead of baffle tile in that position, between the lower superheater headers and the boiler drums, ½-in. transite board has been used. It is secured between two "L" holders, the upper one being hung from ⅞-in. rods passing over the boiler drums. The lower one is built into the section of tile baffling resting on the upper rows of boiler tubes. Seven sections, 21 in. x 4 ft., are required per boiler, each section being reinforced vertically with an angle and a channel. The advantage of this type of construction is that the baffling is readily removable and that it is independent of the expansion and contraction of the superheater risers.

Experience with this equipment has demonstrated the possibility of operating throughout a range from 100 to 350 per cent of rating, as will be noted on the boiler record chart. At the higher rating low-grade fuel is burned at a rate of 1 ton per retort per hour and the refuse is disposed of with no excessive loss of carbon or loss of capacity or efficiency while dumping. Whether or not this high rating is the limit of the stoker capacity has not yet been determined, for the rate of evaporation was limited by the capacity of the feed pipes and the feed line to furnish the boiler with water.

This design of stoker and furnace has demonstrated other advantages. It is possible to control the air supply to the most efficient proportions, little if any slag is formed on the furnace wall and highest efficiency is secured at or near normal rating. The stoker maintenance has been low and the percentage of combustible in the ash has been reduced to a negligible proportion.

The performance of this equipment is shown in accompanying curves. The data were obtained from a series of twelve tests, at outputs ranging from 100 to 350 per cent of rating, conducted under the direction of E. H. Scofield, engineer of power, by representatives of the Westinghouse Electric & Manufacturing Company and of the Twin City Rapid Transit Company. The fuel characteristics and operating conditions varied as outlined in the following tabulation, the result of each test being reduced to a basis of conditions shown in the third column:

	Minimum	Maximum	Curve Basis
Coal:			
Moisture, per cent	14	20	18
Ash, per cent	16	22	18
Sulphur, per cent	3.5	5	4
Volatile, per cent	32	35	33
Fixed carbon, per cent	45	48	45
Ash fused at, deg. F.	.....	.....	2,100
B.t.u., commercial, per pound	8,827	9,750	9,550
B.t.u. dry	.....	.....	11,650
B.t.u. combustible	.....	.....	14,200
CO_2 at top of third pass, per cent	13.5	15.5	14–15
Carbon in refuse, per cent	13.0	20.0	15–20
Uptake temperature, deg. F.	415	740	400–750

While the efficiencies on test range from 77 per cent at nominal rating down to 60 per cent at 350 per cent, the average operating economy is placed at about 70 per cent. Considering the wide and sudden variations in load and the character of the fuel, this performance is considered excellent. It may be compared to an average of 60 per cent for the older installation.

That considerably better results can be expected with a higher grade of fuel was indicated by four tests made at loads ranging from 200 to 275 per cent of rating with Harrisburg screenings of the analysis shown in the following table:

ANALYSIS OF HARRISBURG SCREENINGS

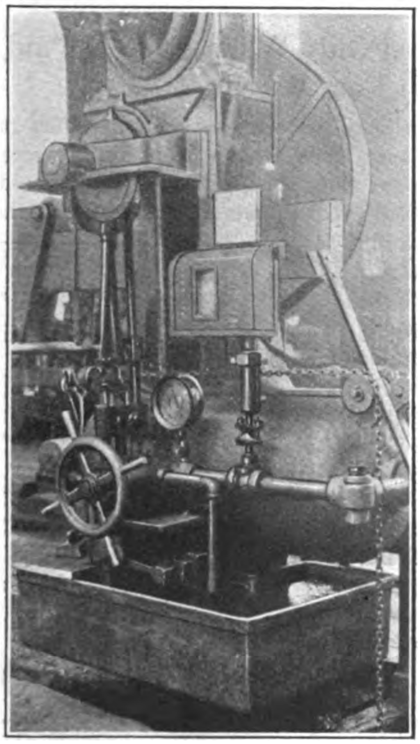
	Per Cent
Combustible	77.87
Moisture	9.90
Ash	12.23
Volatile—dry coal	29.48
Fixed carbon	54.11
Sulphur	2.81
Ash	13.60
B.t.u.—commercial, per pound	11,304
B.t.u.—dry coal	12,541
B.t.u.—combustible	14,514

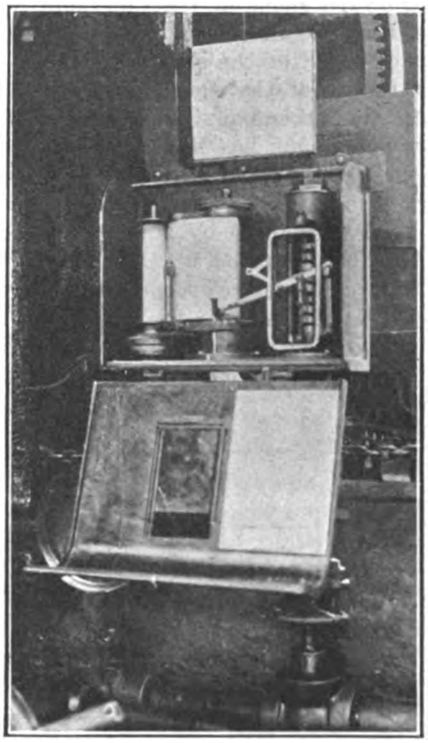
During the twelve tests no large clinkers were formed at any time, no slice-bar work was required on either side wall or bridge wall and no slag formed on the furnace walls or boiler tubes. The dumping periods were frequent and there was no appreciable drop in the percentage of CO_2 or in the steam flow. Such furnace conditions provide a unit of great flexibility peculiarly adapted to stand-by and to intermittent demands and to meet the most exacting requirements of railway and power loads. They also reduce the banking losses to the low figure of 250 lb. per boiler per hour.

Insuring Proper Wheel Mounting

HOW many electric railway men in whose shops wheels are being continually mounted have the assurance that the job is being properly done? P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, Akron, Ohio, has learned by experience that the final pressure on the ram of a wheel press as shown by the gage is not a positive indication that sufficient contact pressure exists between the axle and the wheel to prevent its coming loose. To eliminate the uncertainty accompanying this work by knowing the value of the applied pressure during the whole operation of mounting a wheel, he has equipped his wheel press with an instrument working on the same principle as a steam engine indicator. The instrument, which is connected to the main oil feed line from the pump to the ram cylinder, is known as a hydraulagraph and is manufactured by the American Steam Gage & Valve Manufacturing Company, Boston. The hydraulic pressure acting on the ram operates the piston in the cylinder, which, in Fig. 1, will be noticed just beneath the instrument. This piston, moving against a spiral spring, actuates the pen gear which is attached to the piston rod through a system of levers. The chart is a continuous strip of paper, which is advanced from one spool to another by the movement of the ram itself. The connection to the instrument is made with a cable attached to the ram counterweight. Through the use of a ratchet device the chart is moved forward only during the working stroke of the ram and a reducing motion limits the chart advance each time to but a fraction of the ram travel. The result of the combined pen and chart motions is a diagram showing the curve of the pressure applied to the wheel with relation to the distance it has been pressed onto the axle.

The customary rule used in mounting wheels is to apply a final pressure of 10 tons per inch of axle diameter, assuming, of course that this pressure is built up uniformly during the mounting operation, that is, proportional to the area of the two surfaces in contact. Should either the axle be machined with a slight taper or the wheel bore be larger at one end than at the other, the required final pressure may be attained, not uniformly but rapidly during the last portion of the ram travel. In other words, a contact with the axle is not established along the total bore of the wheel, but only at the point of its minimum diameter. Such a fit is unsafe since a blow and not a sustained pressure is required to loosen the wheel. The curve showing the pressure cycle occurring during the mounting of a wheel when either

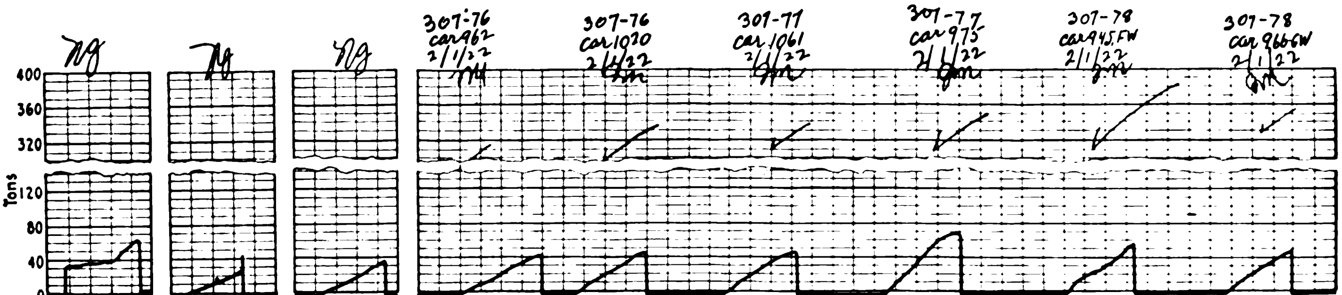




AT LEFT, A HYDRAULAGRAPH MOUNTED ON A WHEEL PRESS IN THE SHOPS OF THE NORTHERN OHIO TRACTION & LIGHT COMPANY

AT RIGHT, THE HYDRAULAGRAPH OPERATES ON THE SAME PRINCIPLE AS THE STEAM ENGINE INDICATOR

BELOW, TYPICAL SECTIONS FROM THE GRAPHIC WHEEL PRESS RECORD CHART



the axle surface or the wheel bore was tapered is marked *A* on the reproduction of a chart taken from the instrument. Curve *B* resulted from a case when the wheel-fit was too loose, the final pressure being caused by the wheel hub coming in contact with the axle shoulder. In such an instance there is insufficient contact pressure to permit the wheel and axle to be put in service. Curve *C* reveals a similar condition, that is, when the axle and wheel bore have uniform diameters but the fit is not tight enough.

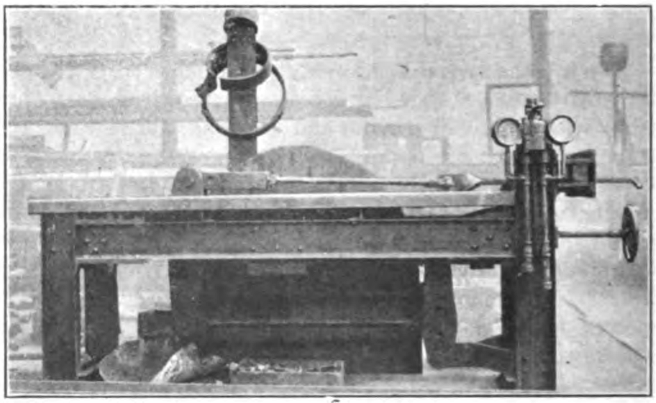
When this hydraulagraph was first installed the chart showed too many cases of faulty wheel mounting due to inaccurate machine work. The workmen now exercise more care in this respect, for they know that if there is a taper of more than 0.002 of an inch in the length of the axle seat or wheel bore the fit will be unsatisfactory. As the result of more accurate machining the chart for each wheel mounted now consistently shows straight lines terminating at approximately the proper pressure ordinate.

Above the curve for each operation the car and wheel numbers, date and name of the operator are recorded, and the chart is filed. Should trouble occur with any particular wheel, it is then possible easily to ascertain all the data concerning its mounting.

Tension Test for Brake Rods

WHEN the threads on the end of a brake rod have become worn or damaged it is the practice in the Harvard shops of the Cleveland Railway to cut off the threaded end of the rod and weld on a new piece of stock. After the repaired rod has been rethreaded, the strength of the weld is tested with the machine shown in the accompanying picture. The threaded end on which a nut has been screwed is held in a jaw while the clevis on the other end is pinned to a bar attached to the frame of the testing machine. Tension is applied to the rod by admitting air to a 10-in. cylinder, the force exerted by the piston of which being transmitted to the rod through a system of levers.

To accommodate the maximum testing stress to the size of the rod, three adjustments of lever ratios are provided. Since it is also possible to vary the tension by the amount of air admitted to the cylinder, a framed chart has been placed convenient to the operator, showing the pull exerted for each of the three lever ratios with values of the air cylinder pressure varying from 10 to 100 lb. per square inch. The maximum force that can be exerted by this machine is 68,500 lb., which occurs when the highest lever ratio is used and the full shop air line pressure of 100 lb. per square inch is admitted to the cylinder. The admission of air to the cylinder is controlled by an ordinary car brake valve, as seen in the illustration. The gage at the left shows the air cylinder pressure while the one at the right is connected to the air main.



GIVING WELDED BRAKE RODS A TENSION TEST BEFORE RETURNING THEM TO SERVICE, CLEVELAND RAILWAY

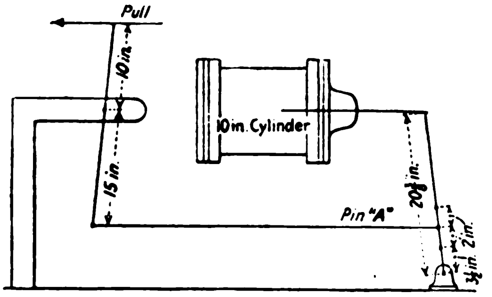


CHART WHICH SHOWS THE PULL EXERTED FOR DIFFERENT LEVER CONNECTIONS AND AIR CYLINDER PRESSURES

Air Pressure Lb. Per Sq.In. In Cylinder	Pull in pounds exerted with pin "A" in Holes as Follows Upper Hole	Middle Hole	Lower Hole
10	3,190	4,350	6,850
20	6,380	8,700	13,700
30	9,570	13,050	20,550
40	12,760	17,400	27,400
50	15,950	21,750	34,250
60	19,140	26,100	41,100
70	22,330	30,450	47,950
80	25,520	34,800	54,800
90	28,710	39,150	61,650
100	31,900	43,500	68,500

Area of cylinder 78.5 sq.in.
Lever ratio with pin "A" in upper hole—1 to 4.075
Lever ratio with pin "A" in middle hole—1 to 5.555
Lever ratio with pin "A" in lower hole—1 to 8.732

Transfers Issued Only When Fare Is Paid in Fort Wayne

SINCE the weekly pass system has been in effect on the Fort Wayne city lines, it has been found necessary to issue transfers only at the time fare is paid. For the past several years patrons have had the privilege of obtaining transfers at almost any time. However, with the advent of the weekly pass, this system had to be done away with for the reason that the operator is not able to tell after a patron had passed him whether fare had been deposited in the fare box or pass used.

On account of the order issued to operators not to issue transfer after patron had passed the fare box, a great many complaints were received. To overcome this trouble, notice was placed at the mouth of the fare box reading, "Transfer Issued Only at Time Fare Is Paid." In addition to this the company ran full-page advertising in the local newspapers, also pasting these advertisements in the cars. Very satisfactory results have been obtained by using this plan, as it not only speeds up the service on account of delays occasioned by arguments, but has given the public the full information that this rule is inflexible and if they fail to ask for a transfer at the proper time, they have very little reason to blame the company.

TRANSFER
Time Fare Is Paid

TRANSFER NOTICE OVER FARE BOX

How Resistance Is Used in Railway Automatic Substations*

An Engineering Analysis of the Numerous Conditions Which Affect Selection of Details of Equipment for Automatic Control of Substations —The Statements Are Based Upon Extended Experience in This Field

By C. A. Butcher
General Engineering Department,
Westinghouse Electric & Manufacturing Company

IN THE *Electric Railway Journal* of June 24 there were published several statements from electrical engineers on the subject stated in the title of this article. There is apparently considerable difference of opinion as to how the resistors should be employed, but a study of these statements, together with personal knowledge of many of the systems with which these men are connected, leads me to believe that there are no real differences among them other than the differences in point of view.

Current-limiting resistors have been used with both synchronous converters and motor-generators, but they are essential with converters. An over-current regulator operating in connection with an electrically-operated field rheostat to reduce the voltage of a direct-current generator is often superior to series resistors as a means of limiting the generator load and is the most frequently used. Since the inherent characteristics of a synchronous converter do not permit of field regulation for load-limiting purposes, series resistors are necessary. Several schemes, however, require considerably less resistance than others and, in addition, have other desirable features in some applications. These are discussed in the following paragraphs.

RESISTORS FOR USE WITH COMPOUND-WOUND CONVERTERS

When compound-wound converters are used, resistors of ohmic value sufficient to limit the current to 50 per cent overload are used. The arrangement is such that these resistors are normally shunted by three contactors which open consecutively, as determined by the action of overload relays. In other words, the bus voltage is given a drooping characteristic on excessive overload. The regulation is in three steps, the bus voltage being reduced by an amount equal to the drop across the resistors in circuit.

In small stations, as in interurban service, where more than one feeder leaves the station, it has been customary to have two steps of resistors between the machine and the bus, and one in each feeder circuit. In large metropolitan stations, three steps have been generally used because of the larger number of feeders which are usually supplied.

The resistance values of each of the first two steps to be cut into circuit when the load is supplied partially from another source are determined, in the final analysis, by the fixed resistance of the circuit between the two sources of supply, each step being seldom more than half this value and often much less. These two steps provide regulation on overload by dropping the effective station voltage sufficiently to cause other stations to take more of the load. The third step of resistance is for current-limiting purposes and is usually cut into circuit only on short circuit. Following a total system outage, in locations where automatic stations are but a small portion of the total capacity supplying a given load, the automatic stations will be the first to resume service, and until other equipment is restored to service, the load may be of short circuit proportions in which case the automatic stations would operate with all resistance in circuit.

The thermal capacity of the third step, then, should be sufficient to allow for the normal time required to restore service. The thermal capacity of the first two steps is usually such as to give a longer time, dependent on the character of the load supplied. In interurban service, where only infrequent load swings are had, little thermal capacity is required. It is customary to allow five to ten minutes at 50 per cent overload for resistors to reach a temperature which will cause the operation of the protective thermostat. In metropolitan stations, it may be necessary to operate for the greater portion of an hour with one or two steps of resistance in circuit. It is, therefore, desirable to insure practically continuous capacity for these resistors.

LESS RESISTANCE NEEDED WITH SHUNT-WOUND CONVERTERS

If shunt-wound converters are used, only one step of current-limiting resistance, together with its shunting contactor, is used for each unit to provide against very severe overloads. Normally the inherent voltage droop of the machine is sufficient to prevent overloading beyond the short-time overload capacity of the unit. The drooping characteristic of the shunt machine may be compared with that of the compound-wound machine and a series limiting resistance shunted by contactors in an infinite number of steps, so controlled as to increase the value of effective resistance, to prevent increase in load above a predetermined maximum.

Experience has shown that under some load conditions in metropolitan service, the insertion of limiting resistance produces sufficient drop in bus voltage to cause the dropping of an excess amount of load, with the result that the load controlling relays operate immediately to reclose the resistance shunting contactors. The operation is rapidly repeated, thereby producing "pumping."

From the very low resistance between stations in a metropolitan system, it is obvious that a drop of a very few volts at the bus in one station may cause the transfer of enough load to other stations to overload them in turn. Thus there may be set up a condition of "pumping" of the load back and forth beween stations. Such condition is impossible with shunt-wound machines, each of which at all times, due to the drooping characteristic, tends to shed the load.

ECONOMICS OF TROLLEY VOLTAGE

It may be argued that low voltage is not desirable at increase in load. However, in congested areas where traffic conditions govern schedule speeds, high, or even what is usually considered normal trolley voltage cannot be economically utilized. Voltage higher than that required to maintain the schedule speed gives rise to increased rheostatic losses on the car in proportion to the excess voltage. During the peak load, when traffic is most congested, this gives rise to increased demand to the extent of the increased losses. Therefore not only are losses increased but, where power is purchased on the basis of demand, the demand charge is also excessive to the extent of the increased losses. Therefore the lowering of the voltage with an increase in the load at stations in areas of congested traffic is a decided economic advantage.

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*See also articles in the issues of this paper for June 24, 1922, page 997, and Aug. 5, 1922, page 199.

This truth has been very definitely established in cities where the bus voltage at such stations has been reduced during peak loads. During light-load periods, when the load on the machines in operation is light, schedule speeds are not, to the same extent, limited by conditions of traffic and are more nearly a function of the trolley voltage. Therefore, the higher voltages at the lighter loads may be desirable. To operate economically, however, the converters in service should be loaded as nearly as possible to the point of maximum efficiency, which is usually about full load. Such operation will quite definitely maintain the bus voltage at an approximately constant value.

LOW TRANSFORMER REACTANCE USED WITH SHUNT-WOUND CONVERTERS

It is customary to operate converters with a field strength such as will give unity power factor at average load. With this arrangement, a compound-wound converter will operate at lagging power factor below this load and at leading power factor above it. A shunt converter operates in a reverse manner, with leading power factor at the lighter and lagging at the heavier loads. Therefore, there would be the same approximate resultant heating of the armature tap coils in either type. If transformers of 15 per cent reactance were used with a shunt machine, the variation of voltage would probably be excessive; therefore, transformers of approximately 7 per cent are used to give about 5 per cent regulation of the direct-current voltage.

VOLTAGE MIGHT BE GRADUATED BY ZONES

Since trolley voltage above what is actually required to maintain schedules gives rise to increased losses and excessive power demand it would seem advisable to operate stations supplying congested areas at lower voltage. Within certain limits it may be practicable to do this. For example, stations in an inner ring might be operated at 500 volts, those in an intermediate ring at 550 volts and those in an outer ring at 600 volts. Such a scheme could be worked out only where all stations are small and supply power to areas in which all cars move at about the same schedule speed.

Where large multiple-unit substations are feeding relatively large areas in which cars are moving at different schedule speeds, as obtains on the different parts of a line which passes from a congested area into an area where free open running is possible, such a scheme is not practicable unless the station is being operated with a sectionalized direct-current bus with each section at a different voltage. This arrangement requires careful sectionalizing of the trolley system, and increases the number of feeders and the total copper required. It also has the disadvantage that greater converter capacity may be required because advantage is not taken of the diversity factor of the total station load.

It may be more practical and economical to permit of feeder drop to the congested areas such as will give more nearly the economic average trolley voltage. This simply means that the losses would be partly transferred from rheostatic losses on the cars to losses in the feeders. Offsetting the increased feeder losses would be lower fixed charges because of the reduced investment in copper.

SEVERAL TYPES OF FEEDER CONTROL ARE IN USE

Of the various types of feeder control equipment in use, each type has its adherents. However, each one has its own particular field of application.

The current-limiting resistance type of feeder, was applied until very recently almost exclusively to automatic substations regardless of capacity or the class of load supplied. For stations supplying power for interurban service, the application is quite satisfactory when the number of cars or trains on a given feeder are seldom more than two, but in a great many cases it is unnecessary.

Where converters are subjected to infrequent but heavy swinging loads, such as may be due to the acceleration of heavy trains, the resistors in series with the feeder, together with resistors in the machine circuit, by limiting the current to be commutated, will enable small converters to handle service which otherwise would require larger machines. The only argument for a resistor in the feeder is that it will, under some conditions, be sufficient to hold the load below the value at which resistors would be cut in between the machine and the feeder bus and thereby prevent penalizing other feeders supplied from the same bus with the consequently lower voltage.

When the resistance per mile of track is relatively high, the feeder-limiting resistor added to the circuit resistance of a grounded trolley may be sufficient to hold the current below the point at which machine-circuit resistors would be cut into circuit. In this case, a line car could move to within a short distance of the break and less time would be required to make repairs. At the same time normal service would be operated on other feeders.

On the other hand, if the fault occurs near the station the total resistance in circuit, including the current-limiting feeder resistor, will not suffice to limit the machine current to a safe value and part or all of the resistance between the machine and the bus will be cut into circuit. Should the short circuit not be burned clear, the resistors will overheat, with the result that the station will be shut down by the functioning of the resistor thermostat. Then when the grids cool the station will again automatically start, only quickly to shut down again if the short circuit condition persists.

Dependent then upon the thermal capacity of the resistors, the stations will start up and shut down periodically until the short circuit is cleared, penalizing all feeders supplied from the station. Not only are they deprived of a source of power, but if supplied from other stations they will be loaded excessively by feeding back into the "short" through the feeder bus.

To a great extent, this condition may be prevented by making the feeder resistor of considerably less thermal capacity than the machine resistors so that it will reach a temperature that will cause the feeder isolating switch to open before the station is shut down. The station then, relieved of the short-circuit load, will resume normal operation on other feeders. However, if the aggregate load on other feeders is heavy, the total load on the machine resistors with a short circuit on the one may be sufficient to overheat the machine resistors and thus shut the station down as described.

HOW MANY RESISTORS WILL IT PAY TO INSTALL?

With but few feeders, as are usually found in interurban substations, it is not difficult to arrange the resistance values and the thermal capacity of feeder resistors so that satisfactory operation will result. The question becomes one of economics: How much capital shall be invested in a lot of highly inactive cast iron, together with the switching required for it? If for example a 500-kw. machine can, by the use of resistance, be made to handle the work of a much larger machine, considerable investment is no doubt justified. If not, it is of doubtful value.

FUNCTION OF THE AUTOMATICALLY RECLOSING BREAKER

In small stations, supplying light interurban passenger service, an automatic, service-restoring contactor is inexpensive and is highly satisfactory. With such equipment, no current-limiting resistors are used. The contactor opens on overload and recloses automatically by the functioning of a relay in a Wheatstone bridge circuit set up to function when the resistance of the external circuit has increased to a value above a predetermined minimum. To permit the trolley to be sectionalized at the substation, similar equipment is supplied for each feeder circuit.

In case of a grounded trolley break, a line car may not be able to proceed towards it past the substation, as may be done under some circumstances with the resistance type of feeder. This is also true, however, where manually operated substations equipped with standard devices supply power to the system.

A feeder breaker in a small interurban station, out on a "short," is usually out to stay until the "short" has been cleared mechanically. The delay time on the train sheet chargeable to trolley breaks will not be increased by the use of the service-restoring contactor, and should show a decrease because of the fact that service is restored immediately after the circuit is cleared.

Where all manual equipment is used, the station operator must be notified to close the breaker. The time required for this depends on the available telephone facilities. In view of the fact that the man clearing the "short" has walked some distance to reach it, several minutes may elapse before he can hook up a portable telephone, get in touch with the operator and have a breaker closed. Even with the resistance type of feeder equipment, several minutes may be required for the resistors to cool before the contacts of the thermostat will operate to restore service.

CAPACIOUS MACHINE RESISTORS SOMETIMES NECESSARY

In large metropolitan stations, from which radiate relatively large numbers of feeders, the aggregate load in actual service will often reach values such as to bring current-limiting resistors into the machine circuit when the load on any one feeder is not sufficiently heavy to cut in a feeder resistor. Should a given station be overloaded due to an outage on one or more adjacent stations, it may be shut down by overheated machine resistors without a single feeder resistor having been cut into circuit. Such a condition can be prevented only by installing machine resistors with thermal capacity sufficient for continuous operation. The number of resistors required to do this is indeed a large item of expense.

Considering a metropolitan 600-volt railway distribution system, the effective total resistance between substations is very much smaller than the resistance between stations on an interurban system. The load is also more uniformly distributed between metropolitan stations than between interurban stations. Because of the low resistance between stations (0.03 to 0.06 ohm), a drop of a few volts at one station will result in the dropping of a large part of the load. Therefore, feeder resistors for metropolitan service must be of low ohmic value and are consequently of little value in limiting current in the event of short circuit. The application is therefore not practicable. Experience has shown that some other method of feeder control is required for this class of service.

CONTINUITY OF SERVICE IS FREQUENTLY ESSENTIAL

Under other than short-circuit conditions and often regardless of a short circuit it is highly desirable to stick to the load. In most cases, it is desirable to open the feeder only when a "short" occurs. If the feeder is carrying a legitimate load, even though abnormally heavy, such as one due to a congestion of cars, it is desirable to maintain voltage as nearly normal as possible to assist in clearing the congestion with minimum delay.

It is not desirable to delay the movement, as is done when voltage is reduced. Such, however, is done when current-limiting resistors are inserted in the circuit. Congestion on one feeder is usually the result of blockade involving several different lines so that simultaneously with the overloading of one feeder, other feeders from the station are at less than normal load. The station then is probably pulling the same total or even less than normal load. For the short time only that usually is required, the feeder circuit will safely carry the current necessary to clear the traffic.

A type of feeder equipment now very popular and applied quite generally in metropolitan service, differentiates between true overload and short circuit. A legitimate overload, regardless of value, will not open the circuit unless the cable reaches an excessive temperature. A thermal relay then operates to open the feeder and lock it out of service. It must be understood that the current limiting features in the machine circuits are retained even when this type of feeder is used. The rapid rise in current of a short circuit produces a voltage "kick" in a small series transformer which operates an instantaneous relay, and thereby causes the opening of the feeder circuit contactor or breaker. Normal changes of load do not cause a sufficiently rapid rate of change in current to produce voltage sufficient to operate the tripping relay. The reclosing of the feeder contactor is dependent on the action of a relay in a Wheatstone bridge circuit set up to measure the resistance of the external circuit. When the short has cleared or the resistance has increased sufficiently to limit the load to a predetermined value, the feeder circuit is automatically re-established. In the case of tie feeder circuits, i.e., feeders with more than one source of supply, the feeder contactor in each station will reclose immediately upon the energizing of the feeder from any point, provided, of course, that the short circuit has cleared. This type of feeder equipment will close from voltage applied either to the feeder or the feeder bus. The feeder bus in any station therefore continues to act as an equalizer regardless of whether or not the machines in the station are out of service or fail to resume service following a total interruption of service or any disturbance which might so reduce the bus voltage in an idle station to a value which would cause all feeder switches to drop open. The feeder bus once energized by the closing of a feeder circuit, permits the closing of all stub-end feeders.

A feeder circuit designed for an average voltage drop of 10 per cent will have a maximum drop of 20, so that the least probable value of short circuit would be five times normal. It is therefore evident that the picking up of legitimate loads of normal or even excessive value will not produce a voltage "kick" in the tripping relay sufficient to cause the feeder circuit to be reopened. Since the operation is against short circuit and not overload, it is obvious that the breaker will rarely open. The reclosing system is rugged and sensitive; permitting adjustment for reclosing at very low values of resistance. Numerous applications of feeder equipment of this type covering a period of a year have been highly satisfactory.

Substations equipped with this type of feeder which immediately isolates shorted feeder circuits do not require as many steps of current limiting resistors between the machine and the bus. There is little probability of a traffic congestion within the feeding radius of a given station such as to give rise to a load of short circuit proportions, and it is therefore unnecessary to provide resistance to limit the current, as on short circuit, to the two-hour machine rating. With compound converters, two steps, each producing a drop sufficient to transfer a given portion of load to adjacent stations, are entirely adequate. For satisfactory operation, these steps should have thermal capacity calculated to give practically continuous operation under 50 per cent overload. The standard temperature relays, which follow very closely the time temperature characteristic of the machine, prevent damage to the machines from overheating by taking them out of service until they have cooled to a safe operating temperature. With shunt converters only a single step of resistance is required.

A modification of the short circuit selective feeder equipment eliminates the Wheatstone bridge reclosing feature and provides means for burning the "short" clear. This feature is described in the following paragraphs. Many operators feel that trouble crews can so quickly reach and clear a trolley break that the expense of burning off the short is not justified.

SUPERVISORY REMOTE CONTROL NEEDED

Experience in the operation of automatic substations in metropolitan service has shown the necessity of some form of supervisory control. One system worked out and in process of installation provides facilities at a central dispatch point for the supervisory control of all machines and both a.c. and d.c. feeders at each substation. This control is superimposed on full automatic equipment so that independently of the supervisory system, all functions are automatic. The devices are those used in the highly developed schemes of machine telephone switching. A modification of the automatic service "restoring short" circuit selective feeder equipment is used in these stations.

To illustrate the operation, assume that a d.c. feeder opens due to short circuit. The operation is indicated to the load dispatcher by the lighting of a small lamp on a control board very similar to that used in a central telephone exchange. In this particular application, the lighting of the lamp indicates that the particular feeder has been transferred to an auxiliary bus. By a selective switching arrangement, the load dispatcher may transfer other feeders which are supplied from other stations to the auxiliary bus. The flow of current to the shorted feeder thus limited by the resistance of the tie feeders will usually burn off the "short" with minimum disturbance to operation. As soon as the "short" has cleared, the feeder is automatically reconnected to the main bus. As before, the operation is indicated to the dispatcher who then proceeds again by means of selective switching to restore the other feeders to the main bus.

In a similar manner, any machine may be started or stopped and any high-tension circuit breaker opened or closed. Inspection of the indicating panel in the load dispatcher's desk gives a visible indication of the operating status of each machine and feeder circuit. In addition to such indications, the load dispatcher has before him a continuous indicating and graphic record of the total load in amperes at each station. This is by a system of remote meter indication. But two pairs of ordinary telephone leads are used between each station and the central dispatch point.

Obviously, a simplification of this scheme is all that need be applied to the average system. Several very simple schemes of a similar nature are in process of manufacture for application to the control of automatic hydro-electric generating stations. Over a single pair of telephone leads, a dispatcher receives audible signal of any unusual operation. By dialing a given number on an ordinary subscriber's automatic telephone set, a selector is set into operation at the substation. This selector, by audible code signals, picks out, for example, the feeder which has opened or similarly indicates any other abnormal operation. By proper dialing, the load dispatcher has complete supervision of the automatic station. Such a system permits of the proper operation of the substation equipment to meet almost any operating emergency.

Automatic switching must be applied to meet service requirements. Since these requirements are not standard, no standard control can be adopted and the details can be determined only after a study is made of the requirements of each application.

New Line of Multi-Speed A.C. Motors

THE Mechanical Appliance Company of Milwaukee, Wis., is marketing a new line of multi-speed a.c. motors which provide for speeds of 600, 720, 900, and 1,200 r.p.m. These motors are of the squirrel-cage type, and are rated on a 40-deg. basis—that is, they will carry full load indefinitely without exceeding 40 deg. They will carry 25 per cent overload for two hours, with a temperature rise not exceeding 55 deg. C. These motors are particularly applicable to machine tool drives in shops provided with alternating current.

Super-Power Plant for Paris Region

IN ORDER to secure maximum fuel economy the power producing interests of Paris, France, have combined to supplant the present power generating facilities with those of the latest and best types. The great power plant discussed briefly in an article in the issue of the *Electric Railway Journal* for May 8, 1920, page 952, is now approaching completion. For the present it will contain five 40,000-kw. turbo-generator units, but will ultimately be extended to a total capacity of 320,000 kw. This plant is being built and will be operated by the Union d'Electricité, which is the successor of the Union Française d'Electricité, formed in 1919.

The steam pressure which will be used in the plant is 313 lb. gage, at the turbine throttle, where the superheat will be about 280 deg. F. One of the elements in securing economy in the plant has been the use of large boilers, so that five double-end and ten single-end boilers supply steam for 200,000 kw. The double-end boilers are of the Stirling type and they are equipped with Riley underfeed stokers. The grate surface of each double boiler is 660 sq.ft. The single-end boilers are of the B. & W. type. These are equipped with chain-grate stokers, and their grate area is 394 sq.ft. per boiler.

The superheater surface in the double-end boilers is slightly under one-half the heating surface, which is 22,600 sq.ft.; while in the single-end boilers it is much more than one-half, the heating surface in this case being 14,300 sq.ft. Economizers with heating surface slightly greater than the superheater surface are provided, and air preheaters are used to extract part of the heat from the flue gases for the purpose of warming the air entering the furnaces.

The boilers are guaranteed to deliver 5.85 lb. and 6.15 lb. of steam per hour per square foot of heating surface for the double-end and single-end types respectively.

The turbo-generator units are rated at 40,000 kw. on the basis of maximum continuous load. They operate at 1,500 r.p.m. and produce 50-cycle three-phase current at a terminal voltage of 6,000.

On account of the high pressure and temperature of the steam the water rate of the turbine is low, the guaranteed steam consumption at each of several loads being as follows: 40,000 kw., 9.62 lb. per kilowatt-hour; 30,000 kw., 9.46 lb.; 20,000 kw., 9.9 lb., and 10,000 kw., 11.0 lb.

The generators will be cooled by means of a closed air system, with coolers located in the foundation.

The turbines are of the Zoelly impulse type, single cylinder and single flow. They contain but ten pressure stages in the expansion, an unusual feature in turbines of this size, at least from the standpoint of the American designers. High pressure steam is admitted into the second stage above 30,000 kw., the admission valves being operated automatically. Provision is also made for bleeding steam from the seventh and eighth stages for feed-water heating, a factor in maintaining the heat balance of the plant.

In addition to the use of large units and high-pressure, high-temperature steam, every effort is made in this plant to recover the lost heat.

Mention has already been made of the economizers and preheaters. The economizers form one part of the equipment for heating feed water. In addition the condensate is used in part for cooling the generator ventilating air, thus absorbing waste heat. The exhaust from the steam-driven boiler feed pumps also yields heat to the condensate, which is also used for cooling the generator bearings. In addition the feed water is heated still further by means of steam bled from the turbine, as already mentioned.

The Gennevilliers plant is well located as to fuel supply, being on the bank of the Seine and contiguous to the Paris-Havre Railway. Coal received on barges or railroad cars can be stored in a 60,000-ton yard lying along the river, or it can be delivered directly to a coal-handling equipment which will crush and elevate it, distributing it to the overhead bunkers. The bunker distribution is by means of a monorail system, with an elaborate sectionalizing and block-signal arrangement, by means of which 6-ton traveling hoppers can be dispatched with great facility. These hoppers are driven by two electric motors each, and current is taken from a trolley wire at 500 volts.

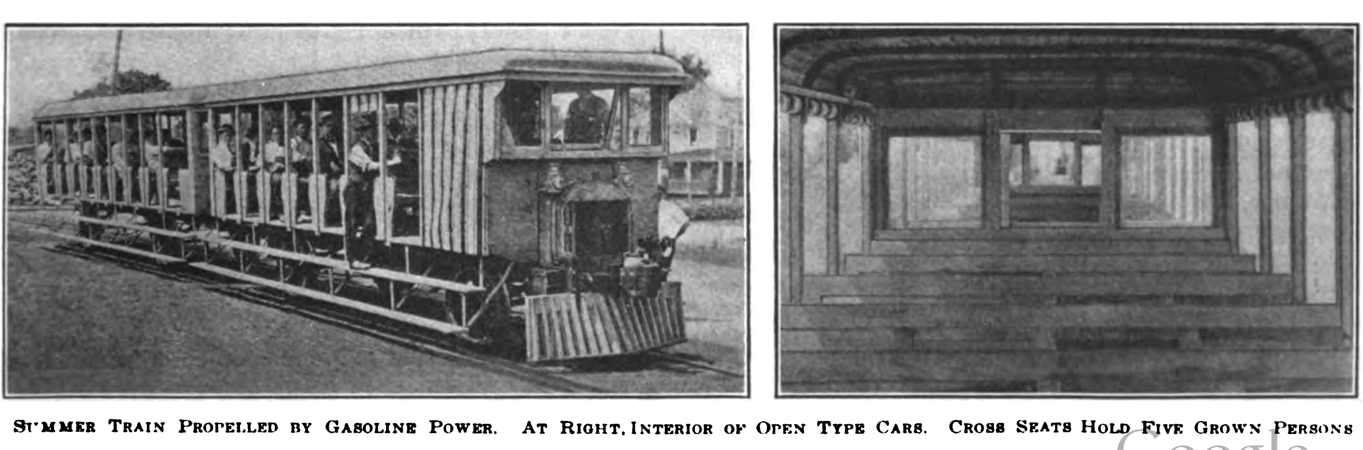
Eighty-five Passengers on Gasoline Train

A GASOLINE "summer train" of the two-car type, manufactured by the Four Wheel Drive Auto Company, Clintonville, Wis., has just been completed. The cars are of the open type with adjustable curtains along the sides to provide protection for passengers against sun or rain.

The forward car of this unit has a seating capacity of thirty-five persons, and the rear car can accommodate fifty. Each seat provides room for five grown persons.

The cars are equipped with air brakes, electric starting device and horn, standard M. C. B. couplers, locomotive type "cow catcher" on the forward car, sanders for sanding the rails, and high-speed reverse gear which enables the cars to go as fast in reverse as forward.

During the test runs this equipment has attained a speed of between 35 and 40 m.p.h. The cars have rounded curves up to 16 deg. curvature at a speed of 25 m.p.h. without the least trouble, and can round much sharper curves at a reduced speed.



SUMMER TRAIN PROPELLED BY GASOLINE POWER. AT RIGHT, INTERIOR OF OPEN TYPE CARS. CROSS SEATS HOLD FIVE GROWN PERSONS

The Boston Elevated Railway—Four Years Under Public Control

This Review Takes Up by Years the Financial and Operating Results of the Trustee Plan—Much Has Been Done to Improve the Service and Rehabilitate the Property, Which for the First Time in 11½ Years Has No Notes in the Banks

By Edward Dana
General Manager Boston Elevated Railway

IN THE February, 1921, issue of the *National Municipal Review* there appeared a paper read by Mr. Jackson, chairman of the Board of Trustees of the Boston Elevated Railway, at Indianapolis on Nov. 17 and 19, 1920, outlining the public trustee plan in Boston (created by Chap. 159 of the Special Acts of the Legislature of Massachusetts of 1918 known as "The Public Control Act."* On June 30, 1922, four years of public control had elapsed.

In attempting to outline the situation at the close of these four years, it seems appropriate to make reference to facts and conditions and permit individual conclusions to be drawn from them.

The paper of Mr. Jackson outlined the functioning of the act, and it is assumed that the method devised in Boston under the Massachusetts plan is consequently understood. In order therefore to visualize the operation of this public utility, it seems wise to call attention to the statistics showing revenues and expenditures by years since 1910 and from them to point out salient features and then explain what is actually going on at the present time.

In the first instance from 1910 to June 30, 1918, the fare had remained at 5 cents and the gross revenue during these nine years had increased from $15,250,000 to $19,500,000. Operating expenses had increased from $10,000,000 to $14,250,000, the chief factors being the gradual increase of the payroll and the increased cost of fuel. During these years the allowance for renewals or depreciation had been insufficient and also during this period in order to hold the 5-cent fare in face of increased operating expenses and other fixed charges, adequate current maintenance had not been provided. Under these circumstances, with less maintenance than was required by the property, with insufficient renewals and with the passing of the dividends completely for the year, the year ending June 30, 1918 showed an operating deficit of $598,442.

It was these facts which resulted in the experiment with public control beginning July 1, 1918, under the service-at-cost plan, which is based on sound economic principles. It was designed to put an end to the downhill flight which had been going on unceasingly, as new subways had been added which increased the charges on the car rider and as operating expenses steadily increased, notwithstanding insufficient provision for maintenance and renewals.

COMPARATIVE DIVISION OF RECEIPTS AND EXPENDITURES FOR THE YEARS ENDING JUNE 30, BOSTON ELEVATED RAILWAY

Note: Figures given are to the nearest dollar.

	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913
Total receipts	$32,781,493	$34,224,150	$32,689,201	$25,223,496	$19,480,022	$19,788,953	$18,781,328	$17,886,550	$17,785,978	$16,968,328
Operating expenses										
Wages	$14,920,406	$16,753,668	$16,381,207	$13,554,684	$9,147,757	$9,033,868	$8,351,118	$7,709,374	$7,247,065	$6,552,208
Material, supplies and other items	3,056,521	2,899,984	3,321,672	4,096,538	2,680,424	1,951,176	1,921,083	1,922,623	2,441,049	3,014,655
Injuries and damages	476,844	627,629	627,626	805,353	817,227	819,706	762,352	722,177	751,332	750,041
Depreciation	2,004,000	2,004,000	2,004,000	2,004,000	352,670	330,000	220,000	62,990	....	....
Fuel	1,656,013	2,399,277	1,996,717	1,901,597	1,381,957	947,413	825,444	870,820	858,416	818,677
Total operating expenses	$22,113,784	$24,684,558	$24,331,222	$22,362,172	$14,380,035	$13,082,163	$12,079,996	$11,287,983	$11,297,861	$11,135,581
Taxes	$1,610,096	$1,306,736	$1,075,497	$941,611	$905,033	$984,071	$1,043,042	$1,069,189	$1,040,947	$1,128,022
Rent of leased roads	2,549,625	2,673,167	2,607,566	2,587,130	2,547,421	2,428,512	2,395,804	2,325,289	2,264,201	2,221,287
Subway and tunnel rents	1,974,141	1,947,963	1,591,324	1,492,000	991,551	995,093	915,192	825,496	677,900	687,309
Interest on B. E. bonds and notes	1,483,787	1,483,626	1,593,258	1,423,142	1,238,374	1,138,656	1,129,678	1,049,785	1,067,900	1,095,507
Miscellaneous items	58,476	54,479	69,285	37,373	16,050	9,525	13,846	4,588	....	....
Dividends	1,606,372	1,523,367	1,403,970	1,360,220	....	1,193,970	1,193,970	1,313,367	1,193,970	1,197,000
Total cost of service	$31,396,282	$33,673,896	$32,672,121	$30,203,647	$20,078,464	$19,831,990	$18,771,528	$17,875,698	$17,542,780	$17,464,705
Loss or gain	$1,385,211	$550,254	$17,080	*$4,980,152*	*$598,442*	*$43,037*	$9,798	$10,852	$243,199	*$496,377*
Back pay applying to May and June, 1919, but paid in October, 1919	....	....	....	*435,348*	....	....	....	....	....	....
				$5,415,500						

The first year of public operation under the provisions of the act required an increase in fares. At the same time substantial increases in wages and cost of materials, supplies and fuel were occasioned by war conditions, with the result shown in the tabulation of an actual deficit of $5,415,500.

During the first year it was necessary under the act to use the reserve fund of $1,000,000 created under the act and to assess the cities and towns in the district served $3,980,151, in order to provide sufficient funds to meet the cost of service during that year.

During the second trustee year it was necessary to go to a flat 10-cent fare on the entire system in order to keep pace with the rise of wages and costs during these troubled times. At the end of the second year receipts exceeded cost of service by $17,079 which was transformed to a deficit by a retroactive wage award in July, 1920.

During the third year which ended June 30, 1921, operating expenses reached the maximum of $24,684,558, including for wages the maximum of $16,753,657. Subway rentals likewise had increased from $559,000 in 1910 to approximately $2,000,000 in 1921. Wages

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*An abstract of Mr. Jackson's paper was published in the *Electric Railway Journal* for Dec. 4, 1920, page 1141.

had been further increased by arbitration in July, 1920. Yet the efforts made by the entire operating organization resulted in meeting the situation without departing from the 10-cent fare and holding the operating expenses to an increase of approximately $350,000 over the second year in the face of an estimated increase in wages, cost of materials and supplies of more than $3,000,000. The receipts during the third year exceeded the cost of service by $550,253.52 and permitted restoration of $131,985.01 to the reserve fund after payment of the second year's deficit.

The fourth trustee year has just closed and a different state of conditions is apparent. After meeting all costs of service, there remained a balance of $1,385,211.44. This balance, plus the $131,985 of the third year, has been applied in restoring the reserve fund to its original total of $1,000,000 and in making the first payment of $517,196.45 to the State for distribution to the cities and towns that contributed to the loan assessment in 1919. Operating expenses had been reduced from $24,684,000 to $22,113,000, and the payroll had been reduced from $16,753,000 to $14,920,000. This result was brought about not by radical cuts in wage rates but rather by the introduction of more efficient methods of operation and the co-operative efforts of the entire organization, together with reasonable reduction in rates.

COMPARATIVE DIVISION OF RECEIPTS AND EXPENDITURES FOR THE YEARS ENDING JUNE 30, BOSTON ELEVATED RAILWAY

Note: Figures given are to the nearest dollar

	1912	1911	1910
Total receipts	$16,522,542	$15,980,708	$15,245,865
Operating expenses			
Wages	$6,132,256	$6,098,711	$5,910,768
Material, supplies and other items	3,242,424	2,488,667	2,376,034
Injuries and damages	797,436	694,559	776,588
Depreciation	....	....	200,000
Fuel	804,519	837,128	822,498
Total operating expenses	$10,976,634	$10,119,064	$10,085,877
Taxes	$1,221,756	$1,244,833	$1,213,089
Rent of leased roads	2,178,523	2,143,263	2,028,165
Subway and tunnel rents	603,226	567,087	559,469
Interest on B. E. bonds and notes	837,033	556,000	556,000
Miscellaneous items	....	....	....
Dividends	1,197,000	1,197,000	1,002,003
Total cost of service	$17,014,174	$15,827,247	$15,444,604
Loss or gain	*$491 632*	$153,461	*$198.734*

It should be noted that the gross revenue fell from $34,224,000 in the third year to $32,781,000 in the year just closed. The Board of Public Trustees had inaugurated a system of local 5-cent fares in conjunction with the flat 10-cent fare which at the present time results in 21 per cent of the total traffic being handled for 5 cents and which has restored millions of riders on short hauls who were lost on account of the introduction of the 10-cent fare. The average fare consequently at the present time is 8.95 cents.

The retention of the basic 10-cent fare has been necessary, however, in order to secure the gross revenue required to meet the cost of service which in 1922 amounted to $31,396,281. As contrasted with this the gross revenue during the year 1917, when 381,000,000 revenue passengers were carried at a universal 5-cent fare, amounted to only $19,788,953. It can readily be seen that any hope of meeting the cost of service with a universal 5-cent fare cannot be realized.

At the present time, with the joint 5-cent and 10-cent fare, passengers are being carried at the rate of 360,000,000 per year, which is considerably above the low point of 325,000,000 in 1919 and not far from the high point of the 381,000,000 previously referred to.

It may well be asked at this time as to what effect the Boston service-at-cost plan has on efficiency of operation, incentive for economical operation, freedom from political or other interference and spirit of service to the car rider.

In this respect it is believed much has been accomplished. Employees have been acquainted with the provisions of the act, with the intimate details of financial matters and the progress made from time to time in improving service and meeting the difficulties of operation. During this period, two decreases in compensation have been amicably adjusted between management and employees and a constant effort has been made to operate the property always in the interest of the car rider with the fewest men possible. The average number of men on the payrolls during the four trustee years has been as follows:

NUMBER OF MEN ON PAYROLL

1918-1919	9,748
1919-1920	10,021
1920-1921	9,264
1921-1922	8,915

Likewise it is of interest to note that the labor turnover has been reduced to a minimum, and in fact all platform men or car service employees have been in service four and one-half years or more, which necessarily results in benefit to the service. This compares with a former annual labor turnover of 55 per cent.

In this connection it has been possible to work out an eight-hour day as well as a guaranteed pay of eight hours for all platform men, with the result that whereas under the former conditions a large number of spare men were required, under the conditions existing today a much smaller number of spare men are required all of whom receive a full day's pay. The so-called spare men reporting each day represent 6.7 per cent of the total today as compared with 20 per cent previously.

Referring to the statistical table again it is interesting to note that the expense incurred on account of injuries and damages for the fourth trustee year was $476,844. Following back through thirteen years it will be noted this is the lowest of any of these years, yet vehicular congestion is greater and the movement of people on the highways greater than in previous years.

The total expense on account of injuries and damages including the cost of operating the Claim Department, trial of cases, etc., for the last trustee year amounted to $620,207.73 which represents 1.89 per cent of the gross revenue, the lowest ratio in the railway's history.

Much has been done in improving the service. Although the mileage operated last year (49,662,045) was less than any year back to 1905, the introduction of two and three-car train service and cars of larger carrying capacity with scientific rearrangement of schedules has provided additional service where needed and permitted the elimination of mileage where not required.

It is of interest to note that the number of revenue seat-miles per revenue passenger for the last year was 7.5 which for those acquainted with this figure as an index of service would indicate adequate service allowance by mileage operated only where required. At congested points more seats are provided than before while surplus seating capacity has been removed at points where it previously existed. This is the acme of proper service and results in minimum cost to the car rider.

Under the act the Board of Trustees were charged with the responsibility of providing for proper maintenance. The percentage of total railway operating revenue applied to maintenance and depreciation consequently has been approximately 24 per cent, whereas previously the percentage of operating revenue applied to maintenance and depreciation had been 17 per cent. What has been accomplished with respect to car equipment is illustrated by a comparison of the number of disabled cars in 1918 and 1921 which shows a reduction of 68.7 per cent for surface cars and 53 per cent for rapid transit cars. The percentage of cars out of service in bad order has been reduced to 5 per cent. At the same time, through the operation of the renewal charge which has been conservatively adopted, it has been possible to replace much of the rolling stock which was unsatisfactory from the point of service to the car rider and expense to maintain. During the period of public operation 535 new cars have been placed in service and 140 additional cars are now on order.

A reasonable program of track reconstruction has been maintained and has resulted in improved operation, lessened the wear and tear on rolling stock, and reduced derailments.

The latest modern machinery has been employed in the construction of track in the interest of efficiency and economy. Recently it was found that the railway's own forces, due to organization and this machinery, were enabled to construct a section of track cheaper than the figures submitted for the work by contract on an advertised bid.

During the trustee year approximately 7 per cent of the track has been rebuilt as compared with an average of 2¼ per cent for the previous six years, which means 22 miles of track as compared with 8.

The following newspaper quotation is of interest:

> By dint of good planning for the night use of electric cranes, air compressors and a concrete breaker with five 500-lb. teeth, the Elevated gave an admirable lesson in quick tracklaying on Boylston Street over the week end.

Much could be detailed in regard to improvements such as have been made in power plant equipment, signals, repair shops, motorizing horse-drawn equipment, development of modern carhouse yards, as well as the progress made upon the modern centralized mechanical repair shops now under way all vitally affecting the quality and quantity of service which can be rendered.

The railway today has more than $2,000,000 cash on deposit, $1,000,000 of which is in the reserve fund created under the Public Control Act. For the first time in eleven and one-half years the railway has no money borrowed from the banks. As contrasted with this there was a floating indebtedness in excess of five millions during the first trustee year.

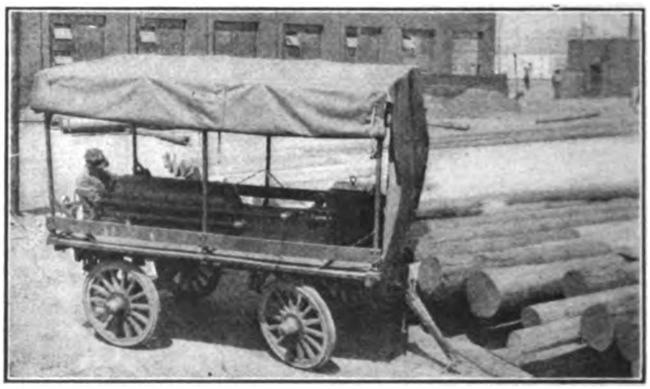
Engine-Driven Welding Equipment Developed

AN ENGINE-DRIVEN welding equipment for use where electric power for motor drive is not available and for job welders who must work in widely scattered districts has been developed by the Westinghouse Electric & Manufacturing Company. This apparatus is made in stationary and portable models.

The equipment consists of a Westinghouse single-operator welding generator geared to a Doman four-cycle, two-cylinder, low-speed, marine-type gasoline engine. The generator is direct current, has a rated capacity of 175 amp., and a maximum capacity of 225 amp., at 1,750 r.p.m. The generator is designed to operate at arc voltage, and to inherently stabilize the arc and supply a substantially constant current of different values over the working range of 90 to 225 amp. The operating characteristics of the generator are such that it is unusually easy for the operator to strike and maintain the arc, and also to obtain the deep penetration and thorough fusion necessary for satisfactory welding. The shaft of the generator extends through the pedestal bearing and is connected by means of a flexible coupling to the exciter.

Portable Paint Spraying Apparatus

THE Northern Ohio Traction & Light Company is experimenting with the spraying process for painting poles. For this purpose a portable outfit has been assembled using an old automobile trailer, on which was mounted a few pieces of car equipment such as may be found in almost any electric railway shop.



PORTABLE COMPRESSOR FOR SPRAY PAINTING POLES

These parts comprise a 550-volt compressor, a governor and an air reservoir bolted to the trailer platform as shown in the illustration. The sprayer is connected to the reservoir through the usual reducing valve with a 50-ft length of automobile type air hose. Power to operate the sprayer is tapped from an outlet on one of the yard poles.

The practice followed has been to spray first the upper halves of all the poles as they were laid out in single tiers in the storage yard and then pike them all over to paint the remaining surface. So far this method has given promising results. One man, of course, can accomplish more in this way than several by hand, partly because the roughness of the surface has less effect on the speed of working with a sprayer than with a brush. Being portable, this outfit may also be used for painting poles already in place.

POLES IN STORAGE CAN BE PAINTED WITH VERY LITTLE HANDLING

Letters to the Editors

Selecting Platform Men

BELFAST CITY TRAMWAYS
BELFAST, IRELAND, June 30, 1922.

To the Editors:

Articles on the selection and training of motormen, appearing in the various issues of the *Electric Railway Journal* from time to time, have greatly interested me. It is apparent that diverse views obtain on this subject, but all agree it is desirable to get the right type of men, that great discrimination has to be exercised in their selection and that, while operating conditions and types of men vary, the man selection problem is always with us.

One cannot always judge a man by his appearance; no man is infallible. Interviews register impressions, good, bad or indifferent. Later they help in determining whether one's judgment is at fault. Certain types of men are brilliant in an interview but not in car operation, and as the duties they have to perform are more of the specialist order, they cannot be sorted out into types, each type yielding the best results under particular treatment. That undertaking is fortunate indeed which has for its guiding hand one whose expert knowledge of human nature and sympathy with the problem fit him for the task.

On this system, a responsible department head interviews and engages all platform men, working upon a common sense system of his own, in sizing up men. By this means he comes into personal touch with every man, asks all questions and takes time to make the applicant feel that nothing has been left undone to give him a square deal. After the men have been trained, they are carefully followed up to see how they progress, also to show them that all interest in them is not lost as soon as they had passed into the service. It takes up time to interview men, but it is worth while in order to select the most suitable for the job. Having to discharge men as unsuitable is a very expensive matter, and it pays to take the time in selecting the right men.

All men in the service know that an easy channel of appeal is provided for them whenever decisions seem to be unfair.

That we have been successful in the care and selection of our platform men is shown by freedom from accident and damage suit claims. Whether this is due to the fact that the greater number of our men are country bred is an open question. My own personal experience is that country men who come into the city seeking employment are anxious to get into a settled occupation with steady wages, which are usually higher than they have been receiving, and once they get a start they will, as a rule, stick tenaciously. They are slower to pick up instructions, but, under tactful teaching and guidance will learn readily enough, are reasonable in their views as regards hours of labor and discipline, and whether in the shop or on the road are not afraid of work.

On the other hand, the town bred man is more used to selecting his own occupation and if he is not satisfied with the prevailing conditions, he soon shows it, does not worry about being discharged, and as often as not discharges himself and uses his friends to get work elsewhere. His knowledge of the city and places to apply for work enables him to please his own inclination. Consequently, his job for the time he is employed does not grip him in the same way.

Whatever type of platform man is selected, either from the country or town, the fact cannot be disguised that each year adds to his duties more exacting operating conditions, due to higher speeds, heavier cars, and denser traffic on the streets.

Bad driving does not necessarily proceed from incompetence on the part of the motorman. It is usually due to recklessness, over-confidence and lack of consideration for others. In fact, some men seem just as reckless as they dare be. This type of motorman cannot be discovered during his training period. He indulges in speed intoxication whenever the chance offers and only realizes that the road does not belong to him after he has had a bad smash.

While the points raised are the daily experience of all traction men, the only way we have of making contact is by absorbing the written results of each other's labors and perhaps there may be some one way trail leading us to the solution of our platform troubles and a formula written on how to select men to suit our various needs.

H. VERNON,
Rolling Stock Engineer.

Now San Francisco Adds Another Section To The Previous "57 Varieties"!

BROOKLYN RAPID TRANSIT SYSTEM
BROOKLYN, N. Y., Aug. 7, 1922.

To the Editors:

In the interest of standardization in general and of street railway rails in particular, some comments may not be out of place relative to the proposed 121-lb. 9-in. girder rail which is to be rolled for the Market Street Railway of San Francisco, mentioned in the issue of the *Journal* for July 29.

Our old friend, "Mr. Local Conditions" seems to have had his say to good effect in this instance and another rail section is to be added to the overburdened catalogs of rail sections, although there may be some small satisfaction in noting that the two fundamental principles of the A.E.R.E.A. standard 9-in. rail design are to be followed. These are the tapered web and the curved head. It is also noted that the joint plates are apparently of the type following the A.E.R.E.A. designs although the full advantage of the wide bearing area at the tops of the plates is not obtained with the new rail section, if your drawing is correct.

One feature of the article describing the new rail mentions the omission of the sloped back or bevel of the head and the relation of such a bevelled head to asphalt laid directly in contact with the rail heads. It may be of interest to state that the association standard 7-in. rail having this bevelled head has been in service in Brooklyn over five years in asphalt pavement laid directly in contact without developing any serious or special wear which can be ascribed to this feature of the standard rail design. Furthermore, perhaps 5 or 6 miles, measured as single track, are being laid in this manner in Brooklyn this year as the result of the experience with previous installations in modern track. Also, the rails here are carrying wheel treads 2½ in. wide with ⅝-in. deep flanges, and the wide head of the association standard is considered an advantage when wheel treads become widened as they frequently do, after a reasonable period of wear.

In closing, it may be noted that rail manufacturers informally advise the writer that about 75 per cent of their orders for both 7-in. and 9-in. girder grooved rails, this year, have called for the Association Standard sections. So we may take heart in our efforts to standardization even though, here and there "local conditions" still have their say.

R. C. CRAM,
Engineer Surface Roadway.

The A. E. R. E. A. Standard Spirals and the Proposed Clearance Curves

THIRD AVENUE RAILWAY SYSTEM
NEW YORK, N. Y., Aug. 2, 1922.

To the Editors:

In your issue of July 15 there appeared an article by S. Striezheff, department of way and structures Brooklyn Rapid Transit System, entitled "Switch Easements and Frog Standardization."

The author seems able to find but little good in standardization in general and in the standards of the A. E. R. E. A. in particular. He quotes with apparent approval "a prominent American engineer" to the general effect that it was common practice in France to install "curves of plain radius and that the cars going over them would after a while work out a spiral for themselves at each end of curve."

In discussing the standard A. E. R. E. A. spirals the author makes a comparison between one of them and Lorain spiral No. 3 with 150-ft. radius switch, which he considers decidedly preferable.

Of course, 150-ft. radius switches and spirals made by the cars themselves are in use, but it is difficult to see how any progress toward standardization can be obtained if such practices are adhered to. The A. E. R. E. A. standards so far adopted have been worked out after an expenditure of much time and study by committees of engineers representing some of the largest of the street railway systems in the United States with the expert assistance of the designing engineers of the special trackwork manufacturers. The standing committees of the A. E. R. E. A. are steadily at work endeavoring to determine on such further standards as may prove practicable. It is believed that a sympathetic study of the standards already adopted by the association will make clear to the industry generally the value of adopting them, from the points of view both of efficiency and economy.

E. M. T. RYDER,
Way Engineer.

Paving Breakers Used to Demolish Building

THE Ingersoll-Rand Company, New York, N. Y., has given out information regarding the use of its CC-25 paving breakers for removing the side walls and top of a large venturi vault in a filtration plant in Cleveland, Ohio. Paving breakers have been used by electric railways in connection with the breaking up and removal of pavement and no doubt some electric railways may have occasion to use them also in connection with demolishing building construction. In the instance described, the paving breakers not only broke up the concrete into pieces with the aid of a cutting chisel they also cut off steel reinforcing rods. Walls 12 in. in thickness, 51 ft. long and 10 ft. high were removed in seven days. The roof of the vault was removed in three and a half days.

Railroad Traffic in New York City

Four Electrified Passenger Terminals Show Increasing Traffic—Flatbush Avenue Terminal of the Long Island Railroad Handles Largest Traffic of Any in This Country

IN CONNECTION with the studies made of the local transportation problem, and bearing upon the need of future provision for handling of suburban passengers within the city, the New York Transit Commission has collected figures which show the steam railroad and local ferry traffic to and from New York in 1921. These figures, based either upon actual counts or very careful estimates, show that the trunk railroads entering New York or approaching upon the New Jersey side carried a both-way passenger traffic of 220,847,049 in 1921. Of this number 148,958,292 were commuting, zone, trip ticket or reduced fare passengers, while 71,808,757 were regular fare passengers.

In addition, as indicated by the figures furnished to the commission, local passengers upon the ferries entering New York, exclusive of interborough ferries, and also excluding railroad passengers delivered to destination in this manner, were 52,621,220, a grand total of traffic in and out of New York by railroads and ferries of 273,468,269 during 1921. As this local ferry traffic is almost entirely commuting in character, it may be combined with the figure of railroad commuter traffic, showing a grand total of commuters in and out of New York of 201,579,512 for the year.

The total increase in railroad traffic for the year was 978,333, which is regarded as a very low figure, doubtless occasioned by the business slump, as both railroad and rapid transit traffic have been frequently observed to be indices of business conditions. The bread-line season of 1913-1914 exhibited the only actual falling off in trolley, subway and elevated travel which has occurred in New York in decades.

The railroad total, while it includes the electric lines of the trunk roads together with the electrically operated Westchester & Boston, does not include the traffic borne upon the Hudson & Manhattan Railroad, which last year carried 94,559,352 passengers; 59,221,354 to and from Hudson Terminal and 35,337,996 to and from uptown New York, an increase of 8,873,484 over 1920.

Traffic to and from the St. George terminal of the steam lines on Staten Island is also not included, as this is almost purely intercity travel, with only a few commuters from Perth Amboy, N. J. This traffic showed a falling off to 11,181,786 in 1921 from the 1920 figure of 13,011,958, a drop of 1,830,172.

The following tabulation presents a comparison of traffic upon the trunk lines to and from New York in the years 1920 and 1921:

PASSENGERS IN AND OUT OF VARIOUS STEAM RAILROAD TERMINALS IN NEW YORK CITY IN 1920 AND 1921

	1920	1921
Baltimore & Ohio	330,000	551,880
Central of New Jersey	18,136,928	16,718,099
Delaware, Lackawanna & Western	21,553,040	21,594,743
Erie	31,248,990	30,026,406
Lehigh Valley	460,000	529,706
Long Island	59,133,876	60,386,698
New Haven	16,952,093	16,653,438
New York Central	28,717,270	28,434,974
Ontario & Western	634,132	619,658
Westchester & Boston	4,442,012	5,395,365
Pennsylvania	38,260,435	39,936,082
Totals	219,868,716	220,847,049

(The above columns include a few estimated figures.)

The Long Island Railroad continues to rank first among local steam lines in point of traffic handled to and from terminals, its total for the year being 60,386,-

698 passengers, of whom more than half, 32,893,995 rode in and out of the Flatbush Avenue terminal in Brooklyn. The remainder were carried to and from the Long Island terminals in Long Island City and Pennsylvania Station. In addition to the heavy traffic to and from its leading terminals, the Long Island picks up and delivers nearly 10,000,000 passengers at four other principal distributing points in New York, namely, Woodside and Hunters Point Avenue, adjacent to stations of the Interborough Rapid Transit Company, where about 4,000,000 and 1,000,000 passengers, respectively boarded and left trains in 1921, and at Jamaica and East New York, where, at each, more than 2,000,000 passengers were transferred to and from rapid transit lines of the B. R. T. system. As these figures are not included in the 60,386,698 total of terminal traffic, the passenger travel of the Long Island within New York City may roughly be estimated at 70,000,000.

The traffic into and from Flatbush Avenue is larger than that of any other single railroad into any other terminal in New York. This again excepts the Hudson Terminal, which is a station upon a rapid transit line. Thus, while it has a materially greater traffic than that shown by the Flatbush Avenue count, the net results are not comparable. So far as is known, the traffic figure at Flatbush Avenue marks it as the greatest trunk railroad terminal served by a single road in the United States, if not in all the world. All the terminal traffic is handled upon one incoming and one outgoing track, and as much of the loading occurs at the peak hours only, the feat of moving the trains according to schedule is described by railroad men as remarkable.

The Flatbush Avenue station is, however, exceeded in its passenger traffic by the Pennsylvania Station and the Grand Central Terminal, which last year had a traffic, respectively, of 36,866,815 and 36,157,012. The Grand Central Station is served by two divisions of the New York Central and the New Haven, while the Pennsylvania Station is served by four railroads, the Pennsylvania, the Long Island, the Baltimore & Ohio and the Lehigh Valley. All of these terminals of course are operated by electricity exclusively.

Publicity and Public Utility Credit*

By John B. Prescott
Prescott & Snider, Kansas City, and
Vice-President, Investment Bankers Association of America

UNTIL very recent years, the approved corporate policy was one of silence, not publicity. Public utility companies were no exception. The value of good salesmanship on the part of the managements of the public utilities and of the good will of the public served was not sufficiently emphasized as an essential element of success in the business. Demonstrations of public interest were not always welcomed. The value of a monopoly for a long term of years was frequently overestimated. The public, on the other hand, utterly uninformed, believing such monopolies immensely profitable, often irritated by inefficient and insufficient service, was naturally resentful.

Such a state of affairs, though perhaps perfectly natural to the experimental stages of a new and rapidly developing industry, furnished a fertile soil for the seeds of suspicion, so cheerfully and successfully sown by the demagogue; and, it yielded an abundant crop of popular distrust, hostile legislation and, for a time, unintelligent regulation. It is easy to understand how difficult it was at first for even an able, intelligent and conscientious regulatory body, as most of them undoubtedly were, to do justice to the utility companies in face of so much adverse public sentiment. Fortunately, the utility companies, the public and the regulatory bodies have been learning in the school of bitter experience and they now seem to have entered an era of clearer perceptions and better mutual understanding and appreciation. That this better mutual understanding is contributing to the removal of many troublesome obstacles is indicated by the following, among many, incidents which have been reported:

After experience with jitney service, Battle Creek and Muskegon, Mich., voted overwhelmingly (it is reported four to one) for street car service.

Kansas City, Mo., has enacted ordinances forbidding jitneys on all streets on which street cars operate and the ordinances have been sustained by the courts.

The officials of the city of Okemah, Okla., had prepared to issue $90,000 bonds to build a municipal gas plant but the citizens, by a vote of 577 to 3, voted a franchise to a private company. A few hours later, the mayor and the citizens built a "bonfire" with the $90,000 of bonds in front of the City Hall.

The city officers of Sault Ste. Marie insisted that the street car company pay for certain paving between its tracks which the company claimed it was unable to pay. The question was referred to the Public Utilities Commission of the State of Michigan, which held that the company might suspend operation July 15, if the city insisted on the company paying for the pavement.

Constructive Educational Work Desirable

Furthermore, there seems to be a better appreciation of the value and necessity of public utility service and a growing desire on the part of the people and of public officials for reliable and complete information in regard to the public utility business. Your committee is informed that the University of Detroit will establish, beginning the next academic year, a comprehensive course in public utilities, including the principles of regulation, finance, public relations and other fundamentals; and, that Massachusetts Institute of Technology, Princeton, Ohio State University and other leading schools have established similar courses within the last few years. This public desire should be promptly met and cheerfully gratified.

In the last report of your committee[1] a brief account was given of the condition of the public utility industry from an investment banking standpoint, the need of fresh capital for development and expansion to maintain good service and keep pace with public demand, and of the conditions requisite to the ready inflow of such new capital. Your committee has been somewhat surprised in view of the rather limited publicity given the report, at the expressions of interest elicited in the financial features of the utility business.

As an illustration, the presiding officer of one of the most widely known state regulatory bodies writes as follows:

> I wish that members of legislatures could have access to this report and other data of a similar nature. The ignorance of our legislature upon such matters as this is astounding. If the I.B.A. of A. could get reliable information upon such subjects to the members-elect before the Legislature meets, they would be much more effective than anything that might be presented in committee or otherwise while the legislature is in session.

The requests for copies of this report, for purposes of distribution, are such that a reprint will be necessary. A more or less widespread public recognition of the primary necessity of the free flow of capital into the public utility business seems to be developing as well as deepening interest in the methods, conditions and cost of obtaining it. This is evident, not only from the dicta of regulatory commissions and courts, but also from articles and editorials appearing lately in leading magazines and newspapers. It appears to this committee that this public demand for information concerning the financial problems of the public utilities should be met by this association, and that it presents an invitation to do constructive educational work concerning sound financial principles and practices, which should not be overlooked or neglected.

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*Abstract of interim report of the committee on public service securities of the Investment Bankers' Association of America, adopted by the Board of Governors July 22, 1922.

[1] See *Electric Railway Journal*, June 10, 1922, page 941.

Prior to the organization of this association the investment banker was himself reserved and silent. As with the public utility operator it was his conventional policy. Times have changed and we must keep pace with them. Public confidence is no longer blind but is demanding definite knowledge as a basis. The work of this association has already accomplished much, but it should be carried forward consistently. More intimate contacts should be established and maintained with regulatory and legislative authorities, and we should do our part in developing an intelligent public opinion upon public utility matters and a more general understanding of the character, quality and value of the services rendered by investment bankers.

STATE OF PUBLIC UTILITY CREDIT

Since the last report of this committee the decline in interest rates has induced or permitted a considerable increase in the volume of refinancing of maturing senior securities of light and power companies, and there has been a noticeable increase of junior financing. Such financing, however, has been expensive and chiefly confined to the larger companies and those of the highest established credit. The average smaller company has not as yet been greatly benefited. While there has been some refinancing of maturing senior obligations of electric railways at high rates, there has been almost a total absence of junior financing. No new projects have been developed and practically no extensions of existing lines are being built.

The greatest single present problem of the electric railways is how to obtain new money particularly through junior securities for the extensions and betterments necessary to maintain satisfactory public service.

It is of course obvious to the investment banker and is becoming more apparent to the public served and to public officials that at least two fundamental conditions must be met before new money will flow freely into junior securities.

1. There must be a sufficient assurance of the safety of principal; and

2. There must be reasonable assurance of a regular and uninterrupted return on sound investment value in the business, and this promised return must be not only "fair" but adequate and attractive.

As has been previously stated, this committee has faith in the fundamental soundness of the electric railway business but the investing public evidently has not forgotten the threats of loss due to restrictive legislation, unfair competition, popular misunderstanding and other causes. However, increasing earnings, saner regulation and a more intelligent popular appreciation of the indispensable necessity and value of electric railway service are reassuring influences which appear to be working towards a restoration of the investor's confidence in electric railway securities.

That the necessity of not only a "fair" but also an adequate return is gaining in public recognition is apparent from recent articles and editorials in leading magazines and newspapers. As samples, we quote the following from an article in a leading magazine of national circulation:

> Practically everyone who has money strives to invest it where it will bring the largest return with the greatest degree of safety. If anyone is offered an investment in a public utility that pays 5 per cent and just as good an investment in something else that pays 8 or 10 per cent, it is an absolute certainty that the investment netting the largest return will get the money. Let no one overlook the truth that money is a commodity which we buy and sell just as we buy and sell clothes and lumber. A public utility or a municipality cannot buy money for less than other people pay for it any more than this same utility or municipality can buy coal or labor for less than it is worth in the market.

And the following from an Illinois editor in whose town the street car company was seeking a new franchise:

> The prosperity of this country has come because it has been possible to make money in this country and to keep a fair share of what was made. Prosperity comes to an end when profits are taken away as fast as, or faster than, they are acquired. . . . The tendency of the last quarter of a century has been to make organization unprofitable; to put a damper on incentive and to take away any profits faster than they were earned.
>
> Remember this: Destroy the money-making possibilities of any enterprise and you wipe out entirely the possibility of the service it can and should render.

All of which is doubly applicable to the flow of money into junior securities where it is now most needed, and indicates a healthy and hopeful change in public sentiment.

National Safety Council

ARTHUR W. BRADY, president Indiana Union Traction Company, Anderson, Ind., will speak at the joint luncheon of public utilities and electric railway sections of the National Safety Council at the Detroit Athletic Club on Wednesday, Aug. 30, the third day of the Eleventh Annual Safety Congress at Detroit, Mich., Aug. 28 to Sept. 1. Alexander Dow, president Detroit (Mich.) Edison Company, will be the other speaker at this luncheon. The chairman of the joint luncheon meeting will be Homer E. Niesz, manager industrial relations department, Commonwealth Edison Company, Chicago.

C. B. Hardin, general claim agent United Railways of St. Louis, C. E. Morrison, vice-president and general manager, Utilities Mutual Insurance Company, New York, and Harry J. Bell, secretary Chicago Safety Council, will discuss the subject of "Progress in Accident Prevention in Public Utilities," on Tuesday morning. "The Financial Side of Accident Prevention" will be considered in a paper by Garrett T. Seely, vice-president and general manager Pennsylvania-Ohio Electric Company, Youngstown, Ohio. The discussion will be led by Harry B. Lucas, treasurer Philadelphia (Pa.) Electric Company, and G. T. Hellmuth, general claim agent Chicago, North Shore & Milwaukee Railroad will follow.

On Thursday morning, President Britton I. Budd, president Chicago Elevated Railways, will address the safety men on "The Human Side of Our Business." W. H. Boyce, general manager Beaver Valley Traction Company, New Brighton, Pa., and S. H. Reid, Bureau of Safety, Chicago, will lead the discussion on this subject.

Co-ordination between engineering and operating ends of the business from the standpoint of safety will be the subject of a talk by H. J. Warnick, engineer, Northern Indiana Gas & Electric Company, Fort Wayne, Ind. Discussion will follow led by F. W. Fisher, safety and employment manager, Rochester Gas & Electric Corporation, Rochester, N. Y., and Wills Maclachlan, electrical engineer, Canada.

J. F. Naylon, division equipment superintendent of the New York Telephone Company, will be the chairman of the Tuesday morning session. B. D. Haskins, Chattanooga Street Railway, will preside at the Thursday morning session.

Program of Wisconsin Meeting

THE complete program for the summer meeting of the railway division of the Wisconsin Utilities Association, to be held in Green Bay on Aug. 17 and 18, is as follows:

Morning Session, Thursday

Address of welcome by Mayor Weisner, Green Bay, and response by President J. P. Pulliam, Wisconsin Public Service Company, followed by opening address by Chairman B. W. Arnold, Eastern Wisconsin Electric Company.

Paper on "Proper Maintenance and Lubrication of Railway Bearings," by H. Cordell, Chicago, North Shore & Milwaukee Railroad.

Paper on "Proper Maintenance of Brakes and Brake Rigging," by O. R. Hill, Rockford & Interurban Railway.

Afternoon Session, Thursday

Inspection Trip—Wisconsin Public Service Company, lines and shops. Demonstration of steel ties, track construction, welding, etc. Baseball and field events at Bay View Beach Park. Swimming and water sports.

Banquet, Bay View Beach Tea Room. Address on "The Electric Railway Industry in 1922," by Labert St. Clair, director advertising section American Electric Railway Association.

Morning Session, Friday

Paper on "Regulation of Service Schedules to Suit Traffic," by Nels Rasmussen, Wisconsin Valley Electric Company.

Paper on "Safety First Practice," by C. E. Warwick, Wisconsin Public Service Company.

Round Table discussions on methods of developing traffic, collection of fares on one-man city and suburban cars, and steel ties against wood ties.

The headquarters will be at the Beaumont Hotel, Green Bay.

F. A. E. S. to Discuss Length of Working Day

AT A MEETING of the executive board of the American Engineering Council, Federated American Engineering Societies, to be held at Boston Sept. 8 and 9, two reports dealing with exhaustive investigations of the two-shift and the three-shift-day problems in numerous industries will be presented. The reports will cover transportation and other utilities, as well as manufacturing industries of the continuous type.

Dean M. E. Cooley, University of Michigan, successor to Herbert Hoover as president of the federation, will preside at the Boston meeting.

Industrial Engineers to Meet

THE Society of Industrial Engineers will hold a three-day national convention at the Hotel McAlpin in New York City beginning Oct. 18. "Economics of Industry" will be the general topic of the convention. On the evening before the convention, there will be a joint meeting of this society with the Taylor Society and the American Society of Mechanical Engineers.

American Association News

Washington Coal Representative Appointed

COL. JOHN PRICE JACKSON has been appointed executive representative for the American Electric Railway Association, National Electric Light Association and American Gas Association with offices at 949 Munsey Building, Washington, D. C., to handle coal matters for these three utilities associations. This important step has been taken to protect the vital interests of the utilities in view of the emergency created by the present strike of coal miners and railroad employees. Mr. Jackson was engaged by the Joint Fuel Committee of the three associations, of which John W. Lieb of New York City is chairman. Member companies of the associations are requested to communicate directly with Colonel Jackson on all matters with respect to the coal situation.

Colonel Jackson was formerly dean of engineering and professor of electrical engineering at Pennsylvania State College. He has served as commissioner in charge of the Pennsylvania Department of Labor and Industry, chairman of the Pennsylvania Industrial Board, and during the war was chief of the Labor Bureau and deputy director of the Army Service Corps. More recently he was manager of the industrial relations committee of the Philadelphia Chamber of Commerce.

The association is again sending out a questionnaire at the request of the national government to secure immediate information on stocks of coal and fuel requirements. The railway association urges complete co-operation in compiling these data in order that the joint fuel committee and the Washington representative may have the essential facts for use in working with the federal officials.

Safety at the Convention

THE safety committee has sent a letter to the manufacturer member companies of the association asking them to "play up" safety as a selling point in their advertising and in their exhibits at the Chicago convention. Attention is called to recently published material on the subject of safety, including the July 22 issue of the *Electric Railway Journal*, and to the fact that the safety committee will have a large display of safety advertising material itself at the convention. Manufacturers are asked to send the chairman of the committee copies of safety literature which they may have gotten out to be included in this display.

Convention Entertainment Features Being Arranged

THE convention committee on entertainments met on Aug. 2 in the office of J. V. Sullivan, chairman. The progress reports brought in by various sub-committees showed that the entertainment features at this year's convention promise to be most attractive.

Arrangements are being made by N. G. Symonds with about fifteen golf clubs around Chicago to allow those attending the convention to play, though no tournament will be arranged. It was tentatively planned to have a special card printed with the A.E.R.A. seal on it, and to purchase souvenir pencils for distribution to the players.

On the basis of information brought in by E. E. Kretschmer, there will be an orchestra of eight men at the reception space on the Pier for four afternoons. He was authorized also to engage an orchestra for the evening of the formal ball at the Drake Hotel. On the recommendation of W. H. Beattys, Jr., tea service for four hundred people will be provided in the reception room for the same four afternoons. An auto trip around the park system and to other places of interest in Chicago has been planned for the entertainment of the ladies on Tuesday.

All the committee was in favor of the program for the feature night on Wednesday at the Marigold Gardens, as proposed by the sub-committee of which Frank Johnson is chairman. Secretary Welsh suggested the tickets for the feature night be assigned according to priority of applications up to some deadline that will be set, after which tickets will be sold without regard to location. In this way it was thought that much of the confusion could be avoided in making last-minute assignments of tables.

Those present were J. V. Sullivan, chairman; N. G. Symonds, H. J. Kenfield, E. E. Kretschmer, W. H. Beattys, A. P. Jenks, Frank Johnson, Mr. Wright, Labert St. Clair, Secretary Welsh, and D. F. Hine representing H. L. Brown.

Engineering Executive Committee

A MEETING of the executive committee of the American Electric Railway Engineering Association was held in the New York office on Aug. 9 to go over the reports of the papers to be presented at the Chicago convention and the transaction of other business. There was a good attendance, those present being C. W. Kimball, Washington, D. C., president; L. C. Datz, Birmingham, Ala., vice-president; and R. C. Cram, Brooklyn, N. Y.; Charles R. Harte, New Haven, Conn., and Daniel Durie, Connellsville, Pa., members of the executive committee. Working in connection with Mr. Hecker, the association engineer and Secretary Welsh, many topics were considered and rapid progress was made.

Helpful Reports Issued

THE following special reports and compilations prepared by the bureau of information and service of the American Association are now available to member companies in good standing upon request:

Public Utility Laws: A summary of the laws creating the state public utilities commissions, giving an analytical digest of the main provisions covering their jurisdiction and powers over transportation companies. The third installment of the compilation began in June.

Securities Issued by Public Utilities in 1922: A list of new public utilities securities, divided between electric railways and other utilities and showing the name of the issuing company, the amount of the issue, the rate of interest and the offering price.

Practical Experience with Welfare Work: A collection of statements of industrial companies gathered by the National Industrial Conference Board, giving a brief outline of experiments with welfare plans, the results obtained and expressions of opinion as to their value.

List of Cities in Which Safety Cars Are Operated: Showing number of safety cars operated in each city based on data furnished by manufacturers.

Use of Transfers and Reduced Rate Tickets: Shows for a number of companies the cash fare and ticket rate in 1921 and 1920 and the percentage of revenue passengers using tickets and using transfers in both years.

In addition to the above supplements to the fare bulletin, the wage bulletin and the cost of living studies have been prepared bringing them down to date.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

San Diego Franchise Refused

Company Will Carry the Franchise and Paving Questions Direct to the Public

Following refusal of the Common Council of San Diego, Cal., to grant to the San Diego Electric Railway a franchise to lay tracks on Sixteenth Street, the company has decided to carry the issue direct to the people. It is causing initiative petitions to be circulated, asking the Council to submit the question to the electors at a special election to be called for that purpose. At the same time petitions are being circulated by the company initiating an amendment to the city charter to eliminate the present charter requirements imposing a 2 per cent franchise tax and requiring the company to maintain the pavement between the car tracks and for 2 ft. on each side of the tracks.

Petitions Signed Liberally

Both petitions are being liberally signed. It is expected to submit them to the Council within the next few days, when it is believed, at least 8,000 signatures will have been attached to each petition.

The proposed Sixteenth Street franchise follows present charter provisions and prescribes in general the same terms and conditions as the general franchise held by the company. It is drawn to expire on Sept. 1, 1952. The application is for four blocks of double track, from Market to Broadway on Sixteenth Street, equivalent to nearly one-half mile of single track.

In a newspaper publicity campaign following its original application for the franchise, the company stated the franchise was desired for two reasons:

Reasons Franchise Is Desired

1. To give better service to workmen and navy men employed at the new naval repair base at the foot of Thirty-second Street, by providing a cross-town cut-off and eliminating the longer ride to the Fifth and Broadway transfer point.

2. To save money in getting cars to and from the carhouses.

Claus Spreckels, general manager, asserted that the saving in wear and tear on equipment and in time because of the shorter haul would be at least $10,000 a year. The company proposed, if the franchise were granted, to route National City and Logan Avenue cars to the downtown section by way of Sixteenth Street and Broadway instead of the present route of Market Street and Fifth Street.

This proposal resulted in arousing violent opposition on the part of merchants and property owners on lower Fifth Street, who contended that lessened car service on Fifth Street and Market Street would result in a loss of a great amount of business to them. The railway management claimed that car service would still be ample, as the Imperial Avenue, Market Street and Woolman Avenue routes would continue to serve that district.

The political power of the merchants prevailed, however, and the company's franchise application was rejected, with the result that the company has invoked the initiative to gain its ends. Business men of upper Fifth Street and Broadway, the heads of the school system, the naval commanders and many other prominent citizens have expressed themselves in newspaper interviews as in favor of the new routings proposed by the company.

The proposed charter amendment initiated is along the lines recommended by the State Railroad Commission and follows an act of the last Legislature, designed to relieve electric railways of paving burdens and the 2 per cent franchise tax, and to give power to the Common Council to grant indeterminate term franchises hereafter, and to make resettlement of present existing franchises to conform to the new amendment.

Text of Amended Section

The text of the proposed amended charter section is as follows:

Sec. 9. Every franchise or privilege to construct or operate street, suburban or interurban railroads upon any public street, highway or public property in the city of San Diego hereafter proposed to be granted by said Common Council shall be granted for such period of years and upon such terms and conditions and in such manner as the general laws of the State of California in effect at the date of application for such franchise or permit provide, and upon such terms and conditions as are not in conflict with general law which said Common Council may in the ordinance granting such franchise prescribe.

The Common Council shall have power and is authorized to provide for a general resettlement of the franchise rights of and to grant a resettlement franchise for an indeterminate period to any person, firm or corporation actually engaged in operating a street, suburban or interurban railroad in the city of San Diego upon written application therefor, upon such terms and conditions and in such manner as the general laws of the State of California in effect at the date of application for such franchise provide. And said Common Council in such resettlement of any such franchise may impose such other and additional terms and conditions as are not in conflict with the general law and which said Common Council may in the ordinance granting such indeterminate franchise prescribe.

The company has also applied to the Common Council for franchises on Twenty-fifth Street and Market Street as follows: On Twenty-fifth Street from Broadway to K Street, standard double-track line, equivalent to a mile of single track; on Market Street from Twenty-fifth to Thirty-second Street, single-track line of light construction, approximately 1 mile long, the company to be relieved of filling in requirements for five years. These franchises have been recommended for passage, but have not been finally acted upon.

No Surface Car Service Order

The New York Transit Commission has announced that no specific general orders will be issued regarding improvement of service on the surface lines, as had been done in connection with the rapid-transit companies. General Lincoln C. Andrews, chief executive officer of the commission, is to have complete charge of matters pertaining to surface transportation, subject to appeal by the companies to the commission. Representatives of sixteen surface lines and systems who were present at a conference before the commission on Aug. 3 agreed to the proposal.

General Andrews was asked by Chairman McAneny to give his conclusions based upon the investigation of the commission into service on the surface lines. He said:

> The appearance of the cars, their cleanliness and suitability for service, the courtesy of the employees, the safety and efficiency of operation—in fact, everything that goes to make operating service attractive and tends to sell it to the public, are matters of pride as well as of personal responsibility to the operator.
>
> I believe that the commission can secure far better service for the public from the surface companies by leaving this responsibility in the first instance upon the operator and holding him to it, and by setting up proper standards of service to be met by progressive steps as rapidly as the condition of each company permits. With the conclusion of the intensive work done in connection with the valuation department, I shall be able to start a reorganization of the work of the Transit Bureau which will enable us to keep in closer touch with the daily work of the operating companies. We should thus be able, through the co-operation of the companies, to improve the details of operation until ultimately New York may be given a street car service of the sort it is entitled to have—the best in the country.

Experts from Other Cities Will Assist in Investigation

Traction experts and city officials from other cities will be asked to appear before Mayor George P. Carrel's street railway committee to assist that committee in its investigation and consideration of the railway problem in Cincinnati, Ohio.

The resolution provides for the appointment of a sub-committee of five to function during a six-weeks' vacation period which the committee will take this month and part of next month. The committee will make its report at the next meeting of the general committee, Sept. 11.

Under the resolution the sub-committee will have authority to investigate and report on the expense of employing expert accountants and traction experts and the character of the reports that are to be obtained. The committee also will be authorized to receive from the Cincinnati Traction Company and the Cincinnati Street Railway any proposition of adjustment which the companies may desire to offer.

Confusion in Handling Traffic and Commuters at the Chicago & Northwestern Railroad Station

Chicago Rides Again

Surface and Elevated Transportation Resumed on Aug. 7 After Six-Day Tie-Up—Men Accept 12½ per Cent Wage Reduction—Company Yields Every Point on Working Conditions—"L" May Ask for Fare Cut

CHICAGO returned to transportation normalcy on Sunday night, Aug. 6, after a six-day tie-up of both elevated and surface traction systems. The resumption of both elevated and surface transportation came after the men had ratified by a two to one vote the agreement reached on Aug. 5 by their leaders to accept 70 cents an hour, a 12½ per cent wage reduction. The company yielded every point on working conditions, including continuance of the eight-hour day and all existing rules covering pay for fall-back, layover time, meal time and reporting time.

The new scale on the elevated will be 72 cents per hour, or 2 cents higher. It was announced by Britton I. Budd, president of the elevated lines, that Gilbert E. Porter, chief counsel for the company, will go before the Illinois Commerce Commission in the near future and ask for a revision downward of the fare rates.

The old "L" wage scale of 82 cents an hour will remain in force until the fare is lowered by order of the commission. This order is expected about Sept. 1. At that time it is believed the cash fare will be reduced from 10 to 9 cents. This penny reduction, the company estimates, will mean an annual loss in revenue of $1,800,000, while the 10-cent wage reduction will amount to an annual saving of only $1,100,000.

The complete new scale for the elevated trainmen is as follows:

	First Three Months	Next Nine Months	After One Year
Motormen	66	67	72
Conductors	65	65	66
Extra Guard	62	63	64

Regular guards will receive 65 cents an hour after one year of service and the pay for towermen will range from 75 to 79 cents an hour. All these figures carry a flat 10-cent reduction. All other classes of elevated employees will receive wage reductions in the same ratio of approximately 12.2 per cent.

The Surface Lines is still nogotiating with the eight remaining unions to bring about an equal downward revision of their wages. These unions include the track men, substation operators, certain shop men, line men, etc. Some of the shopmen are included in the agreement with the trainmen. Besides these reductions in wages the company will have to reduce its expenses for maintenance, materials and damages, and effect other economies to make a living rate of return.

The settlement of the strike was reached after Henry A. Blair, president Chicago Surface Lines, and the

State Street Looking North from Madison, Showing the Volume of Traffic Which Had to Be Handled with One-Way Rules in the Strike

Vehicular Congestion at State and Madison Streets, Madison Being the Point at Which the Direction of One-Way Traffic on State Reversed union committee had whittled their differences until they were only 4 cents apart on their figures, the union holding out for 72 cents and the company bettering its former compromise offer of 65 cents by 3 cents. The whirlwind finish of a situation which had caused carless streets for an extended period and which was leading toward a probable attempt to operate the cars with strikebreakers, came after Mr. Blair summoned the aldermanic-citizens committee and the president of the Chicago Association of Commerce to participate in the conferences. Four hours of continual pounding away and exhorting by these committees finally brought the contending parties together, the company's board of control agreeing to what it says will practically wipe out its profits in making the concession.

The wage controversy of the Surface Lines in short was as follows:

	First Three Months	Next Nine Months	After One Year	Night Runs
Old wage	75	78	80	82
Company's offer	55	58	60	62
Company's first compromise	60	63	65	67
Union's first compromise	67	70	72	74
Final settlement	65	68	70	72

The Surface Lines employees, it is understood, will agree to a clause in the contract with the company by which wages may be changed after thirty days' notice in case a further adjustment in fares is ordered by the Illinois Commerce Commission. The union men accepted the thirty-day clause after the company had withdrawn its opposition to the eight-hour day.

The acceptance of the 70-cent scale by the company, which is 5 cents higher than wages paid to any other street railway men in the country, will mean a reduction in operating wages of approximately $4,000,000 a year to the company. The revenue figures from June 15, 1922, when the 7-cent fare was put into effect, until July 31, show a decrease in revenue of $813,000 compared with the same period last year. Thus it would seem that the average decrease in daily revenue for the forty-seven days that the lower fare has been in effect is $17,300 while the reduction in wages takes up approximately $11,000 of this amount. The actual decrease in revenue from the beginning of the fiscal year, Feb. 1, until July 31, is $595,000. For the first four and one-half months of the fiscal year under the 8-cent fare there was an increase of about $218,000 in revenue or about 1 per cent. The fare reduction of 1 cent has more than wiped out this increase and leaves the cumulative earnings up to July 31 $595,000, or 2 per cent, behind last year's figures.

Perhaps one of the most amazing circumstances of the strike was how the people adapted themselves to a carless life. It was the spectacle of the second largest city in the United States showing the world for the third time in as many years that even a tie-up of its habitual transportation could not completely throttle its industry. No one seemed to be depressed on the first day of the strike, which had the appearance of an annual holiday until it began to rain, and then enthusiasm was somewhat dampened.

The way in which the suburban steam roads came to the rescue aided materially in lessening the traffic tangle. During the strike, the Illinois Central Railroad abandoned all schedules during rush hours and operated trains at one and one-half minute intervals. This road handled an average of 150,000 passengers daily for the five week days of the strike and about 63,000 on Sunday. The normal week-day traffic on the Illinois Central is 73,500 passengers and on Sundays 25,725. A statement published by the Chicago & Northwestern Railway shows that on the first day of the strike, that road carried 110,000 suburban passengers, business which required 225 trains. On the next three days of the strike approximately 135,000 passengers were carried daily and 243 trains were operated per day. On a normal business day the average number of passengers carried in and out of Chicago by the suburban trains on the Chicago & Northwestern is approximately 60,000 and the number of trains necessary to handle this business is 166. No definite figures are available for the other steam roads giving suburban service, but it is estimated that the Chicago, Burlington & Quincy Railroad carried about 40,000 passengers daily while the Rock Island, the Pennsylvania, and the Chicago, Milwaukee & St. Paul roads handled almost 100,000 passengers daily on suburban runs.

PEOPLE'S OWNERSHIP
FARE 5¢
CITY HALL to KEDZIE AV.

One of the Mayor's Borrowed Buses

The Chicago Motor Bus Company also did its utmost to cope with the situation, and on it fell the task of transporting the north shore passengers, who had no suburban steam road to fall back upon as did those living on the south shore. These buses coming only to Randolph Street instead of into the loop and running from 5 o'clock in the morning until 1 o'clock at night, carried 40 per cent more passengers than normally. Of the seventy-five buses, practically all were in service continuously and the completion of five new buses recently was a welcome addition to the fleet. Although generous invitations were extended by the city administration to outlying bus companies to bring their vehicles into Chicago, few responded and it is doubtful whether the total exceeded fifty.

Most of the jitneys were resurrected for the occasion and many trucks were equipped with improvised seats. The market for stepladders was reported to be very active during the strike. Prevailing fares were 25 cents, but as competition increased, some reduced the cost of the ride to 15 cents. Even cheaper rides than this were furnished by a few buses which were borrowed by Mayor Thompson. This was about the only help that he gave during the strike and he is reported to feel satisfied that he has kept his 5-cent fare pledge. Many large concerns ran special fleets of trucks for their employees.

Privately-owned automobiles on all routes of traffic filled the large gap between these means of emergency transportation and the 2,500,000 daily rides that are usually furnished by the surface and elevated lines. It was estimated that one-quarter of the automobiles in Illinois, or about 200,000, were in operation in Chicago during the strike and each operator did his bit by keeping all the seats filled.

Fortunately, the duration of the pre-strike negotiations gave time for the city officials to formulate some traffic scheme that could be put into effect immediately with the cessation of car service. The streets in the downtwon loop were put on a one-way basis and the manner in which this traffic regulation worked out has led some to believe that one-way streets must become permanent. Major R. F. Kelker, city traffic expert, declared that the strike proved that one-way streets are a decided asset in Chicago and he has already been requested to draft a new plan for routing surface cars whereby the one-way streets can be retained. He realizes though that such a rule would require the conversion of rolling stock for entrances on both sides and that nearly all special track work would have to be reconstructed.

Business in the shopping district downtown and outside, it was estimated, suffered losses of about $1,000,000 per day. This was in retail sales, which, since the strike started, appeared to fall off about one-third in volume. It was estimated that an average of 300,000 persons kept out of the loop district each day who otherwise would have come downtown.

For the Commonwealth Edison Company, which furnishes all the power used by both the Elevated and the Surface Lines, the strike came at a most opportune time. It resulted in a saving of 1,900 tons of coal daily or a total of about 11,400 tons. The railway load in Chicago is about one-third the total carried by the Commonwealth Edison Company. With coal prices nearly doubled and reserves for about thirty-six days only, and a ten days' supply en route, this saving eased the tension in this direction slightly.

The illustrations which accompany this account of the strike are reproduced by courtesy of the Chicago *Evening American.*

Court Ousts Jitneys

Transportation Emergency Does Not Exist Where Lawless Element Intimidates Passengers

Justice Charles A. Pooley in Supreme Court in Buffalo has handed down a decision directing Mayor Frank X. Schwab to enforce the state law and prohibit the operation of jitney and bus lines within the city of Buffalo. The decision follows the mandamus action brought by the International Railway because of the Mayor's refusal to stop the operating of jitneys although normal service is being maintained on all local and interurban lines which are operated by the International under Mitten Management.

Immediately following the handing down of the decision Mayor Schwab issued an order cancelling temporary jitney permits he had issued at the outbreak of the strike on July 1. Police were ordered to arrest jitney drivers who solicited passengers or charged a fare. Members of the Buffalo Jitney Owners' Association, however, are operating automobiles, depending upon passengers to make a donation. An effort was to have been made late in the week to break up this practice.

In his decision ordering Mayor Schwab to enforce the law regulating jitney and bus lines, Justice Pooley says that, "aside from any question involved in the origin and progress of the street car situation, the law is plain and no argument is attempted to refute it." The Weatherwax vs. Watt case Albany 118 N. Y. Supp., 559 is cited by Justice Pooley. This decision was upheld by the appellate division. In his decision, Judge Pooley said that a small fraction of the population seeks to defy the law by wrecking the cars and assaulting men who attempt to operate them, as well as the men and women who attempt to ride in them. As a result a complete railway is practically at a standstill so far as its use by the public is concerned, and the substitute offered is an illegal attempt to perform the service. "This plain defiance of the law," says the court, "is presented as a basis for requesting the declaration that public convenience and necessity require the substitute service. The writ of mandamus may issue."

The Public Service Commission has notified the municipal authorities that it cannot grant the city's application for a certificate of public convenience and necessity to operate motor buses in the city streets and for permission to issue permits for operating buses to jitney drivers. In denying the city's application, the commission says it finds that the city has not the power either under its charter or any other special or general law to operate jitneys or bus lines.

In his arguments before Justice Pooley, Henry W. Killeen, counsel for the International Railway, blamed the Mayor for the Buffalo strike. He charged that the strike is being run from the Mayor's office and that the business agent for the union collaborates with the Mayor in issuing all statements regarding the strike.

Justice Pooley interrupted the arguments to explain his views on the situation. He denounced strikers and their sympathizers who are intimidating passengers, stoning cars and hurling acid at loyal employes. He said, however, that the only question before the court was whether jitneys were being operated in the city in violation of law.

Mr. Killeen argued that it is the duty of the Mayor as commissioner of public safety and head of the police department to order the chief of police to direct the arrest of all jitney drivers. He argued that as long as the Mayor is in sympathy with the striking carmen and refuses to enforce the law, it is the duty of the court to mandamus him to enforce the law and he cited the Albany case where the court ordered the commissioner of public safety to drive the jitney lines off the streets. This court was upheld by the appellate division of the Supreme Court. Judge Pooley indicated that he would follow the decision in the Albany case.

President Tulley of the International in a statement addressed to the strikers says:

> Czarlike domination by the union exists, under which men who have been a lifetime in the company's service, and who are unfitted for other work, are required to report daily to the union, under threat of bodily harm, insult to wife and abuse of children, being thus forced to remain out of work while the opportunity to get their old jobs back is rapidly slipping away.

To the owners of the stock of the International, Mr. Tulley makes this public statement:

> International Traction stock, par value of $15,000,000, was entirely wiped out by the losses of the 1918 strike and inefficient operation, due to union domination of both men and management.
>
> International Railway stockholders in 1921 were forced to contribute more than $2,000,000 by cash assessment before Mitten Management could undertake to reorganize the property so as to insure uninterrupted service to the public, continued employment to the men and an assured return to the owners.

Then in a statement to the public, Mr. Tulley explains in detail the results accomplished under the Mitten co-operative plan at Philadelphia.

Mr. Tulley made this statement on the situation to the *Electric Railway Journal*.

> Buffalo in 1901 was saved from a threatened strike during Pan-American year, by Mitten policy, and for more than ten years peace prevailed thereunder. After 1913 union control became increasingly dominant under the then management's policy of favoring the union in hope of securing industrial peace.
>
> Discipline suffered, accidents increased and, although a signed agreement between the union and company had no closed shop provision, employees were nevertheless forced to join the union.
>
> This union to extort a higher wage, which the company was temporarily unable to pay, in 1918 subjected Buffalo to the humiliation of a long drawn out strike during the wartime period when everyone worth while was forgetting self and working to help win the war.
>
> Buffalo is suffering great loss and inconvenience from the present strike, which makes it imperative that Mitten Management now plan to remove the possibility of future strikes.
>
> Mitten Management is neither for nor against organized labor, but cannot have further dealings with a union which neither recognizes the need of good railroading, nor the necessity of living up to its undertakings.

Employment Service of the Four National Engineering Societies

An employment service for engineers of every variety of training and experience is conducted by the four national engineering societies of the United States. This service brings in touch with the various business men the service of 50,000 trained technical men who are members of these societies. One of the objects of it is to show to the various commercial houses the aid which engineers are rendering to others in the same lines and to help these firms and corporations secure similar assistance.

Men of engineering training are prominent in all branches of commercial endeavor and their creative ability is recognized as being of great help in the building up of the nation.

This service is in a position to supply civil engineers, mechanical engineers, electrical engineers, sales engineers, production managers, superintendents and other trained executives. It is under the direction of W. V. Brown. His office is in the United Engineering Building, New York City. The service is free to both employer and to employee.

Motorman "On the Job" Saves Life

A motorman in the employ of the Altoona & Logan Valley Electric Railway, Altoona, Pa., has been publicly commended by general manager Crane for saving a life while operating his car late in the night.

While he was running his car below Bellwood Motorman Housel saw an electric flash. He knew at once that sign was something unusual and so he brought his car to a quick standstill. He went out to investigate and found lying on the ground a few feet away along the track, a man. The man, in the employ of the Home Electric Light Company of Tyrone, had been sent out to repair a break in the power wire. He came into contact with the heavily-charged wire and was hurled to the road. Just that one flash which occurred when he touched the wire was seen by this wide-awake motorman. An editorial in the Altoona *Mirror* says that Motorman Housel was "On the Job."

Traffic Survey Will Be Completed by August Fifteenth

John A. Beeler announces that by Aug. 15 he hopes to complete the survey now being made by him of the properties of the New Orleans Railway & Light Company. It is estimated that 250,000 observations will be required to reach an accurate idea of the changes that may be necessary to the present system so as to give the best possible service at the minimum cost. Until the work of his engineers and technical assistants is completed, however, it will not be possible to determine what reroutings should be made nor how much additional equipment will be required.

Power Improvements Planned

The Indianapolis (Ind.) Street Railway planned to present a petition to the Public Service Commission on Aug. 12 asking for permission to carry out a large program of improvements. According to Robert I. Todd, president of the company, all the financing of the project has been completed. The entire proposition links up with the question of adequate power.

Mr. Todd said recently the West Washington Street power plant was obsolete and should have been scrapped some time ago. The future power development will be made at the West Tenth Street power station. Included in the expansion and rejuvenation of the company are first, more power; then cars, new shops, new carhouses, extensions and a general overhauling of tracks. Under the proposed plans the company will build at least six and probably eight substations in Indianapolis.

Akron Company Successful at Referendum

By a majority approximating 11,000 in the City of Akron, the Northern Ohio Traction & Light Company won its franchise fight at the polls on Aug. 8. With four precincts missing the vote Wednesday morning stood: For the ordinance, 16,273; against the ordinance, 5,473. The company carried every precinct in the city except one.

The ordinance voted upon Tuesday was passed by the Council last April and a referendum election was called. It provided for:

1. A straight 5-cent fare until Feb. 1, 1924.
2. Construction of a new line across the new $2,000,000 viaduct, linking that section known as North Hill with the downtown section.
3. Establishment of eight new bus lines.
4. Rebuilding West Market Street line.

Announcing that it had faith in the voters of Akron, the company, six weeks ago, began the construction of the new line and the rebuilding of the West Market Street line. It also purchased eleven buses, which have since been delivered and put into service.

The vote Tuesday shows that the people approved the trust placed in them by the company. The Akron franchise fight began four years ago when the Morse-Witwer franchise ordinance was defeated by a vote of six to one. Since that time sentiment has materially changed and the result was the vote Tuesday.

Be a Rooter for the Railroads Not a Booster for the Bus

The set of resolutions adopted some weeks ago by the Boone, Ia., Chamber of Commerce and forwarded to Boone merchants urged the shippers of Boone to send their freight via the railroad; that the truck was only fair weather service which would stop operating in the winter. The same arguments were made with respect to the passenger buses which "daily use our public roads as right-of-way and our streets as stations." In the opinion of the board of directors of the Mercantile Board, so says the letter, there is no town in the entire State which owes more to the railroads than Boone, which has had the service of the Fort Dodge, Des Moines & Southern Electric and the Chicago & North-Western. The Chamber of Commerce tells the people to boost for the railroads—"they are your best friends." The letter, signed by the secretary, was prepared after information had been received that truck lines for handling freight had been established between Des Moines and Boone and possibly to Fort Dodge and Marshalltown and Boone.

May Electrify Line

The Eagles Mere Railroad, a steam road built in 1892 and operating between Sonestown, Pa., Eagles Mere and Eagles Mere Park, a distance (one way) of 10 miles, has been purchased and is being run by the hotel interests at Eagles Mere. It is a narrow gage road, originally 8 miles in length, but extended in 1904 to the Eagles Mere Park, making an extra distance of 2 miles, total 10 miles length.

The new owners, who have incorporated the line into the Eagles Mere Railway Company, with Herman V. Yeager as general manager, are planning many extensive improvements. It is planned first to change the line from narrow gage to standard gage and also to either electrify the road or operate a gasoline car service.

Publicity Activities Extended

In order that the publicity interests of Henry L. Doherty & Company, New York, N. Y., may be adequately presented to the newspapers and magazines addition of two new members to the New York organization is announced:

Frank L. Blanchard, former managing editor of *Printer's Ink*, has been made director of the company's publications and advertising.

George B. Walker, late secretary of the public relations committee of the American Banker's Association, is news editor.

Publication of the *Doherty News* has again been started.

Accept Four Per Cent Wage Cut

Motormen, conductors and carhouse employees of the South Covington & Cincinnati Street Railway, Covington, Ky., have accepted a wage reduction of 4 per cent. The new wage scale is as follows: 48 cents an hour, for motormen and conductors in service more than one year; 45 cents an hour for employees in service over three months and 43 cents an hour for new men.

The schedules formerly were 50, 48 and 45 cents an hour. Carhouse employees' new wage scale ranges from 35 to 46½ cents an hour. Other employees including trackmen have not been reduced. The new schedules are retroactive to July 1.

Elevated and Subway Franchise Sought in Buffalo

Dr. Carl H. Guess, 1095 Tonawanda Street, and Conrad V. Brunner, 139 Highgate Avenue, Buffalo, have petitioned the City Council of Buffalo for a fifty-year franchise to build and operate an elevated and subway system through about a dozen streets in Buffalo at an estimated cost of $75,000,000. The petition filed with the municipal authorities states that a subway would be built from the Main Street wharf at the Buffalo River to the north city line, a distance of about 12 miles, with elevated lines on Niagara Street from Shelton Square to the city line and across Hertel Avenue from Tonawanda to Main also in such east side streets as Broadway, Genesee and Fillmore. The promoters promise all-day service, but no reference is made to the fare which would be charged.

News Notes

May Operate Electric Cars.—It is reported that business men living in towns along the defunct Kansas City & Northwestern Railway have called a meeting at Seneca, Kan., to consider the proposition of operating electric cars over the line.

New Franchise Being Negotiated.—The Manitowoc & Northern Traction Company, Manitowoc, Wis., is seeking a fifteen-year franchise to supplant its twenty-year privilege which soon expires. The company expects to purchase a local bus line to provide service in the south and southwestern part of the city but before closing that deal wants assurance of exclusive rights.

In Favor of Retaining Service.—If an agreement on paving can be reached operation of the Dunkirk & Point Gratiot Railway, Dunkirk, N. Y., serving visitors to the Point Gratiot Park and bathing beach will be continued. The Common Council is willing to make changes in connection with the paving of West Front Street if the abutting property owners give their consent. The company is unable financially to bear the paving expense but is willing to raise its tracks to the level of the proposed paving.

Compiling a History.—D. E. Parsons, general manager of the East St. Louis & Suburban Railway, East St. Louis, Ill., is gathering all possible data and historical facts on street and interurban railways in Belleville and connecting this city with East St. Louis and St. Louis. No comprehensive account of railway activity in this section has ever been recorded and it is with the idea of compiling such a history that Mr. Parsons has started on this work. He has announced that he would appreciate the co-operation of those well-informed on the subject.

Financial and Corporate

Expert's Attack Resented

President of Twin City Rapid Transit Retorts Tartly to Statements Made by Dr. Wilcox

Horace Lowry, president of the Twin City Rapid Transit Company, has generally refrained from making statements concerning the serial report which Delos F. Wilcox is making to the Minneapolis City Council in connection with the appraisal of the Minneapolis Street Railway preparatory to appearing before the Minnesota Railroad & Warehouse Commission in a hearing to determine a permanent fare. He has, however, made a vigorous statement in reply to the serial issue of Aug. 2, in which reflection was made upon the founders of the company and a suggestion that they had unloaded watered stock on the public.

Mr. Lowry said in part:

> The railway will present all matters pertaining to the value of its properties to the warehouse commission as soon as the city of Minneapolis is ready to proceed with its side of the case. The company is loath to enter into any premature discussion with Dr. Wilcox concerning its affairs.
>
> However, Dr. Wilcox, in his last statement, has gone out of his way to create such an erroneous impression, that the company feels it should be corrected in justice to the public and to itself.
>
> The law provides that the company is entitled to a reasonable return on the value of its cars, tracks, shops, power houses, buildings, and all other property. Obviously, the amount of stock of the subsidiaries or the Twin City Rapid Transit Company has no relation whatever in the determination of the "fair return" on Minneapolis street railway property.
>
> By direct inference Dr. Wilcox declares that the stock of the company was unloaded on "widows and orphans," when it is a matter of public record that the stock of the Twin City Rapid Transit Company has been listed for more than thirty years on the New York Stock Exchange, and any citizen of Minneapolis, or any other place, could and can at any time purchase it.
>
> The directors of the company have been chosen by the stockholders on account of their belief in the director's business ability, and not because of the amount of stock owned by these directors. The officers have been elected by the directors due to their belief in the ability of these officers to operate the property efficiently. It is a well established fact that officers of large companies are rarely heavy stockholders of such companies.
>
> The slur cast by Dr. Wilcox upon the men who built the Minneapolis Street Railway need not be answered. The records of these men speak for themselves.
>
> In conclusion, the whole question must rest upon what the commission determines under the law to be the fair value of the property, and Dr. Wilcox's personal opinion as to the past or future action of the Minneapolis Street Railway and the Twin City Rapid Transit Company will have no bearing on the case. The company feels that it always has been fair to the public and means to continue to be so.

Mr. Wilcox said in effect that Minneapolis will never be able to get a satisfactory solution of its railway problem until it finds some way of being rid of the incubus of the over-capitalized and locally irresponsible Twin City Rapid Transit Company; that co-operation with the city in the valuation business means only that the company will accept concessions upward. As Mr. Wilcox sees it the only solution of that problem, unless it be on the company's own terms, will come from the exercise of compulsion. According to him it is evident the company had lost confidence in the State Railroad & Warehouse Commission and the State courts and would not accept the judgment of the commission on valuation unless it coincided with the company's own ideas. The impression that the Lowry and Goodrich families and their associates controlled the Twin City company through ownership of the majority of its capital stock was erroneous, as they held only a small percentage of the stock.

Taxpayers Urge Purchase Action

Owing to the actions of a special committee of city officials appointed to arrive at a valuation of the properties of the Market Street Railway, San Francisco, Cal., a resolution was introduced at a recent meeting of the Board of Supervisors asking that the matter be indefinitely postponed. It was found, however, that the unanimous opinion of the larger bodies working for the upbuilding of the city, was that the matter should not be postponed. In consequence the decision of the Taxpayers' Committee was to invite the officials of the Market Street Railway to sit down with them and go into details for the purpose of arriving at the best possible price the company would be willing to sell its properties to the city. The idea would then be to present the matter to the full Board of Supervisors with the desire that the question be placed on the ballot at one of the coming elections so that the citizens can express their opinion in reference to the advisability of the purchase of the properties. This procedure would be in accordance with the Amendment carried at the election of two years ago in favor of buying these properties and unifying the entire transportation system.

The taxpayers explain that under present conditions neither the Market Street Railway nor the Municipal Road can build extensions and that the city has been brought to a standstill in this regard. The point made in their behalf is that the people have spoken regarding this by a large majority, but that despite this the Supervisors and the Market Street Railway have so far simply interchanged letters. On this phase of the matter the committee representing the taxpayers says:

> The reasonable, ordinary business-like way to arrive at a mutually agreeable price, if possible, in so large a transaction when both parties are here in this city, is by conferences. The representatives of the Market Street Company have expressed their willingness to meet with the representatives of the city. This, the representatives of the city should do for a mutual interchange of ideas as to price, terms and how the same are arrived at. Until this is done, the representatives of the city cannot feel that they have fully discharged their duties in the matter, and to end negotiations at this time would be extremely premature.

Revised Valuation Figures Presented

Revised valuations of operating properties of the electric railways in Queens Borough were submitted to the New York Transit Commission on Aug. 7 by the bureau of valuations in concluding its appraisal of all New York City tractions for purpose of effecting a consolidation of transit facilities under municipal ownership.

Appraisal of New York & Queens County Railway property, originally valued on basis of first cost at $3,957,382, is changed to $3,370,367; on basis of 1921 prices, original estimate of $9,883,660, is revised to $9,937,286. Estimate of Long Island Electric Railway property, on basis of original cost is changed from $511,678 to $300,059; revision of appraisal based on 1921 prices increases original estimate from $1,728,528 to $1,699,717.

Revised valuation recommended for acquiring New York & Long Island Traction Company property is increased $9,729 to $466,300, while revision of estimates based on 1921 prices increases valuation from $1,335,803 to $1,340,323. Original cost estimate of Ocean Electric Railway property is increased from $268,970 to $311,086, and estimate based on last year's prices is increased from $770,240 to $773,356. Valuation recommended for Manhattan & Queens Traction Corporation property is increased $5,148 to $1,130,972, while an addition of $5,627 makes value based on 1921 prices $2,164,498. Addition of $1,170 to original cost estimate of New York & North Shore Traction Company property makes revised estimate $46,370; appraisal based on 1921 prices remains unchanged by the commission at $389,082.

In all cases, recommended valuations are based on original costs less expenditures necessary to place property in first class operating condition. Valuations at 1921 prices are after depreciation.

American Water Works Assumes Control

Control of the Potomac Public Service Company, formerly the Hagerstown & Frederick Railway, Frederick, Md., has passed to the American Water Works & Electric Company of New York. The offer accepted at a meeting of the directors of the Potomac Company was $30 a share for the common stock, the proviso being that 70 per cent of the stock would be disposed of. This condition was more than met.

The American Water Works & Electric Company, will likely have representatives on the executive committee, and on the board of directors, but outside of these representatives, there will be practically no change in the management.

The company also controls the West Penn Company, which recently closed a similar deal for the purchase of control of the Monongahela Power & Railway Company, operating in territory adjacent to that served by the Potomac Public Service Company.

All War Loans to Utilities Repaid Save Two

A statement of the present status of all loans made to public utility corporations under the war finance act has been prepared by the War Finance Corporation. It is as follows:

Appalachian Power Company, New York	$1,000,000	Paid in full
Aurora, Elgin & Chicago Railroad, Aurora, Ill	219,000	....
Brooklyn (N. Y.) Rapid Transit Company	16,566,900	Paid $22,200
Central Power & Light Company, St. Louis	60,000	Paid in full
Charleston (S. C.) Consolidated Railway & Lighting Company	350,000	Paid $13,006
Columbus (Ohio) Railway, Power & Light Company	642,000	Paid in full
Commonwealth Power, Railway & Light Company, Portland, Me.	4,800,000	Paid in full
Interborough Rapid Transit Company, New York	11,937,500	Paid in full
New Orleans Railway & Light Company	1,000,000	Paid in full
New Orleans Railway & Light Company	1,000,000	Paid in full
United Railways Compary of St. Louis	3,222,000	Paid in full

New Brunswick Company Would Sell to City

J. J. Bodell of Bodell & Company, Providence, R. I., representing security holders of the New Brunswick Power Company, St. John, N. B., has made a proposal to the city for the sale to it of the entire property of the company, including the electric railway, gas and electric light undertakings. His idea would be to have the city assume the payment of the charges on all the interest-bearing securities of the company now outstanding and pay dividends on both issues of preferred stocks, securing title to the property through gradual liquidation of the purchase price of all the common and preferred stock. He has proposed:

1. That the company deliver to the city all the common stock covered by the option.
2. That the company pay the principal amount of outstanding bank loans as of this date.
3. That the company obtain the consent of the holders of the first preferred stock to a reduction of the present annual dividend rate from 7 per cent to 6 per cent.
4. That the company obtain the consent of the holders of the second preferred stock to a reduction of the present annual rate from 7 per cent to 5 per cent.
5. That the company obtain from the trustee of the mortgage a release of the water power rights and lands owned by the company and located on the Lepreaux and Magaguadavie Rivers.
6. That the city guarantee by endorsement the payment of the principal of the bonds and interest at the rate of 5 per cent per annum thereon, and the sinking fund.
7. That the city guarantee by endorsement the payment of quarterly dividends on the preferred stock.

Sanderson & Porter, New York, were recently engaged to take over the management of the property. This change was referred to in an article in the *Electric Railway Journal* for June 10, page 949, in which the affairs of the company were reviewed.

Surplus in Montreal

For the year ending June 30, 1922, the Montreal (Que.) Tramways Company reports gross earnings of $11,712,525 against $11,773,005 for the same period a year ago. Operating expenses and taxes decreased from $6,327,841 for the year ended June 30, 1921, to $5,769,403 for the year ended June 30, 1922. After subtracting operation costs, maintenance, etc., a balance of $3,315,962 for the year ended June 30, 1922, remained. After allowance considerations, City of Montreal rental, etc., the company's statement for the year showed a surplus of $187,948, against a deficit the year previous of $239,022 and another deficit for the year ended June, 1920, of $364,700.

The company has announced that the $584,000 4½ per cent mortgage sterling debenture bonds due Aug. 1, are being retired. It is not the intention of the company to make any further issue at this time in connection with this retirement.

Service Discontinued

The gasoline cars in use on the lines of the Manhattan City & Interurban Railway, Manhattan, Kan., have been withdrawn and service has been discontinued. According to Joseph G. West, manager of the company, who announced the suspension of service, business has fallen off 50 per cent in the past year.

These gasoline self-propelled cars replaced the electric cars several months ago after the local power company had announced increased rates for "juice." The story was told in the *Electric Railway Journal* issue of July 8, 1922.

Security Issues Authorized

The directors of the newly-organized Spokane (Wash.) United Railways have authorized the issuance of $3,500,000 bonds to be covered by a mortgage for that amount in favor of the Farmers' Loan & Trust Company of New York. Issue of $1,500,000 preferred stock and $2,000,000 common stock was also authorized. The stocks and bonds have been prorated between the Washington Water Power Company and the Spokane & Eastern Railway & Power Company in payment for these two electric railway systems taken over by the new company.

Acquisition Deal Falling Through

The deal whereby the Springfield & Troy Railway was to acquire the properties of the Springfield, Troy & Piqua Railway has apparently fallen through. In consequence doubt is expressed as to the future of the traction line, which operates between Springfield and Troy, Ohio. According to H. H. Durr, chairman of the reorganization committee, the Springfield & Troy Railway secured an option on the property, but allowed it to expire without action. The deal was even carried up to the point of paying over of the initial purchase. Residents along the line have shown themselves disposed to invest in any company that takes over the line, in order to keep it in operation, as it is the only transportation service between Springfield and Troy.

Financial News Notes

Approves of Power Line Purchase.—The Railroad & Public Utilities Commission of Tennessee has approved the purchase of a transmission line by the Tennessee Power Company. The line is 21 miles long. It extends from Maryville to Knoxville. A bond issue of $250,000 has been authorized to cover part of the purchase price.

Back Dividend Declared.—According to a recent announcement of the Nashville Railway & Light Company, Nashville, Tenn., it is prepared to make the payment of $12.50 per share on the preferred stock deposited under the plan of organization of the Tennessee Electric Power Company. Dividend payments will amount to $312,500.

$5,000,000 Issue Authorized. — The Illinois State Commerce Commission has authorized the Chicago & West Towns Railroad to issue a trust deed to Harris Trust & Savings Bank as security for a $5,000,000 mortgage loan. Permission to issue $1,000,000 of the mortgage bonds dated July 1, 1922, and maturing in ten years, also has been granted.

Gold Certificates Offered.—Halsey, Stuart & Company, New York, N. Y., are offering at prices yielding from 5½ per cent to 6½ per cent $725,000 Cincinnati (Ohio) Traction Company 6 per cent equipment trust gold certificates, maturing serially 1923 to 1932. The certificates are issued under the Philadelphia plan and represent about 75 per cent of the cost of seventy-five new double-truck motor cars.

Line Ordered Dismantled.—As the result of a recent decision of Judge Luse in the District Federal Court at Superior, Wis., the old Wisconsin Interurban Electric line will be dismantled. The line operated between Madison and Portage, Wis. The expense of razing the tracks, poles and other equipment will be borne by the city of Madison. The line has been in receiver's hands since 1919.

$30,000 Considered Too High for Park.—The committee appointed by the Mayor of Pittsfield, Mass., to negotiate with the Berkshire Street Railway for the purchase of a triangle in front of the union station in Pittsfield for a public park has reported that it regards the price—$30,000—named by the company as excessive, and also that it lacks authority to consider the matter of additional franchise privileges desired by the company as an added consideration. One request made was for a permit to lay a track across City Hall Park on the north side, and another was for a location for a siding in Dalton Street. The committee states that $20,000 is the utmost that the city should pay the railway for the land.

Traffic and Transportation

Franchise Before Council

Winnipeg Railway Will Offer Reduced Fare Schedule to Secure Ten-Year Renewal

The franchise problem confronting the Winnipeg (Man.) Electric Railway is now before the City Council. The special committee on street railway negotiations has presented two reports, the majority report favoring ultimate public ownership and the minority report suggesting the city finance the company up to an estimated sum of $2,500,000 or extend the franchise for ten years as requested by the company for a consideration.

If the city will agree to postpone the first period in which it may acquire the railway utility from 1927 to 1937 the railway has made definite promises to revise the schedule of fare which will put the entire system on a 5-cent fare during certain hours of the day.

A. W. McLimont, vice-president of the Winnipeg property, does not believe that the proposal to have the city finance the company will be taken seriously. He said that there were many difficulties to be taken care of if the city should lend large sums to the company and also that the amount proposed to be advanced would not be sufficient to meet the purposes which the railway has in mind.

The company through its publication "Public Service News" has stated that besides offering reduced rates of fare it would be willing to extend its track and car service and to install such necessary motor bus service as may be agreed upon between the company and the city.

Urging no unreasonable delays "Public Service News" says:

> We believe that the present is the appropriate time to formulate a comprehensive development and construction plan for Winnipeg and an energetic start should be made looking to the provision of public services, not only to meet present immediate needs, but also to take care of the future. Any unreasonable delay will result in retarding the city's growth and development.

It will mean that within three years all fares are to be reduced to 5 cents. The plan is worked out in the accompanying table.

	AUGUST 1 1922	
Cash fare	7 cents	
White tickets	4 for 25 cents	Good at all times.
Red tickets	5 for 25 cents	Good from 6 to 8 a.m. and 5 to 6.30 p.m.
Sunday fare	5 cents cash	
Children's tickets	8 for 25 cents	Good for children under 16 at all times.
	AUG. 1, 1923	
Cash fare	6 cents	
White tickets	6 for 35 cents	Good at all times.
Red tickets	5 for 25 cents	Good from 6 to 8 a.m. and 5 to 6.30 p.m.
Sunday fare	5 cents cash	
Children's tickets	8 for 25 cents	Good for children under 16 at all times.
	AUG. 1, 1924	
Cash fare	6 cents	
White tickets	9 for 50 cents	Good at all times.
Red tickets	5 for 25 cents	Good from 6 to 8 a.m. and 5 to 6.30 p.m.
Sunday fare	5 cents cash	
Children's tickets	8 for 25 cents	Good for children under 16 at all times.
	AUG. 1, 1925	
Cash fare	6 cents	
All adults' tickets	5 for 25 cents	Good all days all times.
Children's tickets	8 for 25 cents	Good for children under 16 at all times.

Better Business—Springfield Slogan

A determined "Better Business" drive has been launched by the Indiana, Columbus & Eastern, the Columbus, Newark & Zanesville, and the Ohio Electric traction lines. Forty-eight hour freight service between Cleveland and Springfield and way points has been started, and an express freight service established between Lima and Springfield as an auxiliary to the regular freight service. Through traction freight service will also be established to Detroit and other Michigan points in the near future. Several improvements in the Springfield headquarters for the benefit of shippers, directly or indirectly, are being made.

Transfer System Will Aid Transportation Companies

With the idea in mind of increasing electric railway patronage and of aiding merchants and the public in general the Prole Transfer System was recently incorporated under the laws of California with a capitalization of $1,000,000. Under the Prole plan, named after W. A. Prole, the founder, a system of coupon transfers would be installed and a co-operative agreement entered into by transportation companies, merchants and theater managers.

Mr. Prole said that the idea would be for the public to continue to pay the existing car rates, but to receive transfers between 9 a. m. and 4.30 p. m. and 7 p. m. to midnight. These transfers would have attached to them two 2-cent coupons which would be redeemed by merchants and theatre managers on the basis of 2 cents on each cash purchase of 25 cents or multiple thereof. The system has been advertised in newspapers and periodicals.

Urges Extension

Efforts Being Made to Force Los Angeles Railway to Make Extension—Traffic Inadequate

Eleventh-hour efforts are being made to cause the California State Railroad Commission to hand down a decision ordering the Los Angeles Railway Corporation to extend one of its car lines up Vermont Avenue in Los Angeles from First Street to Griffith Park, regardless of the probable result that 10-cent fares would be ordered on all the Los Angeles Railway Company's lines in the City of Los Angeles to meet the cost of the extension. The addition would mean an expenditure of $600,000, and operating expense after completed of $6,000 per month, most of which monthly expense would represent a loss to the company, being more than the income that would be expected from the extended line.

The Railroad Commission has been made aware that a campaign of propaganda is being financed by real estate promoters, who are paying for posters and handbills which are being distributed in Hollywood urging citizens to petition the city and the commission to force the railway to extend its line to the park.

PROMISES TO INSTALL NECESSARY BUS SERVICE

Griffith Park, is rated as the largest city park in the world, and real friends of the park declare the proposed motor bus line to and from the park, connecting by universal transfers between the Los Angeles Railway line and the cars of the Pacific Electric Railway lines will have the effect, which was the long-cherished desire of Col. Griffith, donor of the park, of making it cheaply accessible to people in all parts of Los Angeles.

Chief Engineer Osborne, of the Board of Public Utilities of the City of Los Angeles, and Chief Engineer Sachse of the State Railroad Commission have worked for the past three years for the maintenance of the 5-cent carfare on the Los Angeles Railway Company's lines in Los Angeles, and it was their survey and resulting operation economies effected on the Los Angeles Railway Company's operation costs that maintained this low fare in Los Angeles when lines in other cities throughout the United States were charging from 7 to 10 cents.

The tremendous growth of that portion of Hollywood lying between Griffith Park and First Street and Vermont Avenue and Western Avenue has been recognized by the Board of Public Utilities and the commission. The problem that is now before these regulatory bodies is how to give the additional service required to serve this population and to give improved transportation from all parts of the city to Griffith Park and at the same time not force the Los Angeles Railway and the Pacific Electric Railway to make extensions that would call for capital expenditures that would be beyond the resources of these companies.

Admitting the need for extended crosstown service along Vermont Avenue to Griffith Park, Chief Engineer Osborne recommended to the Board under date of May 1 the establishment of motor bus line feeders to serve the newly built up Hollywood district.

"The Board of Public Utilities," Mr. Osborne stated in his report, which was approved by the board, "has consistently advocated the establishment of bus lines to develop new territory or to act as extensions into new territory which will not support electric railway construction." As far back as Nov. 12, 1921, the Board of Public Utilities recognized the need of improved transportation service for this rapidly developing part of Hollywood, and adopted recommendations of Chief Engineer Osborne:

Recognizing the need of giving car service to East Hollywood, the Pacific Electric Railway filed on Jan. 10, last, with the Board of Public Utilities, an application for a motor bus "feeder line" along Vermont Avenue from First Street to Los Feliz Boulevard, which is at the entrance to Griffith Park. This application is now pending before the board pending the State Railroad Commission's decision on the entire Hollywood transportation situation. The Pacific Electric Line also at the same time filed an application for a bus line permit from Larchmont Boulevard and Melrose Avenue to Highland Avenue and Cahuenga Boulevard. This second application is likewise pending until the commission makes its report.

MORE HOLLYWOOD PROPAGANDA

The State Railroad Commission in a recent decision on the matter of Pacific Electric fares ordered the company to give universal transfers to the Los Angeles Railway. The Los Angeles Railway may likewise be ordered by the Commission to give universal transfers to the Pacific Electric Lines' cars. The establishment of universal transfers in the near future will fit in with the Board's general plan for improvement of transportation conditions in the Hollywood district.

The Board of Public Utilities is taking no cognizance of the present propaganda in Hollywood for the extension of the Los Angeles Railway Company's lines to Griffith Park, for the board has repeatedly gone on record for a comprehensive plan for improved, rapid and adequate transportation service for all of Hollywood including universal transfers, a Pacific Electric subway under Bunker Hill for its Hollywood cars and lines and a larger number of cars on these lines. The Pacific Electric Railway Company is proceeding rapidly to secure rights of way and with its engineering plans for its $2,800,000 subway under Bunker Hill, and new cars, long ago ordered, are rapidly nearing completion and will soon be delivered and placed on the Hollywood service.

Jitneys Must Secure Permits from State

The Connecticut Supreme Court ruled on Aug. 4 that jitneys could not operate anywhere in the State without a permit from the Public Utilities Commission. This decision written by Justice Curtis upholds a former opinion given by Judge Booth in the Court of Common Pleas in which he imposed a fine upon Louis Darazzo, operator of a jitney between New Haven and Branford. The decision of the Supreme Court makes the jitney act constitutional and binding and gives the Public Utilities Commission full power to enforce the law.

After the general jitney clean-up by the Public Utilities Commission appeals were prepared to the Supreme Court, it being claimed that the jitney law was unconstitutional in that the Public Utilities Commission was vested with confiscatory instead of supervisory powers. All the other jitneymen except Darazzo dropped their plans to carry the fight to the Supreme Court. But Darazzo fought the case single-handed. Arrested on the charge of violating the jitney law by operating a machine over a fixed route without a license from the Public Utilities Commission, the case came to the criminal side of the Court of Common Pleas.

There was no trial of the case, however, because Darazzo refused to plead and instead demurred to the information. In the demurrer the constitutionality of the jitney law was attacked, the claims being of about the same nature as those advanced at the hearing in the federal court before three judges on the same issues. Judge John R. Booth, sitting in the criminal side of the Court of Common Pleas, overruled the demurrer of Darazzo and asked the accused to plead. Refusing to do this the court found Dazarro guilty and imposed a fine. An appeal to the Supreme Court was taken and argued at the June term.

Detroit United Will Start Interurban Motor Bus Operation

That the Detroit (Mich.) United Railway will start running interurban buses for both freight and passenger service has been announced by E. J. Burdick, the company's vice-president and general manager. Details for the company's plan have not been made public but the proposed action is the result of the study of the subject by officials and engineers of the Detroit United Railway during the past two years. The company officials have arrived at the conclusion that motorbus transportation is an inevitable progressive step that can not be deterred. Interurban transportation by automobiles, it is cited, bears the same relation to electric interurbans that they then in turn bore to the steam roads. The interurbans and the railroads have proved essential to each other and to each other's progress.

The regulation of motorbuses is considered as essential to their own welfare and to the public weal and the Detroit United Railway will look to the state for proper regulation when it has entered the field of motorbus transportation. This regulation, Mr. Burdick stated, will be up to the Legislature and the Michigan Public Utilities Commission. No legislation to curb the motorbus will be asked as it is considered that such a course would be disastrous to the motorbus field and act as a check on what is considered a new and legitimate utility.

Another point considered essential is the proper regulation of the motorbus in its use of the state highways, the companies being held responsible for compensation to the public, based upon the volume of business handled over the highways. It is further cited that if the small operator can make a profit with only one or two automobiles, the Detroit United Railway with all its resources, can prosper in the field.

Transportation News Notes

Fare Decision Expected.—The New York Public Service Commission recently fixed Aug. 8 as the last day for hearings in the Syracuse fare matter. The city of Syracuse is fighting for lower rates on the lines of the New York State Railways. A decision of the commission is expected shortly.

Trolley Routes to Be Numbered.—In order to aid visitors in finding locations the United Traction Company, Albany, N. Y., has adopted a new system for designating car routes. Each route will be given a number and all cars will display on their sign boards the number of the particular route over which they operate. The present route signs list all the streets which the car traverses.

Fifty Per Cent Ride on Passes.—During the month of July it is estimated by officials of the New Brunswick Power Company, St. John, N. B., that 50 per cent of the rides for the month were on passes. When the pass system was installed it was announced that it was only an experiment, but passes have been in vogue for eight months and evidently will be continued indefinitely.

New Checks to Be Issued.—The Pittsburgh (Pa.) Railways is having made a new kind of token, which will be larger than the old one and more convenient for the car patron, who found it difficult to locate the small check. An advantage for the company is that the Pittsburgh ticket will have straight lettering on both sides unlike most car checks which have the lettering rounded. Because of this car checks from other cities could not very well be used in Pittsburgh. It will require the circulation of 4,000,000 checks a week to accommodate Pittsburgh car riders.

New Publications

Electric Arc Welding

By E. Wanamaker and H. R. Pennington. Published by Simmons-Boardman Publishing Company, New York. 254 pages, 167 illustrations, cloth, 6 x 9 in.

Based largely on a series of articles by the authors which were published in the *Railway Electrical Engineer*, this book on electric arc welding gives information that is in most demand for practical purposes.

As both of the authors were for years connected with the Rock Island Railroad the illustrations and information are taken largely from steam railroad practice, but most of the applications are adaptable to electric railway use. A large amount of practical information on many phases of the art has been incorporated. This includes descriptions of welding systems and their installations, phenomena of the metallic and carbon welding arc, training of operators, sequence of metal disposition for various types of joints and building up operations, electrode materials used, welding ability of various metals, welding composition, thermal disturbances of parts affected by the welding process, physical properties of completed welds, efficiency of welding equipments expressed in pounds of metal used or deposited per kilowatt hour, and welding costs. The section on training operators for arc welding is particularly complete, and if the suggestions given are followed they should result in better workmanship and a broader application of the art of welding.

Railway Signaling

By Everett Edgar King. McGraw-Hill Book Company, Inc., New York City. 363 pages. Illustrated.

Professor King, who is head of the railway civil engineering department of the University of Illinois, has put into convenient form for study and reference the elements of railway signaling. While necessarily and naturally the subject is approached from the standpoint of the steam railroad, the signaling principles applicable on electrified roads are given. The treatment also includes highway signals, which are of interest to all railways crossing highways.

In appendixes Professor King gives the rules governing the construction, maintenance and operation of interlocking plants, prepared jointly by the engineers of the Railroad Commission of Wisconsin, the Railroad and Warehouse Commission of Illinois, the Railroad and Warehouse Commission of Minnesota and the Public Service Commission of Indiana and adopted by their respective commissions; a memorandum on the essentials of signaling incorporated in the report of the committee on transportation of the American Railway Association and included in the manual of the Railway Signal Association, and a set of definitions of terms used in railway signaling, taken from the Proceedings of the Railway Signal Association.

An Investigation of the Fatigue of Metals

University of Illinois Experiment Station Bulletin No. 124. Urbana, Ill.

This report covers the results of an investigation conducted at the experiment station in co-operation with the National Research Council, the Engineering Foundation and the General Electric Company, by Profs. H. F. Moore and G. B. Kommers. The tests were performed by means of the best modern available apparatus and their scope was sufficient to permit some general conclusions to be drawn, which are given in compact form. The way was also indicated for other researches which are needed to shed light on some parts of the subject.

The following significant conclusion will be read with interest:

"The phenomenon known as 'fatigue' of metal under repeated stress might better be called 'the progressive failure' of metal. The most probable explanation seems to be that such failure is a progressive spread of microscopic fractures. A nucleus for damage may be a very small area of high, localized stress, due to a groove, a scratch or a crack; in other cases failure may be due to internal inclusion or irregularities of structure; it may be due to internal stress remaining after heat treatment; it may be due to a grain or group of grains unfavorably placed to resist stress; or failure may begin in the weaker grains of a metal whose structure consists of two or more kinds of grains; or it may, of course, begin in any portion of the metal, which, by accidental overload or otherwise, is stressed to the yield point."

E. M. F. Electrical Year Book

A combined dictionary, encyclopedia and trade directory of the electrical industry. Published by the Electrical Trade Publishing Company, Chicago. 843 pages.

As its sub-title suggests, this book combines definitions of electrical terms, short articles of an encyclopadic nature, and brief descriptions of 3,000 electrical and other closely related products made by and used by the electrical industry. Each article so described is followed by a list of its American and Canadian manufacturers. Manufacturers have the privilege of inserting advertisements of a descriptive nature about their own devices in addition to the regular listing of their names under the classified products, but all such advertisements are marked with an abbreviation "Adv." It is the announced intention of the publishers to revise the information contained in this book each year to accord with the latest developments, to bring all definitions up to current usage and to correct all listings of products and producers to the date of each yearly edition.

Hydro-Electric Service Report

Third Annual Report of Government Hydro-Electric Service of the Netherlands' East India. Bandoeng, Java.

This comprehensive, beautifully illustrated report (in Dutch) contains a complete summary of the water power situation in the Netherlands' East India, particularly in Java. The report also covers Sumatra, Celebes and Algemeen. A series of appendixes contains maps and data in diagrammatic form, showing the available water powers in these colonies. The subject is of transportation interest because the Netherlands government has extensive plans for electrification in Java, where grades are steep and water power is plentiful.

Psychotechnik und Taylor-System

By K. A. Tramm, transportation engineer, Berlin, Germany. Published by Julius Springer, Berlin, 1921.

In a well illustrated book of about 140 pages, Mr. Tramm tells of the work which is being done on the Berlin street railway system in selecting and training men by means of modern psychological methods. Mr. Tramm's work was described in an article in the *Electric Railway Journal* for Jan. 28, 1922, page 143. This book covers the same field as the article, but in much more detail. In sending a copy of his book to the *Electric Railway Journal*, Mr. Tramm wrote that the tests described have worked out very well indeed.

Engineering Standards Committee

Work of the Engineering Standards Committee. 1921. Published by the committee, 29 West Thirty-ninth Street, New York City.

This pamphlet contains an explanation of the organization and methods of working of the committee, together with a list of co-operating bodies and another of projects which have an official status before the committee, including approved standards.

Pyrometric Practice

Technologic paper No. 170, United States Bureau of Standards, Washington, D. C.

Several members of the physics staff of the bureau have compiled this treatise of more than 300 pages, covering the subject of pyrometry in both its scientific and practical aspects. The work will be of value to all who have to do with the measurement of high temperatures.

"Engineers and Engineering," published by the Engineers' Club of Philadelphia, contains in its July, 1922, issue the full text of a paper on "Paving Between Tracks and Adjoining Rails" by E. J. McIlraith, Philadelphia Rapid Transit Company. The discussion following the presentation of the paper is included. Mr. McIlraith's paper was abstracted in the issue of the *Electric Railway Journal* for July 29, 1922.

Personal Mention

New York Surface Lines Report to General Andrews

Sixteen surface lines of New York City are now under the special charge of Brigadier-General Lincoln C. Andrews, chief executive of the Transit Commission. He will hear complaints, make decisions, and make known the commission's instructions. The railway companies will have the right to appeal to the commission on any decision.

This concentration of power eliminates the necessity for the commission to issue orders concerning service and equipment to individual lines. That method was followed with the rapid transit lines. General Andrews will now supervise the service, and set standards which are to be reached by the surface companies as soon as possible. The responsibility for performance and adherance to rules is left with the individual companies.

General Andrews was appointed to the Transit Bureau in 1921 to take charge of the various departments. His work consists in the assignment of duties, and the supervision and correlation of all the departments. He is a graduate of West Point, and served in France during the World War. After the armistice he became Assistant Provost Marshal General of the Expeditionary Forces.

C. H. Hardesty Chief of New Traffic Department

A department of traffic has been created by General Manager E. B. Moore of the Monongahela Power & Railway Company, Fairmont, W. Va., whose order places C. Howard Hardesty, general traffic agent, in control of the new department.

The duties of the new department manager will be to control on both the local and the Parkersburg-Marietta divisions, the passenger, freight and express traffic. He shall also have charge of the matter of rates on such traffic and shall have supervision and direction of all passenger ticket offices and freight offices and of all passenger and freight agents.

In the past the local traffic agent worked under the instructions of the manager of railways and he had no jurisdiction over traffic on the Parkersburg-Marietta divisions which was handled exclusively by the officials of that division.

L. M. Brown Made Superintendent of Interstate Property

L. M. Brown since 1917 superintendent of transportation for the Interstate Public Service Company, Indianapolis, Ind., has been appointed general superintendent of all railway property of the Interstate company. He has been with the company for seventeen years. His first position was that of conductor. Later he was made dispatcher and trainmaster, and finally superintendent of transportation.

New Springfield Manager

John S. Bleecker to Take Executive Charge of Indiana, Columbus & Eastern Traction Company

John S. Bleecker has been appointed by Receiver J. H. McClure to be general manager for the receiver for the Indiana, Columbus & Eastern Traction Company, and Columbus, Newark & Zanesville Electric Railway. The announcement was made recently at the general offices of the companies in Springfield, Ohio. Mr. Bleecker will have his headquarters in Springfield.

J. S. BLEECKER

Mr. Bleecker will step into this work as easily as an ex-service man falls into line when he drills with his two-year-old son. For Mr. Bleecker formerly managed the New Orleans Railway & Light Company, the Columbus (Ga.) Electric Company and the Columbus Railroad, and the Myles Salt Company at New Orleans. Since January of this year Mr. Bleecker has been associated with the Electric Bond & Share Company of New York, N. Y.

His experience extends to a number of other companies in Seattle, Boston, Paducah and Houghton, where he represented Stone & Webster, Inc. He was first associated with this management corporation in 1900, and the connection remained until he was appointed manager of the New Orleans company in 1919. It was while he was with Stone & Webster that he was general manager, under a receivership, of the Columbus Electric Company and the Columbus Railroad, and made a remarkable record.

Mr. Bleecker has already assumed active charge in Springfield. Mr. McClure had been devoting his full time to the operation of the two traction companies prior to his appointment as vice-president and general manager for the Chicago, Aurora & Elgin Railroad, but the latter necessitated his removing to Chicago.

Legion Cross Presented to A. E. Kennelly

For distinguished services as exchange professor in engineering to the French Republic, the Cross of the Legion of Honor has been awarded to Dr. A. E. Kennelly, professor of electrical engineering at Harvard University and the Massachusetts Institute of Technology. Dr. Kennelly was the first exchange professor sent to France from America under the scheme of regular annual exchange of professors in engineering and applied science, inaugurated last fall between the French University Administration and seven American institutions.

Professor Kennelly is the third American engineer thus to be honored recently, the others being Colonel Arthur S. Dwight, President of the American Institute of Mining and Metallurgical Engineers, and Charles F. Rand, chairman of the Engineering Foundation.

C. D. Baker is now directing transportation matters of the Long Island Railroad as general superintendent. He was formerly assistant superintendent and now is filling the position held by J. R. Savage.

Clarence H. Hitchcock, who has been chief clerk to the general superintendent, has been appointed inspector of the Rockford & Interurban Railway, Rockford, Ill. Mr. Hitchcock will have general supervision of operation.

W. N. Beasley, a lawyer of Halls, Tenn., has been appointed to the Tennessee Railroad and Public Utilities Commission by Governor Alfred A. Taylor to succeed the late Col. B. A. Enloe. Julian H. Campbell has been elected chairman. Col. Harvey Hannah is the other member of the commission. Mr. Hannah is now a candidate for the Demcoratic nomination for Governor.

Obituary

Cornelius Van Vorst Powers, chief of one of the bureaus of the New York (N. Y.) Transit Commission, died a short time ago.

Ernest A. Wenzel, for many years chief inspector in the Eastern District of the Brooklyn (N. Y.) Rapid Transit Company, died on June 24 at his home in Brooklyn.

James H. Horne, sixty-four years old, nationally known designer of passenger cars and former superintendent of the Barney & Smith Car Company, Dayton, Ohio, died very suddenly in Dayton recently.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Miners Plan Partial Truce

Buyers of Coal Are Awaiting Developments of the Cleveland Conference and as a Result Orders for Coal Have Eased Off Slightly—Priority Orders Are Few and the Car Supply Remains Short

The pinch of coal shortage is becoming severe in several portions of the country. Spokesmen for the fuel distributor stated this week that great pressure is being brought from the New England states and by states in the Northwest and in the Middle West.

Secretary Hoover stated that failure to observe the price maximum applied only to an insignificant portion of the tonnage being produced. No increases have been allowed in the maximum price, he stated, in those districts where the 1920 wage scale has been put into effect. He emphasized that the price agreement is for the period of the strike only, but he said the settlement of the strike will not necessarily take the lid off of prices.

The conference of bituminous operators and miners called by John L. Lewis of the United Mine Workers at Cleveland, Ohio, Monday adjourned its sessions daily. Operators not present were thus to be given time to reach the conference, it was stated. The real reason for the adjournment, however, it is generally understood, was to take under consideration the Crews-Glasgow plan for settlement of the strike. The original meeting—the attempted Four-State conference—was held in abeyance to see what would happen to the proposed Crews-Glasgow scheme. The plan now is that if the operators not present still hold aloof to try and form an agreement among those taking part in conference. A committee was appointed Friday to draft a new wage scale and agreement.

SLIGHT DECREASE IN COAL DEMAND

Demands for coal have eased off a trifle in the past week. There is, of course, no dearth of orders for all the coal that is being mined, but there has come an abatement in the rush as buyers prefer to await developments of the Cleveland conference. The cessation of feverish buying has been accompanied in some instances by curtailed industry activity and further efforts toward fuel conservation by utilities and carriers. In some sections the shortage is now acute; this is responsible for many Lake vessels tying up because of no bunkers and shortened operating schedules at steel mills in the Youngstown district.

Railroads are functioning better, production has increased slightly, and while congestion of loads is still the main bar to heavier non-union production, the accumulated tonnage on wheels is slowly being untangled and sent to destination.

Coal Age Index of spot bituminous prices dropped 45 points to 511 on Aug. 7. This corresponds to an average mine price of $6.18, as compared with $6.73 on July 31. Buyers who must have coal are paying gilt-edged prices for it, unless they are fortunate enough to be lined up with connections who are using the Hoover price as a basis of sale. The list of operators in this category is growing rapidly, however, and in the Midwest the Hoover level may be considered the minimum price of today, with the range continually narrowing as less and less coal moves at the high prices of last week. No seller wants to have high-priced coal confiscated at the Hoover level and there is also a growing feeling among producers that the wisest policy is to accept a reasonable return, especially as the car supply is to be contingent upon the observance of fair prices.

Contrary to expectations, priority orders have not swamped the mines now operating nor has the car supply improved materially, even for those producers who had accepted such preferential business.

The feeling that a resumption of union mining is impending is reflected in this week's market for British coal in this country. Heavy orders had been placed in Great Britain for consumers in New England and the Atlantic seaboard but cancellation of some of these orders, amounting to many thousands of tons, followed the events of the week in the coal trade. As delivery of British fuel involves several weeks' time. no consumer wants to have much of this tonnage enroute or on unfilled orders when there is a prospect of home-mined coal being available in the near future.

Coal Shortage Felt at Steel Mills

The fuel stringency has become much more pronounced at iron and steel works, according to a review of conditions in this week's *Iron Age*. In the Chicago, Cleveland, Youngstown, Pittsburgh and Buffalo districts a dozen more blast furnaces have been forced to suspend. As many more are likely to be thrown idle by another week, and indications are that in two weeks several steel plants will be forced to stop.

It is plainly indicated that for a good many weeks but a small percentage of newly mined coal will go into the production of iron and steel. There is no excitement among consumers, and little of the scramble for material that is often seen in time of scarcity.

July output of steel ingots showed an expected decrease from June, but it was not large. The estimated daily rate for the country was 113,700 tons, as compared with 115,800 tons in June and 114,700 tons in May. August will show a pronounced falling off.

Bids Received for Station Work and Yard Track

The New York Transit Commission has received bids to cover the changes required in the steel work at the east end of the Bridge Plaza station, Long Island City, to make possible service by the Brooklyn Rapid Transit Company beyond the plaza station, at which Brooklyn Rapid Transit trains operating in the Broadway subway, Manhattan, now terminate.

The commission also received eight bids for an additional approach track for the Lenox Avenue branch of the Lexington Avenue subway into the Interborough yards at Lenox Avenue and 147th Street. This contract will require the construction of a few hundred feet of subway and an open cut.

Food Prices Increase

The U. S. Department of Labor, through the Bureau of Labor Statistics, has issued compilations showing changes in the retail cost of food in twenty-four representative cities.

During the month from June 15, 1922 to July 15, 1922, fifteen of the twenty-four cities increased as follows: Manchester and Portland, Me., 4 per cent; Bridgeport and New Haven, 3 per cent; Chicago, Denver, Fall River and Milwaukee, 2 per cent; Atlanta, Baltimore, Columbus, Houston, Jacksonville, and Salt Lake City, 1 per cent. In Pittsburgh there was an increase of less than five-tenths of 1 per cent. The other nine cities decreased as follows: Philadelphia and Richmond, 2 per cent; Cincinnati, Detroit and Kansas City, 1 per cent; Little Rock, New York, Scranton and Washington, D. C., showed a decrease of less than five-tenths of 1 per cent.

Metal, Coal and Material Prices

Metals—New York	Aug. 8, 1922
Copper, electrolytic, cents per lb.	14.00
Copper wire base, cents per lb.	15.625
Lead, cents per lb.	5.77
Zinc, cents per lb.	6.57
Tin, Straits, cents per lb.	32.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.875
Somerset mine run, Boston, net tons	6.875
Pittsburgh, mine run, Pittsburgh, net tons	....
Franklin, Ill., screenings, Chicago, net tons	...
Central, Ill., screenings, Chicago, net tons	....
Kansas screenings, Kansas City, net tons	4.875
Materials	
Rubber-covered wire, N. Y., cents per lb.	6.05
Weatherproof wire base, N. Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.05
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	91.50
White lead, (100-lb. keg), N. Y., cents per lb.	12.50
Turpentine (bbl. lots), N.Y., per gal.	$1.16

Rolling Stock

Chicago (Ill.) Elevated Railroads has ordered 100 motor cars from the Cincinnati Car Company. Baldwin trucks will be used. As stated in these columns in the May 13 issue, these cars will be similar to cars already in service but particular attention will be given to provide increased comfort to passengers.

Chicago, Aurora & Elgin Railroad, Aurora, Ill., has placed an order with the Pullman Company for nineteen steel passenger cars and one dining car.

Great Northern Railway, St. Paul, Minn., has purchased four rail motor buses to be used in short line service.

Muskegon Traction & Lighting Company, Muskegon, Mich., recently spent $12,000 in new motors for its cars. The company is considering the purchase of double-truck cars for winter use. No definite decision, however, has been reached in this regard.

Southern Indiana Gas & Electric Company, Evansville, Ind., has bought four new safety one-man cars to take the places of the ones destroyed when the car houses of the company burned several weeks ago. The company is also building five double truck cars.

Hull (Que.) Electric Company has added two one-man safety cars to its rolling stock equipment. The cars are 21 ft. long, 8 ft. 1¼ in. wide and seat forty-one persons. The car bodies are of semi-convertible type with wooden sides and were built by the Ottawa Car Manufacturing Company.

New Orleans Railway & Light Company, New Orleans, La., will purchase the 100 new cars following authorization by Judge Rufus Foster of the United States District Court for the eastern district of Louisiana. The bids of the J. G. Brill Company, Philadelphia, Pa., for seventy-five cars and that of the Perley A. Thomas Car Works, of High Point, N. C., for twenty-five cars, were approved by the court. The cost of the equipment is estimated at $1,186,755. The order of the court authorizing the purchase makes the purchaser of the railway system, at the coming public auction on Aug. 17, assume the contract of paying for the equipment.

Power Houses, Shops and Buildings

American Water Works & Electric Company, New York, N. Y., is considering extensions to its power system to take care of the rapidly developing business of the company. The improvements will approximate $1,000,000.

Ohio Service Company, Coshocton, Ohio, has purchased the plant, equipment and lines of the Sugar Creek Light & Power Company, supplying current to Walnut Creek, Sugarcreek, Shanesville and Baltic. The plant will be connected with the Ohio Service Company's line in Dover on Aug. 1. The Ohio Service Company has an option on the plant, equipment and lines of the Zoar Battery Company at Zoar, which supplies Zoar, Bolivar and Mineral City with light and power.

New Orleans Railway & Light Company, New Orleans, La., is contemplating among the improvements in the immediate future, involving an outlay of nearly $750,000, the erection of two additional substations in New Orleans. The Bourbon Street substation is to be rebuilt and equipped with a 2,000-kw. motor generator and furnished with additional 233 volt d.c. feeders for the Edison system and two a.c. 6,600 volt feeders are to be transferred from the Central station. The other substation will be erected on Dryades Street. Dwight P. Robinson & Company, Inc., New York, will have charge of the new work. They are now installing the new turbine at Market Street.

New Incorporations

Dixie Traction Company, Beechwood, Ky., has filed articles of incorporation with a capital stock of $10,000. William T. Russell of Cincinnati and men from Covington are the incorporators.

Trade Notes

Scheld Engineering Corporation, New York, N. Y., has been appointed metropolitan and export representative for the Franklin Moore Company, Winsted, Conn., manufacturer of material handling machinery.

Conveyors Corporation of America, Chicago, Ill., announces that Monroe L. Patzig of Des Moines, Ia., has been appointed representative for the sale of its American trolley carrier in central Iowa.

The Dayton (Ohio) Mechanical Tie Company reports that the Gary Street Railway has just ordered a large number of Dayton Resilient ties for further improvements of tracks in Gary, Ind. This is the third order placed since the initial installation of this type of tie.

Charles P. Steinmetz, chief consulting engineer of the General Electric Company, Schenectady, has been nominated for State Engineer and Surveyor of New York by the Socialists. The platform of the Socialists declares for public ownership and operation of all public utilities. It condemns the New York Transit Commission for alleged favoritism.

Perey Manufacturing Company, New York, N. Y., announces that it has received the contract for equipping the Frankford elevated line with forty-seven of its standard type passimeters, and in addition the Philadelphia Rapid Transit Company has purchased twenty-eight of this type for installation at points on their system where changes were necessary through putting the Frankford Elevated Railway into operation.

Florandin Equipment Company, New York, N. Y., has been organized by C. H. Florandin with offices at 110 West Fortieth Street, New York, to act as representative of the Conveyors Corporation of America, Chicago, manufacturer of the American steam jet ash conveyor and the American trolley carrier. The new organization will also do a general contracting business in and around boiler rooms and industrial plants located in New York and its vicinity, erecting and installing the lines of equipment which the organization handles. Mr. Florandin has had wide experience in this work, for several years being eastern manager of the Conveyors Corporation before forming his own company.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces a number of changes in personnel. R. B. Mildon has been appointed general manager of the stoker department, with headquarters at South Philadelphia. G. A. Sacchi, formerly manager of the stoker section, has been appointed manager of stoker sales and will have his headquarters at South Philadelphia. Edgar Woodrow has been appointed manager of the contract division of the stoker department. F. G. Hickling is now manager of the railway division of the Pittsburgh district office. Norman Stewart is branch manager of the Minneapolis office. S. R. Shave has been appointed manager of the price section of the power and railway departments, East Pittsburgh. M. C. Rypinski of the radio sales division has transferred his headquarters to New York as a branch of the headquarters sales department. A. Heckman is now works electrical engineer for the East Pittsburgh works of the company.

New Advertising Literature

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just published leaflet No. 3,428, describing the advantages of rolling contact for control apparatus.

Irving Iron Works, Long Island City, N. Y., has issued an eight-page bulletin, describing the construction of their subway grating. A table of safe loads for the various types used is included.

Armstrong Cork & Insulation Company, Pittsburgh, Pa., has recently issued a booklet entitled "A Neglected Source of Economy," which deals with the savings that can be effected in manufacturing plants by the use of refrigerated drinking water systems. A copy of the folder will be sent free of charge to those who ask for it.

The Hardwood Manufacturers' Institute, Memphis, Tenn., has issued a pamphlet entitled "The Hardwood Manufacturers' Institute." This contains reprints of several addresses and resolutions introduced at a recent meeting of the Institute. The pamphlet also contains information as to its purposes and policies.

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What Kind of Automatic Substation Overload Protection?

WHEN the question of putting in automatic control comes up for discussion between the manager and the electrical engineer, the former is likely to put his foot down pretty hard on some particular feature which he thinks should govern. For example, he may say that service must be uninterrupted regardless of everything else and the substation must look out for itself. Or he may be more solicitous for the machinery, saying that a slight interruption to service cuts no figure, but valuable substation apparatus must not be jeopardized. There is still another aspect which may interest him, namely, the way in which the station will behave with respect to distribution of load and to voltage fluctuation. The substation must not, through the opening and closing of its mysterious relays, unduly interfere with the line voltage by shifting loads promiscuously. Of course, there is also, and usually, the matter of cost to be considered in connection with each plan.

Given the requirements, it is up to the electrical engineer to analyze his own problem with consummate skill. For this purpose he has not heretofore had much more than descriptive literature available. But thanks to the symposium on the use of resistance as a factor in insuring good service from automatically-controlled substations, printed in the June 24 issue of this paper, and the contributions to the discussion in the issues of Aug. 5 and Aug. 12, his need for specific technical information has at least in part been met.

This paper has no hard-and-fast rules to suggest as guides in automatic substation design. The subject is too varied for that. All that can be hoped in this direction is that such information as is given in these contributions on the subject will be carefully assimilated and applied.

The Coal Industry "Should Worry" About the Public

ON LAST April 1 there was surplus coal and the price, therefore, threatened to go down to the point that the existing rate of wages could not be paid. The miners would not accept less. The strike, prolonged through four and one-half months, created such a shortage and consequent demand that high coal prices are assured throughout the winter. So the operators quickly agree to the old wage scale, the check-off system, no arbitration, etc., and sign a contract extending to next April 1. The deadlock is broken, but the public and all industry must pay the bills.

A pretty cycle. It solves the problem for the operators. The miners preserve their high wage scale. But where do the public and business get off? What slightest assurance is there that the same cycle will not be repeated next year? The committee that is to be created will have no authority. It can only recommend and the outcome of its work is not promising. The immediate interests of the miners and operators are served by the settlement, and there is not likely to be a coal famine this winter. Beyond this, no accomplishment is in evidence. The operators can certainly take no pride in being party to such an unconstructive settlement. For the problem is before the country just as seriously as before and the permanent solution is only postponed.

The Public Must Protect Itself

CONGRESS will be derelict in its duty if, during the coming session, it does not in some way limit the present power of railroad employees to stop interstate transportation by striking. Congress has plenty of power as well as precedent for action of this kind. The Erdman act and the Newlands act differentiated labor engaged in transportation from that in other undertakings, and the vital concern of the public in the settlement of railroad problems is again emphasized in the present railroad act. The purpose of this act was to secure the development and continuity of service of the interstate railroads of the country, and if the law did not go far enough, its scope should be increased. In the present state of the public mind the railroad and coal situation stand paramount and far exceeding in importance as issues the tariff or the bonus to which Congress has given a great deal of time during the past eight months.

The most serious aspect of the present trouble was the abandonment of work by train operators on several roads because of the presence of guards or because of alleged defective equipment. The first reason is a direct challenge to the power and duty of the constituted authorities to keep order. A concerted attempt to prevent either the states or the national government by intimidation from protecting private property and otherwise carrying out the law is a far greater assault against our present system of government than to abandon work because of dissatisfaction with wages and working conditions. If the railroad union heads are to have a veto on the movements of the police, the militia or other guards authorized by law, they might just as well take the title of commanders-in-chief, which by the constitution belongs to the President. As to the excuse of defective equipment, this will strike most observers as a subterfuge only, when unsupported by evidence.

Admittedly it will be difficult to draft an entirely satisfactory national law to cover the situation because of the great freedom with which men have been able to stop work. It has been said, also, that any such plan is equivalent to involuntary servitude and contrary to our ideals. Nevertheless, some way must be found to make the welfare of the whole people, which is paramount to the desires of any group or class, free from the caprice of that group. When a man accepts a job with a public service industry, he must accept a restriction on the right to a collective strike. If he is unwilling to submit to this he should get a job in another industry in which the public welfare is not the controlling consideration. At the same time wages in these industries should always be adequate to attract good men.

There are precedents for limiting the freedom of action of labor engaged in certain industries on which the public is dependent. The Kansas Industrial Act is one precedent and the Industrial Disputes Act of Canada is another. The reason there are not more precedents is that up to recently there has been no great need for any. Now, however, it is within the power of a few people to stop a vital utility service such as railroad transportation and the mining of coal, and they have repeatedly shown a readiness to use this power to serve their own ends. The public must protect itself against repetitions of the present situation whether or not a truce to settle the existing strikes is arranged.

European Tramways Have Also Had Their Financial Troubles

REPORTS from abroad prove that the tramways in European countries have passed through a cycle not greatly different in kind from that here, but the changes in most cases have been even more marked because the depreciation in the purchasing power of currency has been greater. It is not surprising that this situation should be found because tramway conditions are largely the same everywhere, and there is melancholy satisfaction in realizing that American fare experiences have not been unique. Briefly the situation has been on both sides of the Atlantic that wages and the cost of materials rapidly increased, there was great difficulty in securing an increase in fare from the authorities, and when this increase came, traffic fell off, as a rule. In Great Britain the difficulties appear to have been somewhat less in degree than elsewhere in Europe, due perhaps to less depreciation of the currency, to greater ease in getting fares because most of the larger properties are municipally owned and to the great industrial activity of the larger towns during the war in the manufacture of munitions.

The interest of American managers in the situation centers particularly on the solutions adopted. That in Paris was described at length in the issue of Aug. 5. Briefly, the city purchased the property and leased its operation to a private company on a sort of service-at-cost plan, but as yet it has been impossible for the leasing company to operate the system at the fares charged without a good-sized deficit, and this deficit is being made up out of the municipal funds Up to the financial crisis brought about by the World War, the Paris tramways were operated by seven private companies. In Berlin the city has taken over the tramway system and in this case is operating the cars directly, municipalization taking place in 1920. Here the effort required to raise the fare as rapidly as the mark depreciated naturally has been great, and tickets issued by the tramways department had to carry a statement that they would no longer be good for a ride when retired by public announcement. In the countries of even greater currency depreciation, as Austria, the rapidity and extent of fare increases have been even greater.

It is instructive to note that in spite of all these vicissitudes, in no country has the belief been held that because of these conditions electric railways are obsolete. As with every other going concern, there are expenses of operation and these have to be met by charges for the services rendered, supplemented in some cases by subsidy. But every one realizes that the electric cars have still to be kept running, even in the countries where the currency has fallen to almost minute values.

Electric Railways Can Use National Safety Council Service

THE coming eleventh annual safety congress promises to be unusually effective from the standpoint of the electric railways. The program contains the names of three of their presidents, Arthur W. Brady, Frank R. Coates and Britton I. Budd, and there are others well known in the general safety department of the electric railway field. The participation of these men in the congress insures its value to all who really desire to mitigate the accident menace.

The National Safety Council has not been taken as seriously among electric railways as in the manufacturing industries, yet if the organization is what it should be, it ought to command the support of one as much as the other. Surely the annual costs of accidents on most properties is sufficient to cause grave concern and every available means to reduce them should be utilized.

If the National Safety Council as at present conducted does not suit electric railway managers, they can improve it from the inside if the leaders among them will take hold. The council is a going concern; it is a truly national affair; it possesses possibilities of helpfulness if only through its function of acting as a clearing house for safety information.

What's the Matter with the Company Sections?

THE company sections of the American Electric Railway Association seem not to be as active as they formerly were. Have the sections lost their vitality, or have conditions in the industry so changed that they are no longer desirable or necessary? This is a pertinent question, because the electric railway industry has passed through a period of strenuous trial, and while it is now on the upgrade it needs to utilize every agency that can help to bring it back to its normal status. Is the company section one such agency, and if it is, why is not this agency being used more effectively?

There was a time during the war period when a slump in company section activities was to be expected. Such a slump occurred. But it is now nearly four years since the armistice was declared. This seems long enough to allow the sections to get back into form. Why have they not done so?

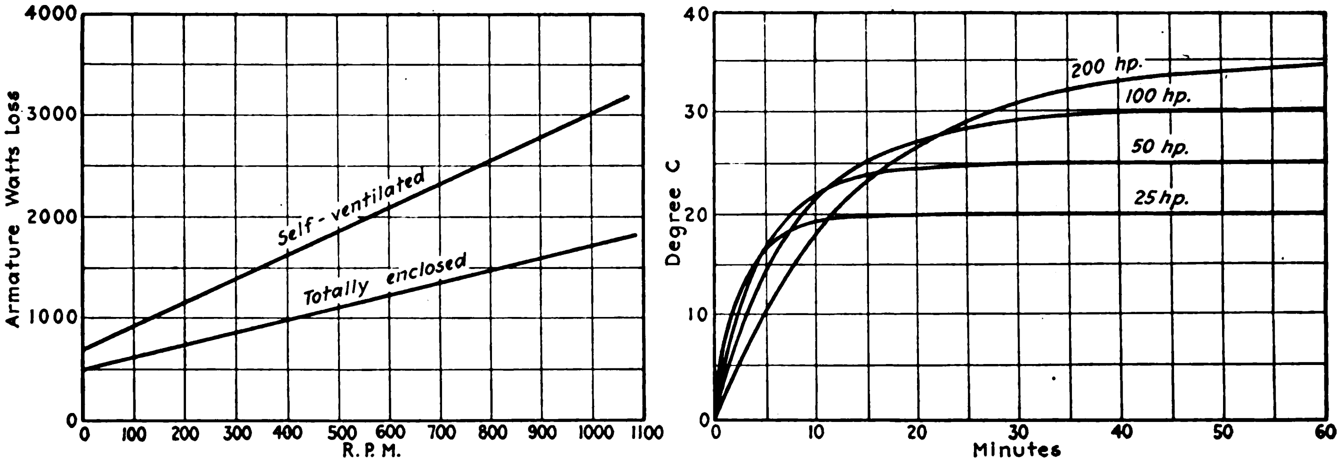
There is a real need for company sections of the American Association or their equivalent. There is an advantage in having the stimulus due to membership in a national organization. But there is no magic about a company section that will cause it to operate itself. Motive power is needed locally, and this means conviction on the part of a few energetic spirits that the proposition is worth while. Probably the present state of suspended animation is due to the fact that the hustlers in most of the sections are hustling in connection with some other activities, which for the time they consider more important.

Limiting Temperatures of Railway Motors

The Performance of Railway Motors as Limited by Temperature of the Windings—The Relation of Motor Load to Internal Temperatures and Methods of Measuring Temperatures Are Discussed

By G. E. Luke
Motor Engineering Department, Westinghouse Electric & Manufacturing Company

THE characteristics of an electric motor are such that it will try to carry any load which is put upon it, regardless of the magnitude of the load. Thus in the hands of unskilled operators it is easily possible to abuse a motor by requiring it to perform excessive overloads. This condition is especially possible in railway service, where all conditions of loads are found, such as operating with one-half of the motors cut out, pulling in disabled cars, bucking snow, operating with tight brakes and many other possibilities. The existence of overloads is indicated by repeated "blowing" of the circuit breaker, flashing of the motors and slipping of the wheels. A motor may be overloaded, however, without any of the above indications. The real criterion of overloading is the maximum internal motor temperature. The result of excessive temperatures is to deteriorate the insulation; failure is not instantaneous; on the contrary, the motor may not fail until weeks or months afterward.



At Left—Graphs for a 65-Hp. Railway Motor Showing Relation of Watts Loss Dissipated from Armature on Continuous Duty to the R.P.M. on Basis of a 65-Deg. C. Rise by Thermometer. At Right—Approximate "Hottest Spot" Correction Factor at Nominal Rating for Various Sizes of Motors

The purpose of this article is to discuss, briefly, insulation life as influenced by temperatures, the relation of motor load to the internal temperatures and the method of measuring these temperatures.

The insulation used on railway motor windings is composed of many materials. From the temperature standpoint they are divided into two classes, A and B. Class A insulation is composed of specially treated or impregnated cotton, linen, paper and similar materials. This type of insulation is generally found in the light traction railway motors in which wire wound armature coils are used. This insulation deteriorates in strength with age even at room temperatures; high temperatures act to accelerate the deterioration. A temperature of 105 deg. C. is given in the standardization rules of the A. I. E. E. as the maximum temperature which this class of insulation can stand continuously without endangering the life of the motor. In order to reduce weight to a minimum it is considered good engineering to run railway motors at higher temperatures than are found on stationary machines. Experience has shown that class A insulation exposed to actual temperatures ranging from 115 to 125 deg. C. will give a motor life satisfactory for railway service.

Proper impregnation of windings will greatly improve this insulation. The varnishes or gums tend to keep moisture out of the windings and to prevent oxidization or burning of the insulation under high temperatures.

Insulation life as affected by temperatures is also a function of time. Class A insulation for short periods may be exposed to temperatures much higher than the values previously given. For example, tests on a small railway motor at loads ranging from 150 to 300 per cent normal rating for time periods of five to thirty minutes gave maximum internal temperatures varying from 150 to 200 deg. C. On three of these runs the armature insulation varnish started to "smoke" (the actual temperatures recorded ranged from 175 to 200 deg. C.). After these special tests the coils were torn apart and the insulation was found to be in good condition. Neither the cotton tape nor the treated cloth showed signs of failure either mechanically or electrically. Such temperatures, however, if repeated would no doubt cause failure, especially after the varnishes and gums have been driven out of the windings.

Class B insulation is composed of mica, asbestos and other materials capable of resisting high temperatures in which class A material or binder is used for structural purposes only and may be destroyed without disqualifying the insulation for continuous service. This class of insulation is used on the majority of the heavy traction motors, especially those which have strap wound armature coils. This insulation will safely withstand temperatures of 150 deg. C. or more on continuous duty. In fact, with this type of insulation, the limitation to the maximum permissible temperature is quite often found not in the insulation but in the soldered connections. Ordinarily "half and half" solder melts at approximately 180 deg. C. By the use of a tin solder this melting point may be increased to 230 deg. C.

It is possible to have a coil insulated with both class A and class B insulation and still be equivalent to a class B insulated coil. This may be done, for example, in a strap wound field coil with asbestos insulation between the straps and several layers of mica or asbestos wrappers around the coil, these layers being held in place by a few layers of treated cloth and tape. In this coil the class B insulation is found where the maximum temperatures exist. The class A insulation, being on the outside of the coil, is exposed to temperatures considerably under the internal temperatures.

The temperatures previously referred to are the maximum internal temperatures or the so-called "hottest spot" and not the temperatures obtained with the usual thermometer method. On overloads the maximum temperatures are found on the copper and the insulation adjacent is exposed to this temperature. It is at this point where insulation failure first starts and not on the outside of the coil, where much lower temperatures may exist.

CONTINUOUS AND SHORT TIME RATINGS NECESSARY

Railway service requires a motor to be able to deliver an average load continuously and also to be able to carry heavy overloads for short time intervals without exceeding dangerous temperatures in the windings. In order to be able to apply the motors properly, this requirement necessitates a double rating. These ratings are the continuous and a short time rating.

On continuous duty all of the heat produced due to the motor losses must be carried away as fast as it is generated; that is, there is no stored energy. Starting with the imbedded armature, this loss is conducted from the copper principally to the iron core. To do this requires a temperature difference between the copper and the core, since the heat flow is across the insulation. Electrical insulation is also good heat insulation. For example, the average insulation has a resistance to the flow of heat of approximately 3,000 times that of copper; this means that if a loss of one watt is flowing through a piece of insulation 1 in. square and only $\frac{1}{16}$ in. thick the temperature drop will be about 20 deg. C. This drop is unaffected by ventilation and depends only upon the heat flow and the thickness of the insulation. This heat loss due to the copper loss is conducted to the iron core, where it then flows to the cooler portions of the iron, namely, the ventilating surfaces. The iron loss also takes this same path. The required temperature drop through the iron will be only a few degrees, due to its relatively good thermal conductivity. It requires a certain temperature drop at the ventilating surfaces in order to transmit the heat loss to the inside air. This temperature gradient between the surface and the average inside air temperature is a function of the relative velocities between the surface and the air and the watts per square inch of surface which must be dissipated.

With an inclosed motor, the average internal air temperature is high, since the armature loss which has been transferred to this air must now be transmitted to the frame, and this loss, together with the field loss, must all be dissipated from the external frame surfaces. Each portion of this heat path requires definite temperature drops. For winter operation in cold climates self-ventilated motors are usually provided with covers for totally inclosed operation. The fan on the armature under these conditions is effective in circulating the internal air and thus materially increases the rate of heat flow to and from the ventilating surfaces as well as equalizing the internal temperatures. The windage loss due to the fan in the average railway motor is small and does not exceed 5 per cent of the total losses at the average operating speed. This loss is more than compensated for by the fact that the increased windage inside of the motor, according to tests on a 50-hp. motor at the continuous rating, decreased the internal temperatures 13 per cent, which shows the importance of proper internal ventilation even on inclosed machines.

On the other hand, with a self-ventilated motor in which a definite quantity of air is pulled through the motor, the internal air temperatures are much lower and the surface velocities relative to the air are also higher. Both of these conditions give the ventilated motor a greater continuous rating than the inclosed motor of the same size.

The benefit to be gained by self-ventilation is roughly proportional to the fan's peripheral speed. This is shown in the graphs giving the relation of watts loss dissipated from the armature and the armature speed for a constant temperature rise under two different conditions of ventilation.

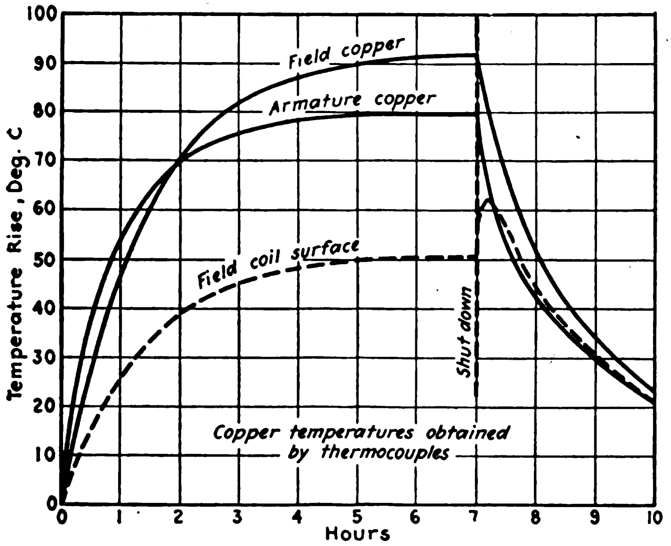
It is unfortunately the characteristic of series motors, however, that high motor losses which accompany high loads also result in low armature speeds and hence decreased ventilation. This disadvantage can of course be overcome with the use of a separate constant speed external blower. This is an added complication, however, and is done only when necessary. Such conditions are often found in heavy traction service.

The continuous rating of a motor is greater in service than on the test floor. This is due to the increased ventilation on the external frame resulting from the car movement. This is especially pronounced with an inclosed motor, where all of the heat loss must be liberated from the frame. In such cases an average speed of 10 m.p.h. will result in temperatures 15 to 20 per cent lower than those found on the test floor. With self-ventilated motors the heat dissipated from the frame ranges from 25 to 65 per cent of the total loss, depending upon the motor speed at the continuous rating. Thus with this type of motor the temperatures will be reduced approximately 5 to 15 per cent with a car speed of 10 m.p.h. compared to the temperatures obtained on the test floor.

The load carried by a motor in service is anything but a continuous load. For this reason a short time rating is used, namely, the nominal or the one-hour rating. The purpose of this rating is to give an indication of the motor's short time or thermal capacity, since with such loads the heat losses cannot all be liberated as fast as generated; in other words, part of the losses must be stored up in the motor copper and iron. The storage of the heat is of course accompanied by an elevation of the motor temperature.

At the nominal rating the losses of the motor which take the form of heat are partly liberated from the frame by radiation and convection (principally the latter), a part is carried away by air currents passing through the motor, and the remainder must be absorbed by the motor parts. On a slow speed motor where the ventilation is relatively small as much as 85 per cent of the losses may be absorbed, the remaining 15 per cent being accounted for by heat loss from the frame and air through the motor. On the other hand, with a well-ventilated high-speed motor it is possible to find 10 per cent of the loss dissipated from the frame, 30 per cent carried away by the ventilating air, with the remaining 60 per cent absorbed. This shows that the one-hour rating is not a true indication of the motor's heat storage capacity, since the percentage of heat loss stored in the motor during this run is a function of the motor's ventilation.

The real limitation to the short-time rating is due to the fact that the heat losses are not uniformly distributed throughout the motor but are concentrated in the copper windings, which have relatively little weight and are well heat insulated from the heavier iron masses. This is especially true of the armature windings, since the current density in these are generally greater than in the field windings. A loss of 5 watts per pound of copper will raise its temperature 100 deg. C. in one hour if all is absorbed. However, at the nominal rating the armature loss ranges from 15 to 50 watts per pound of armature copper, the latter figure being found in the smaller motors. Thus, the percentage of armature copper loss at the nominal rating, which must be transferred through the insulation to the iron or air, ranges from 66 to 90 per cent. This requires the internal copper temperature to be greater than the iron core temperature, and if it is desired to estimate these internal temperatures from the iron temperature by thermometer the conventional "hottest spot" correction factor must be added. This factor is a function of the heat density flowing through the insulation, the thickness of insulation and condition of load, whether continuous or short time. The approximate value of this correction or internal temperature drop is shown in the accompanying graphs, for various sizes of motors at the nominal rating. At other loads this factor will vary approximately as the square of the current. This shows clearly the small thermal capacity of the armature copper on the smaller motors.

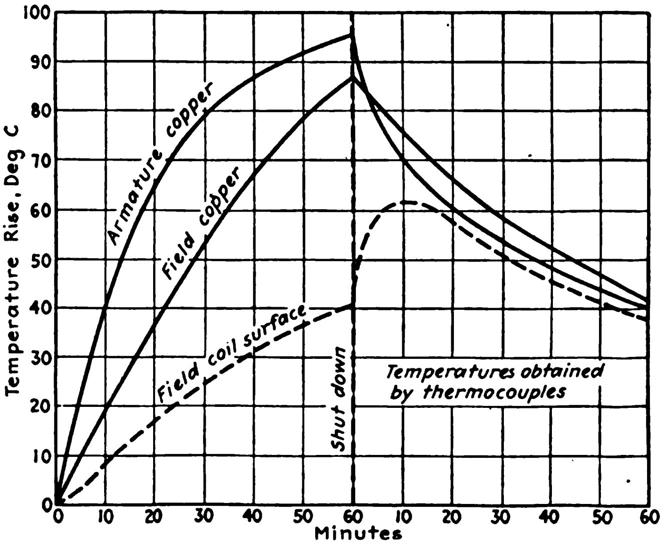


APPROXIMATE HEATING AND COOLING GRAPHS OF A 50-HP. RAILWAY MOTOR SELF-VENTILATED AT CONTINUOUS RATING

For overloads equal to twice the one-hour rating the maximum rate of rise of the armature copper above the iron will be 9.6 deg. C. per minute for the 200-hp. motor and 28.0 deg. C. per minute for the 25-hp. motor.

On the test floor it is now possible to obtain the temperatures of any part of the motor with the use of temperature detectors such as thermocouples. The standard thermocouple for this work is the copper-advance couple. A welded or soldered junction of these two metals produces a voltage nearly proportional to the temperature of the junction. This voltage should be read with a potentiometer, which, for convenience, may be calibrated in degrees centigrade instead of millivolts.

These same thermocouples may be built into the motor windings with the junction placed at any desired point. On the stationary parts, such as field windings, the voltage produced by the hot junction, and consequently the temperature at that point, may be read while running. On the armature, however, it requires slip rings and brushes in order to be able to read the temperature of the thermocouple junction while running. On account of the difficulties involved, this is not usually done, but the thermocouples in the rotating part are read after shutdown. This can be accomplished, for example, by allowing the ends of the thermocouple leads to extend a short distance beyond the band wire for quick connection after shutdown. In this manner accurate data may be obtained as to the maximum internal motor temperatures and the heating and cooling characteristics of the motor under any load conditions. The average temperature of the windings may also be obtained on the test floor by the resistance method. These resistances in a series motor are low and can be read accurately with the use of a Kelvin double-bridge. These data are of great value to the application and designing engineers.

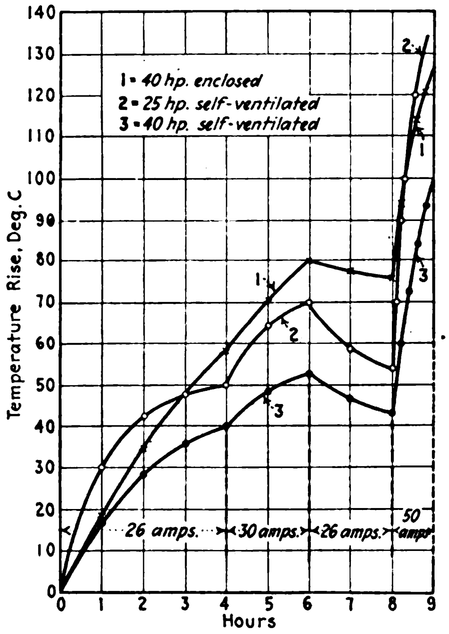


APPROXIMATE HEATING AND COOLING GRAPHS OF A 50-HP. SELF-VENTILATED RAILWAY MOTOR AT THE ONE-HOUR RATING

In service accurate motor temperatures are much more difficult to obtain. The easiest method and the one usually used is the thermometer method. This of course does not give the maximum internal temperatures nor is it usually possible to take a reading when the motor is the hottest.

The resistance method has been used in several cases. This can be applied to the field windings. With the current and voltage drop accurately known the resistance and consequently the average temperature of the windings may be determined. This method requires accurate and practically instantaneous reading of the voltmeter and ammeter for consistent results. A more satisfactory method is obtained by the use of thermocouples. With these the motor temperatures of the stationary parts may be obtained with the car in motion and in this way the maximum temperature may be found. (See article on "Determination of Train Make Up" by G. C. Bishop in ELECTRIC RAILWAY JOURNAL for Jan. 21, 1922.)

The heating curve of a 50-hp. self-ventilated railway motor at the continuous rating is given in an accompanying illustration. The solid lines are the maximum copper temperature rise of the field and armature windings as obtained with thermocouples. The rise by resistance was lower than these values. The dotted curves give the surface temperature rise of the field coils as obtained by either thermocouple or thermometer placed on outside of the coil. It should be noted that after shutdown the surface temperatures, as measured by thermometers, rise to a maximum value and then begin to fall. This rise is due to the decreased ventilation after shutdown. The difference between the field copper and the field coil surface rise is the temperature drop through the insulation. After shutdown the copper temperatures drop rapidly. The armature copper temperature falls quicker than the field. Conversely, the heating curve shows a steeper armature copper rise than that found on the field copper.



APPROXIMATE HEATING GRAPHS OF THREE RAILWAY MOTORS—MAXIMUM COPPER TEMPERATURE

This rapid change in temperature brings out clearly the difficulty encountered in obtaining the motor temperatures, especially in service where considerable time may be lost before temperature readings are obtained. At the one-hour rating the heating curves show the relative heating of the armature and field copper on short-time loads and why the armature is apt to be "roasted" if the motor is subjected to short-time overloads greater than the nominal rating.

The older types of railway motors were usually of the slow speed, non-ventilated type. These motors had large short-time capacity and relatively small continuous capacity. The modern demand for lighter and cheaper motors resulted in the development of the present line of self-ventilated motors. Since the ventilation is proportional to the armature speed greater gains in the continuous ratings could be made by going to these higher speeds. However, all railway service is subject to overload conditions which require heavy short-time capacity, and this can be obtained only by sufficient iron and copper masses for absorbing the surplus losses. This limitation restricts the degree of ventilation economically possible for this service. In order to bring out this point more clearly, the heating curves of three motors running over the same cycle are given. The ratings and weights of the three motors are:

Number	1-Hour Hp.	Rating, R.p.m.	Cont. Rating, Amp.	Weight, Lb.	Ventilation
1	40	700	26.0	1,900	Inclosed
2	25	1,200	32.0	1,000	Self-ventilated
3	40	700	38.0	1,900	Self-ventilated

The cycle consisted of the following:

(*a*) 4 hour run at a r.m.s. current of 26 amp.
(*b*) 2 hour run at a r.m.s. current of 30 amp.
(*c*) 2 hour run at a r.m.s. current of 26 amp.
(*d*) An overload run r.m.s. current of 50 amp.

The last portion of the cycle represents conditions which may be obtained by cutting out half of the motors on the car or in pulling in a disabled car, which practically doubles the motor's root-mean-square current.

In comparing the inclosed motor with the lighter self-ventilated motor it is seen that the heating curve of the ventilated motor is steeper. However, the limiting temperature on continuous duty will be much lower on the self-ventilated motor due to the internal ventilation. At the beginning of the last cycle the light ventilated motor is 22 deg. C. cooler than the inclosed motor. On the overload, however, since the temperature rise is practically determined by the watts loss per pound of copper and iron, the ventilated motor will necessarily have a steeper rate of rise. Thus, this overload can be carried for eighteen minutes by both the light ventilated motor and the heavier inclosed motor without exceeding a 100 deg. C. rise. If these two types of motors were called upon to deliver a heavy overload with both initially at the same temperature then the heavy inclosed motor would have a considerable margin over the lighter motor and would necessarily be able to carry the load longer. On the other hand, a self-ventilated motor of the same weight and characteristics as the inclosed motor will give a considerably lower temperature at the beginning of the overload and it will be able to run one hour at the 50-amp. load without exceeding the 100 deg. C. rise. In the example just cited the 1,000-lb. self-ventilated motor will do the same work as the 1,900-lb. inclosed motor providing the overloads are kept within reasonable values. Hence, in general, the saving in weight to be gained by using high-speed ventilated motors is determined by the heavy peak overloads and especially by those due to abuse or emergency conditions.

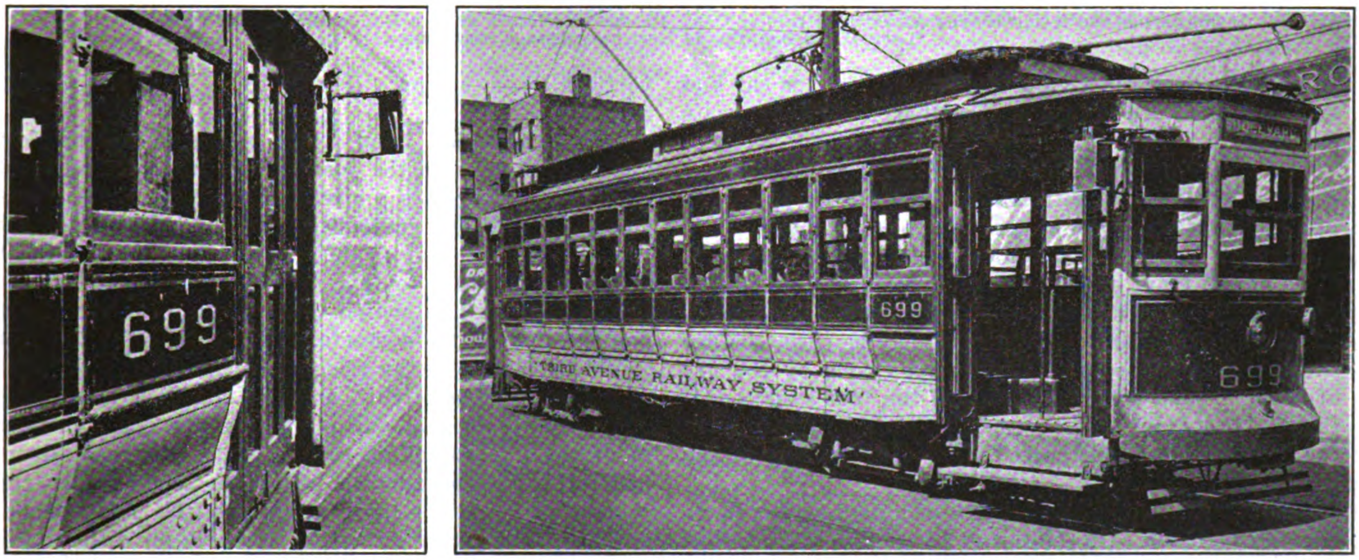
Airtight Door Developed

A NEW cast-iron door, 18 in. x 16 in. in size, has recently been developed by the Conveyors Corporation of America, Chicago, Ill. It is designed especially for boiler settings and is airtight. Floating hinges pivoted to door at the center insure an even pressure over the door when it is closed and locked. The door can be provided with either of two types of locks—with a wing nut at the end of a hinge bar or with a lever locking device, which is recommended when the door is subjected to frequent opening and closing.

Double-End Turnstile Car Tried in New York

Third Avenue Railway Has Remodeled One of Its Semi-Convertible Pay-as-You-Enter Cars and Installed Turnstiles and Other Automatic Equipment to Permit of One-Man Operation

THE Third Avenue Railway, New York, N. Y., has had one of its semi-convertible pay-as-you-enter cars equipped with turnstiles for double-end operation in trial service for the past two months. Many new features have been introduced in connection with the control, air brake and fare-handling equipment. The installation of the new equipment and the rearrangement of the apparatus on the platform and at the ends of the car were done in the shops of the company, under the supervision of J. S. McWhirter, superintendent of equipment, and many of the ideas and new equipment installed have never before been tried in electric railway service.

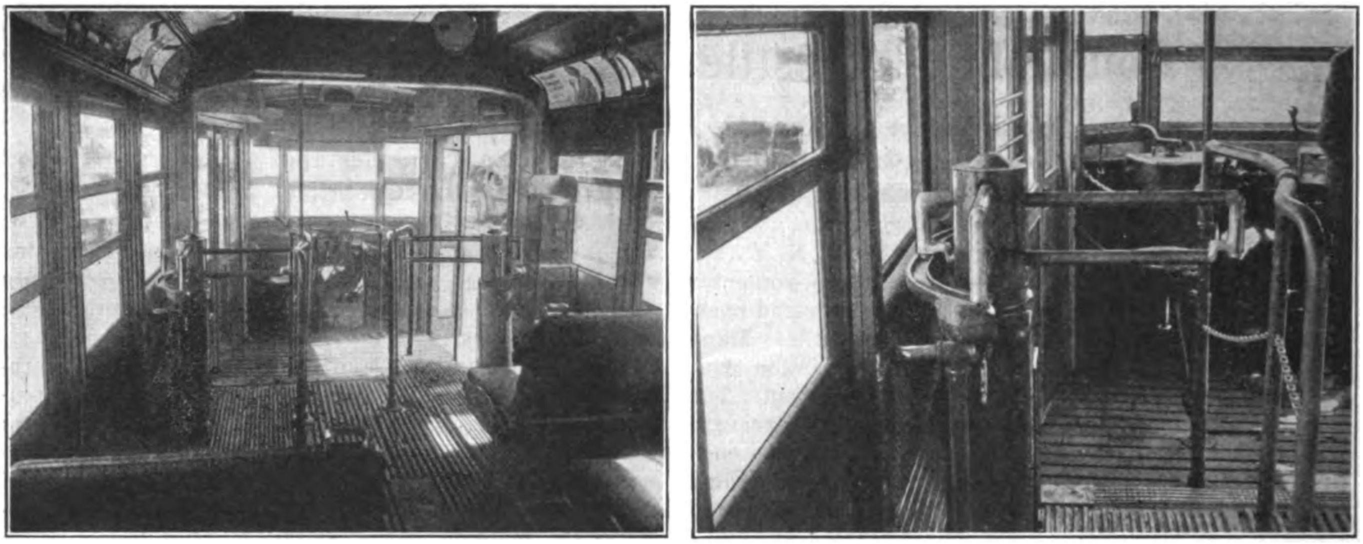


CAR AS RECONSTRUCTED FOR ONE-MAN OPERATION
At left—Folding mirror gives operator view of rear entrance. At right—Spacious front exit opening.

Car No. 699 is the particular one equipped and this is one of a lot of cars purchased from the J. G. Brill Company in 1909 and described in the *Electric Railway Journal* for Jan 23, 1909. The car is 30 ft. long over the corner posts and 43 ft. long over bumpers. As originally operated, there were seats for forty-four passengers inside the car body. In order to provide space for the installation of the turnstiles one cross-seat and two longitudinal seats were removed at each end of the car. Accompanying illustrations show the floor plans of the car before and after its rearrangement for one-man operation. As the car is arranged for double-end operation, four turnstiles are used, only two of which are necessary for operation in one direction. The car is operated on the pay-as-you-leave principle, the exit for all passengers being at the front end and entrance at the rear. The turnstile at the rear entrance acts only as a barrier to prevent people leaving by the rear door. The exit turnstile at the front end is released by the insertion of a 5-cent piece in a special type of fare box. The passenger can then pass out and the fare is automatically registered by the turnstile. Should a passenger wish change an additional exit opening is provided through the center so that he can receive his change from the operator and then deposit 5 cents in a Johnson fare box at the right of the operator, as the passenger leaves.

The turnstiles used are of the H. R. Langslow reciprocating arm type, handled by the Damon-Chapman Company, Rochester, N. Y. This type of turnstile is used in the stations of the New York, Westchester & Boston Railway and was described in the *Electric Railway Journal* for Oct. 1, 1910, and June 8, 1912. A particular advantage comes from the use of this type of turnstile in that the arms are made to slide through the center portion of the turnstile through the guidance of a cam. Much space is thus saved, as the turnstile can be set directly against the side of the car instead of occupying additional space for the rotation of the turnstile of ordinary types. Pipe railings are provided for guiding the passengers into and out of the cars. The tops of these railings extend slightly above the arms of the turnstile, and the bottom portion is closed in by the use of chains as required. The two turnstiles which are not in use with the car operating in one direction are also closed by the use of chains. The type of fare box used to unlock the turnstiles is of a type similar to that in use in the Interborough subways in New York in connection with their station turnstiles.

As the operation of the rear entrance door is controlled from the front end of the car, mirrors are installed at the right entrance to the operator. Clearance limitations are such that the mirrors must be folded in against the car while the car is in motion. The operation of these mirrors is interlocked with the door operation, so that the mirror swings out into position as either door is opened and folds in again after the last door closes. Mirrors are also installed inside the car above and to the right of the operator, so as



TURNSTILE AND RAILING ARRANGEMENT AT END OF CAR. PASSENGERS LEAVE BY THE RIGHT AND CENTER OPENINGS. LEFT HAND OPENING IS USED FOR REAR ENTRANCE

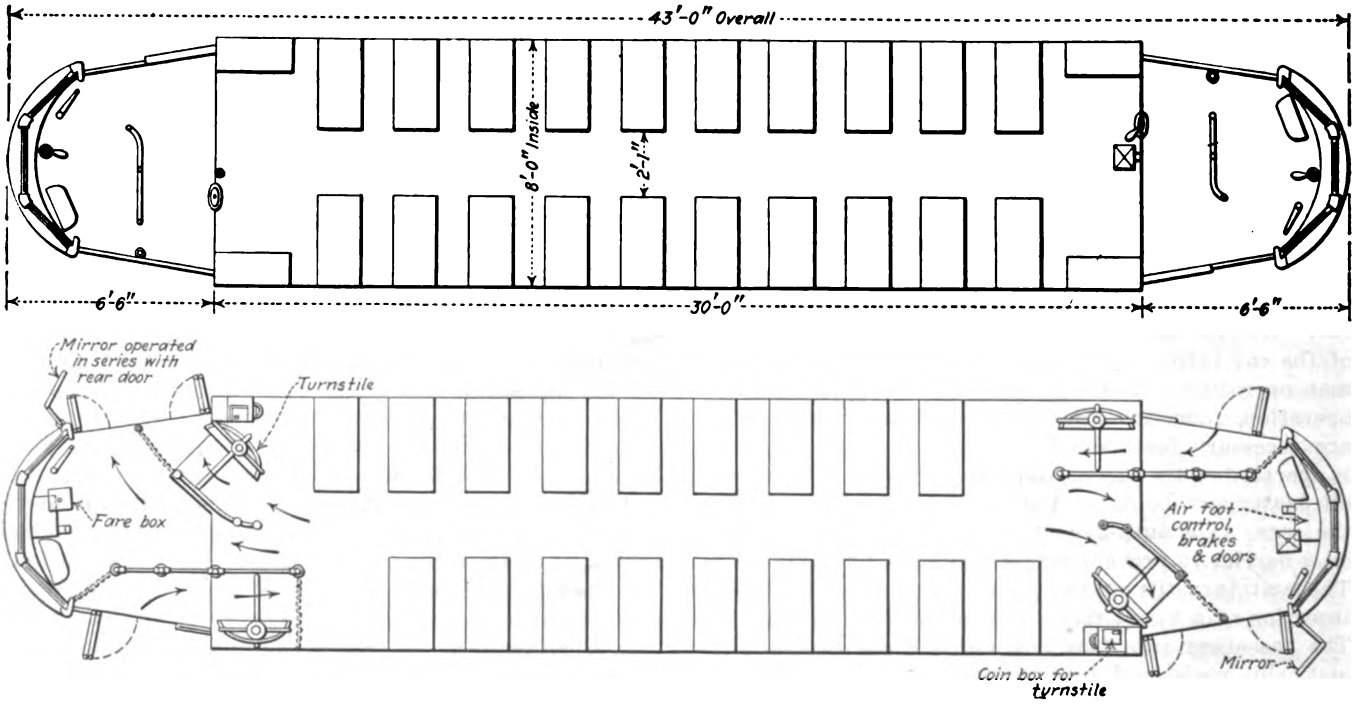
to give the operator a view of the inside of the car and enable him to see passengers as they leave their seats for exit.

The doors are operated by National Pneumatic door engines, electrically controlled, and are opened by means of a push button placed at the operator's left hand, while a selective switch is provided which permits him to leave either front or rear door closed as desired. Both doors are closed by means of contacts on the foot pedal, but the contacts for the front door may be closed before the operator wishes to close the rear door by the use of a small hand lever connected to the foot switch contacts. The front door is usually closed first to give the operator an unobstructed view in the mirror of the rear door.

The control is of a new design of automatic acceleration K controller. On the top of a standard K controller on each platform is mounted a balanced air cylinder with rack and pinion attached to the main drum shaft. The main controller handle is of the pivoted type, normally held at an angle of about 30 deg. from the vertical by a spring. The reverse drum is thrown manually.

When the small hand lever connected to the foot switch is thrown to the position which closes the front door it also energizes a circuit through magnets whose valves operate the controller air cylinder to place the main drum controller on the first point. The movement of the main drum to this position provides a pick-up circuit for the line switch through the door interlocks and the foot switch contacts. Therefore, after the foot switch is moved to the release position to complete the rear door closing circuit, and the last door closes, the line switch comes in and starts the car. The coming in of the line switch in turn operates the main drum magnet valves to advance the main drum under the control of a series limit switch to the full parallel position, thus giving automatic acceleration without any movements on the operator's part other than those necessary to close the doors and put the foot pedal in the full release position.

When the line switch is dropped out by returning the



FLOOR PLANS OF CAR. AT TOP, CAR BEFORE RECONSTRUCTION. AT BOTTOM, REMODELED CAR foot pedal to the running, lap, service or emergency positions the main controller drum is automatically returned to the off position.

Should the operator wish to operate the controller in reverse, or to any position other than full parallel, he has only to bear down on the pivoted controller handle (this movement draining air from the operating cylinder) and to operate the controller as a standard drum controller. This feature is particularly valuable in cases of controller failure and when dynamic braking is desired, the latter being thus independent of line current.

The air foot control mechanism is a modification of the McWhirter foot-operated control which has been in service on cars of the Third Avenue Railway System for several years. In addition to its use to close the doors and operate the automatic control as already described it operates a piston type straight air brake valve and an air-controlled emergency valve. The pneumatic combination provides for a delayed balancing of the door engines on all four doors after an emergency application from the foot pedal, instantaneous balancing of the door engines after an emergency application from the hand-operated "Conductor's" valve, a quick recharge of the emergency valve, and full pressure in the door pipe before the brakes release. Provision is made to apply and hold the brakes in emergency in the event of a broken pipe or reservoir cock or low air pressure. The control is interlocked to prevent trolley current being applied to the motors until the brake cylinder pressure has fallen to 35 lb., but this feature does not apply to dynamic braking.

It is to be noted from the above that aside from pushing a button to open the doors and throwing a small lever to close the front door all operations of motors, brakes and doors are controlled through the operator's foot pedal.

While this car has been operating in service for several months with a comparatively small number of defects, and while the operation has nearly reached the point where the car can make as good schedule as the same size of car operated with two men, the Third Avenue Railway still regards the car as experimental, and further changes may be made before a decision is reached as to its adoption.

Some Details of the French Midi Electrification

IMMEDIATELY after the cessation of hostilities in the late war the French government sent a technical commission to Switzerland, Italy and America to study existing railway systems. This commission recommended that 1,500-volt direct current be adopted as the standard for the electrification of all French railroads. Conforming with this decision the Midi Railway is using 1,500-volt direct current for all new installations and the sections already electrified at 12,000 volts will be changed to the lower voltage to secure uniformity.

The lines of the Midi Railway are mostly located in the south of France, north of the Pyrenees. As far back as 1906 the management commenced an exhaustive study of the electrification of this part of the system, having in mind the utilization of the water power available on the northern slope of the Pyrenees. By 1914 four sections had been electrified with single-phase current at 12,000 volts and 16.67 cycles. The war stopped all work.

Conforming with the new system power will be generated in six stations, or groups of stations, capable of developing a total of 362,000 hp. The stations will be put up progressively as the different sections are electrified. The head of water varies from 350 ft. in the station with the lowest head to a maximum of 2,500 ft. Power will be generated at 8,000 volts and 50 cycles and will be distributed to the railway substations over a 60,000-volt three-phase distribution system. Different points of the distribution system will be connected by a 150,000-volt transmission line.

The railway substations, which are located along the railroad at intervals of 12 to 18 miles, are connected directly to the 60,000-volt distribution system. They all contain rotary converters with the exception of a few in which mercury arc rectifiers will be used.

DETAILS OF POWER EQUIPMENT

The equipment for the generator stations, the distribution system, the railway substations and the locomotives will be built in France. The Westinghouse Electric & Manufacturing Company will supply a large part of the 150,000-volt transmission system, including the transformers, synchronous phase modifiers for the voltage control and the relay protective gear.

For the initial development three generating stations will be utilized. The 150,000-volt lines will connect these with the distant cities Pau, Dax and Bordeaux to the west and Toulouse to the east. At the generating stations 20,000-kva. banks made up of single-phase two-winding transformers will raise the voltage from 60,000 to 150,000 volts. At the substations near these cities the transmission system connects again with the distribution system through stepdown transformer banks of 20,000-kva. made up of single-phase three-winding transformers, lowering the voltage from 150,000 to 60,000 volts. These transformers have a third winding of 6,600 volts for feeding synchronous phase modifiers.

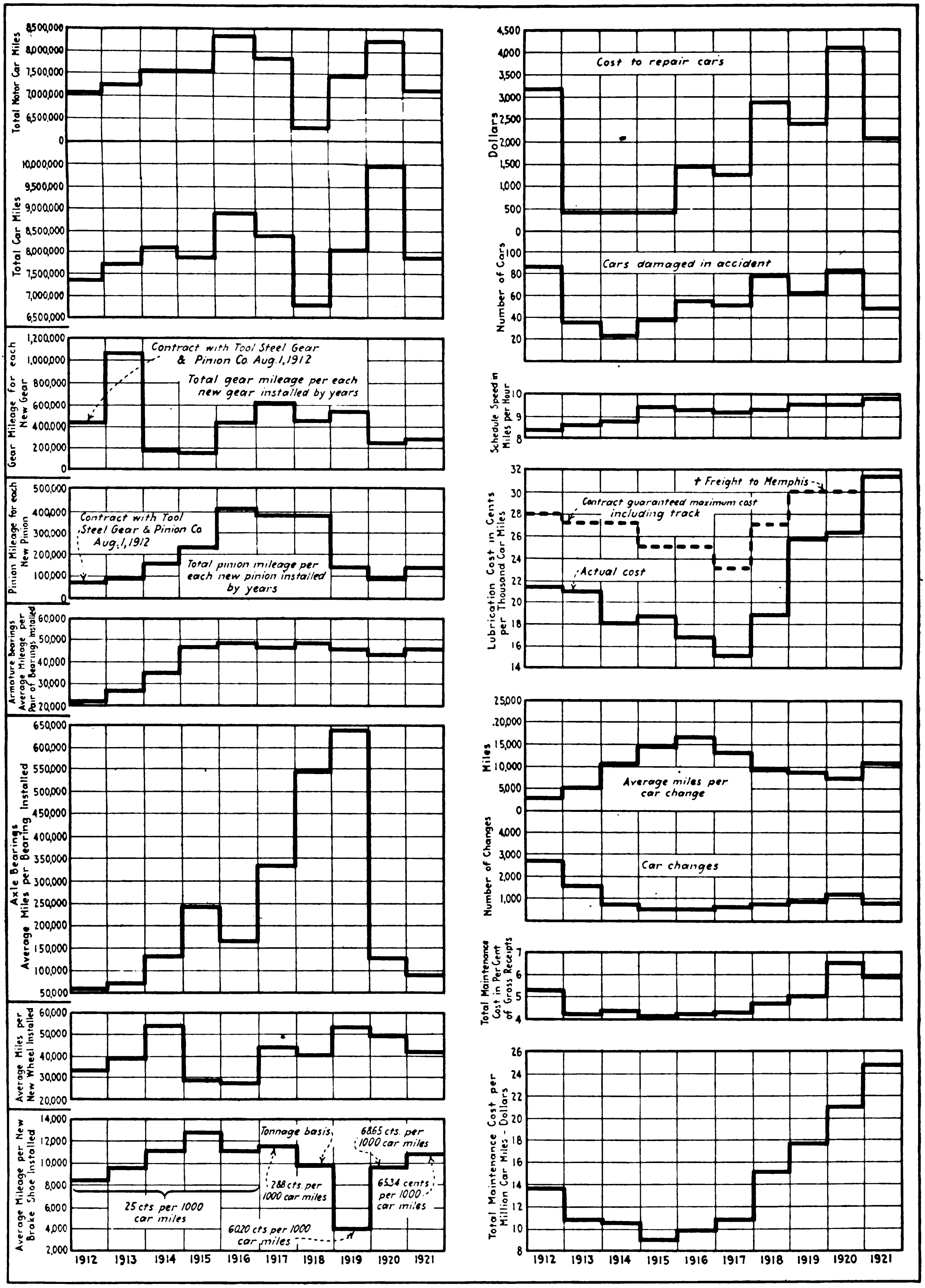
These machines are intended automatically to keep constant the voltage at the substation irrespective of the load. Owing to the length of the lines and the high voltage of the transmission they are designed to cover a wide range of reactive kilovolt-amperes.

At Bordeaux there will be two phase modifiers each of 15,000 kva. capacity and 7,500 kva. lagging capacity. At Dax and Toulouse there will be in each two machines of 8,000 kva. leading and 4,000 kva. lagging capacity. All these phase modifiers are equipped with the Westinghouse patent automatic voltage regulator designed to cause the machine to give the right amount of reactive kilovolt-amperes leading or lagging required to keep the line voltage constant.

A complete scheme of relay protection embracing the generator, distribution and transmission has been worked out. The generators and transformers are individually protected differentially; that is, they are automatically taken off the line in case of internal trouble.

The transmission and distribution are so laid out that the supply to the railway substation is assured. The lines are therefore for the most part in duplicate, except where sections are fed from both sides. Where the transmission lines are in duplicate they are equipped with balanced line protection by means of the recently developed Westinghouse directional relay, which does not require potential transformers. The whole relay scheme is so laid out that in case of trouble in any section of line or piece of apparatus the part in trouble is isolated without interrupting the supply to the rest of the system.

Ten-Year Records of Memphis Maintenance Statistics



Maintenance Records Used as a Bogey

Memphis Street Railway Has Kept Careful Record of the Performance of Its Equipment for Fifteen Years — Data Are Checked Up and Drafts Are Compiled as Incentive to Better Performance

THE Memphis Street Railway is one of the few companies which have kept systematic records of performance for different parts of its equipment over a number of years. These records are now proving invaluable as a means for testing new types of equipment and also the efficiency of the transportation and mechanical departments. Graphs showing records of a number of parts from January, 1908, to January, 1918, were published on page 806 of the issue of this paper for April 27, 1918. Through the kindness of A. D. McWhorter, superintendent of equipment and overhead lines of the company, these records have been brought up to date and are reproduced on the opposite page. On the following page is given an "efficiency report" for December, 1920, and 1921, together with figures for the twelve months of each year. These efficiency reports are made up each month for the month and for the year to date for both the present and previous years.

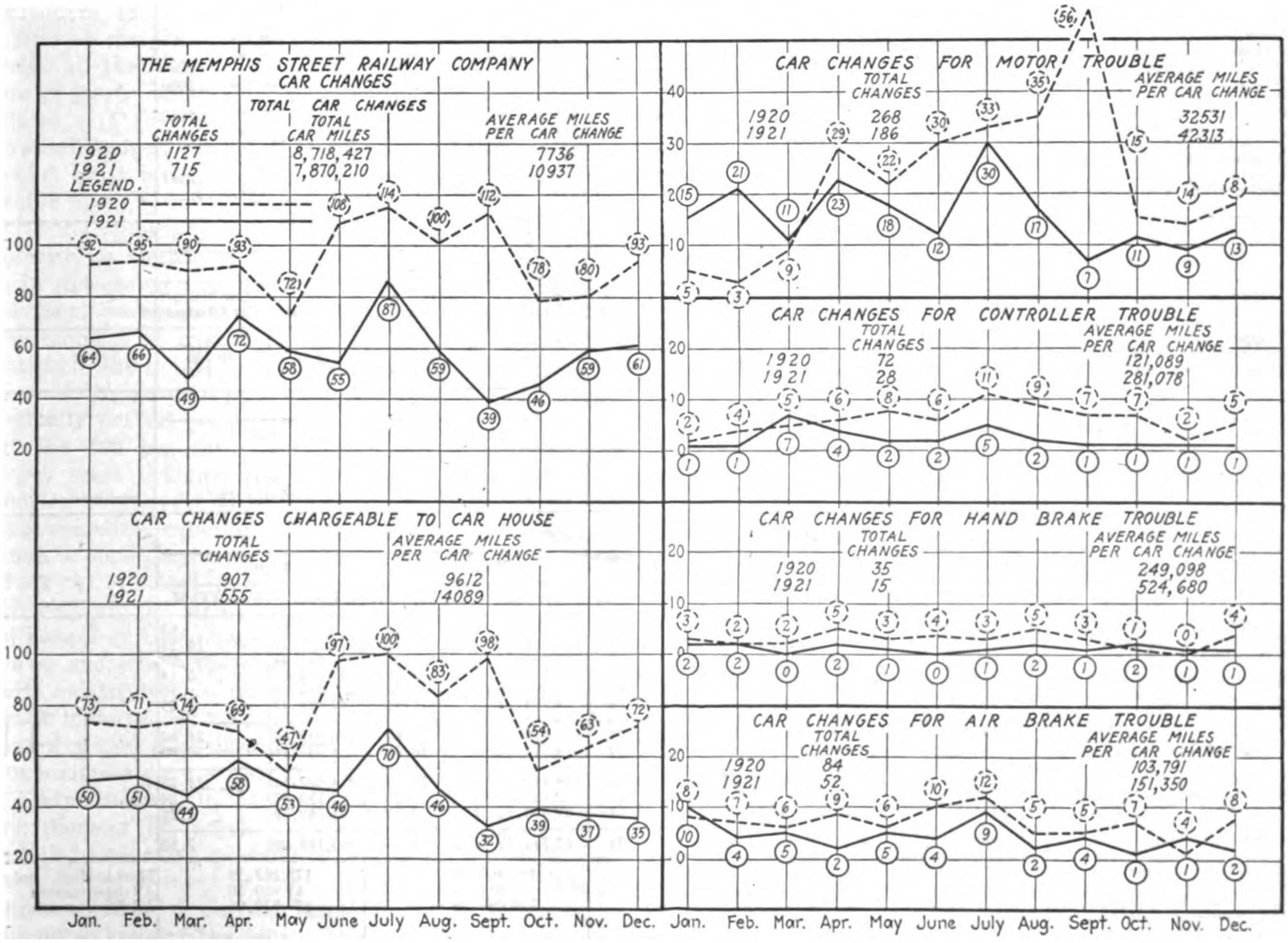
A statement giving the basis upon which the figures in the accompanying table are compiled by the company is published in the April 27, 1918, issue already referred to. This statement shows, for example, that the passenger car-mile figures are obtained monthly from the auditor's office, a separate entry being made for each different type of car. The schedule speed is obtained by dividing the total car-miles by the total car-hours; the number of cars turned out of the different shops is obtained from the daily report of the foreman of the machine shop and the monthly reports of the foremen of the carpenter shop and the paint shop, etc.

In addition the company keeps graphical records by months of the number of car changes and those chargeable to motor trouble, controller trouble, carhouse, hand-brake trouble and air-brake trouble. These charts form such a very good guide to the efficiency of the maintenance department that Mr. McWhorter has taken advantage of this fact to stimulate an effort to get better results.

In consequence, photographs of these charts, combining the figures for the current year and previous year, are hung in a conspicuous position in the shop. One of these charts, that for 1920 and 1921, is reproduced.

The original photographs are 12 in. wide by 9 in. high, and they are inclosed in a frame with glass. The practice of preparing and posting these charts is as follows:

On Jan. 1 of each year a new sheet is prepared, and the results of the previous year are placed on it in dotted lines. On Feb. 1 the record for January of that year is drawn on in a solid line, and on the first of each following month the same plan is followed, the figures



THESE RECORDS ARE POSTED IN THE SHOPS TO STIMULATE INTEREST IN BETTER MAINTENANCE for the current year being shown by a solid line. As each month's figures are charted, a photograph is made and replaces the photograph which has been posted in the shop for the previous thirty days.

A very gratifying degree of interest is exhibited on the first of each month by the foremen of the various departments when the chart is brought up to date. Each takes a great interest to be sure that the record for his division is lower than the previous month and for the corresponding month of the previous year.

EFFICIENCY REPORT—MEMPHIS STREET RAILWAY

Mechanical Department

Note: Memphis & Lake View Ry. Co. Operation Included in This Report	Car-Miles				Car Equipment						
	Month of December		Year to Date		Passenger Cars		Seating Capacity	Age, Years	Motors		Age, Years
	1921	1920	1921	1920	Number	Type			Number	Type	
Passenger Car-Miles						Closed					
Double track motor	378,337	373,506	4,377,926	4,567,073	83	Double truck, 4 motor.	44	16	50	G. E. 201-I	7
Max. trac. truck motor	104,024	104,371	1,195,879	1,253,439	25	Max.trac.trk,2 motor	48	7	2	Westh. 101-B	9
Single truck motor	100,374	176,787	1,542,587	2,399,217	11	Single truck, 2 motor	36	9	156	G. E. 80	15
Double truck trailer	62,729	57,684	703,428	738,835	95	Single truck, 2 motor	30	20	154	G. E. 57	16
Total passenger	645,464	712,348	7,819,820	8,958,564	44	Double truck trailers	54	8	144	G. E. 67	17
Service Car-Miles						Open			18	G. E. 1000	22
Double truck motor	2,704	2,926	36,220	28,227	67	Single truck, 2 motor	50	18	256	G. E. 800	22
Single truck motor	355	858	7,263	6,892	325	Double truck trailer.	54	17	16	Westh. 69	22
Double truck trailer	150	403	5,849	4,120	..	Total	..	..	796	Total	..
Single truck trailer	628	....	1,058	839	..					Air Compressor	
Total service	3,837	4,187	50,390	40,078		Service Cars			25	Westh. D-I-F	7
Total passenger and service	649,301	716,535	7,870,210	8,998,642					1	Westh. D-2-EG	15
					9	Double truck, 4 motor			4	Westn. D-I-EG	12
Total motor miles	1,922,144	2,056,340	22,988,636	25,573,604	10	Single truck, 2 motor			4	Nat. brake DD-4	12
Total air brake miles	485,065	480,803	5,610,025	5,848,739	5	Double truck trailers			38	Nat. brake A-4	14
Total wheel miles	4,788,980	5,021,700	56,758,048	62,361,344	7	Single truck trailers			36	Nat. Brake AA-4	17
									13	Nat. Brake AA-1	19
									1	Nat. Brake B-2	17
Passenger car schedule, speed miles per hour	10.02	9.48	9.85	9.53	31	Total service cars			122	Total air compressor	..
					356	Total passenger and service cars			918	Total motor & air compr.	..

Service Performance of Material and Parts	Month of December						Year to Date						Remarks
	1921			1920			1921			1920			
	Units Installed	Service Mi. Per U Installed	Cost per M Miles	Units Installed	Service Mi. Per U Installed	Cost per M Miles	Units Installed	Service Mi. Per U Installed	Cost Per M Miles	Units Installed	Service Mi. Per U Installed	Cost Per M Miles	
Railway armatures wound	4	480,536	....	9	228,482	....	140	164,224	......	126	202,965	....	
Air compr. armatures wound	1	485,065	....	0	....	....	19	295,264	......	10	584,874	....	
Fields, used	1	2,407,209	....	0	....	....	41	697,528	......	33	952,192	....	
Commutators, renewed	0	....	....	0	....	....	16	187,416	......	7	4,488,906	....	
Commutators, turned	13	185,169	....	18	140,952	....	300	95,329	......	257	122,266	....	
Gears, new	6	320,357	....	10	205,634	....	80	287,329	......	104	250,721	....	
Pinions, new	10	192,214	....	20	102,817	....	164	140,174	......	283	90,366	....	
Wheels, 33 in., new	94			85			1,122			1,089			
Wheels, 24 in., new	10	38,007	.2000	8	49,720	.2000	98	41,520	.2000	132	44,864	.2000	
Wheels, 21 in., new	22			8			147			169			
Brake shoes, 25-lb., each, new	450	10,642	.57906	575	8,733	.87655	5,264	10,782	.65344	6,437	9,685	.68650	
Armature bearings, pairs	44½	43,194	....	49	41,966	....	504½	45,567	......	602½	42,445	....	
Motor bearings	18	213,571	....	10	411,268	....	492	93,449	......	253	128,363	....	
Journal bearings, 9-lb. ea. avge.	49	97,734	....	40	125,542	....	572	99,227	......	583	106,966	....	
Lubrication	....	....	.2529	....	....	.4833	....	....	.3142	....	....	.2641	
Trolley wheels 4 in. copper	76	7,707	....	124	5,778	....	1,403	5,103	......	1,776	5,067	....	

Car Changes	Month of December				Year to Date			
	1921		1920		1921		1920	
	Number	Car-Miles Per Change	Number	Car-Miles Per Change	Number	Car-Miles Per Change	Number	Car-Miles Per Change
Chargeable to car house	35	18,441	72	9,894	555	14,089	907	9,612
Not chargeable to car house	26	24,826	21	33,921	160	48,936	220	40,720
Total cars changed off line	61	10,581	93	7,660	715	10,937	1,127	7,736

Pay Roll, Total Force	Month of December		Year to Date	
	1921	1920	1921	1920
Total number men on roll	105	133	109	122
Average rate per hour	.4746	.5342	.4939	.4875
Total amount of pay roll	$12,857..30	$17,915.35	$165,683.05	$189,073.25

Maintenance of Cars and Equipment—Cost (Accts. 29B-32-35-36-38-39-66)	Month of December				Year to Date				
	1921		1920		1921		1920		
	Amount	Per M.C.M.	Amount	Per M.C.M.	Amount	Per M.C.M.	Amount	Per M.C.M.	
Superintendence, Atc. 29B	$520.00	.83	520.00	.75	6,265.00	.83	6,031.60	.69	
Passenger cars, Atc. 32	9,050.49	14.45	13,311.42	19.23	122,364.60	16.12	117,893.70	13.53	
Service cars, Atc. 35	390.74	.62	88.16	.13	2,868.34	.38	781.24	.09	
Electric equipment, Atc. 36	3,372.54	5.38	5,283.02	7.63	53,603.49	7.06	53,518.65	6.14	
Shop tools and mach., Atc. 38	35.51	.06	79.00	.11	1,020.33	.13	885.80	.10	
Shop expense, Atc. 39	583.76	.93	1,518.69	2.19	8,753.74	1.15	10,894.41	1.25	
Total	13,953.04	22.27	20,800.29	30.04	194,875.50	25.67	190,005.40	21.80	
Memphis & Lake View Railway	381.80	20.00	402.48	20.00	4,576.78	20.00	4,797.16	20.00	
Total	14,334.84	22.20	21,202.77	29.76	199,452.28	25.57	194,802.56	21.75	
Bldg. & structures, Atc. 25B	152.04	.24	309.12	.45	2,122.41	.28	2,139.62	.24	
Car house employees, Atc. 66	4,938.85	7.89	5,981.25	8.64	60,634.38	7.99	63,249.38	7.26	
Total	5,090.89	8.13	6,290.37	9.09	62,756.79	8.27	65,389.00	7.50	
R. & R. expenditures	11,617.66		15,913.08		186,463.68		178,287.39		Mechl. dept. only
R. & R. reserve	7,841.66		3,263.00		45,634.35		51,950.50		All departments
R. & R. total bal. reserve	....		....		234,049.54		179,920.06		All departments
Apportionment for maintenance and R. & R. reserve	....		....		....		....		....

Why Use Base Plates With Welded Rail Joints?

Base Plates Are Not Needed If a Correct Design of Joint Plate Is Worked Out—Additional Weight of Metal and Increased Amount of Welding Do Not Economically Solve the Problem

BY HOWARD H. GEORGE
Engineer Maintenance of Way, Public Service Railway,
Newark, N. J.

THE use of base plates with certain types of welded rail joints has recently been adopted by two of the large street railway companies in this country and increasing interest seems to be displayed among electric railway way engineers in their employment for this purpose, especially with those joints of the arc welded type where the base plate is also seam welded to the rail base.

While it is undoubtedly true that a base plate does strengthen the joint, it would seem as though its use, particularly with welded joints, is only dodging the real issue; that it is only a makeshift to overcome the mechanical defects in the splice bars themselves or to bolster up weakness due to defective welding, and that the proper thing to do is to work out a correct design for the joint plates which will eliminate the necessity for base plates. And at this time it might be well to emphasize the fact that it is not the writer's intention to argue the relative merits of the various types of base plates or welding processes now on the market, but rather, as an interested member of the American Committee on Welded Rail Joints, to bring out what he considers to be the salient features involved and to invite as complete a discussion as possible and thus develop all the facts in the matter. If the welding bars are properly designed, there should be no need for base plates. If they are not properly designed, then the present designs should be modified to suit the conditions which must be met. The use of base plates, however, would seem to indicate that something is wrong either with the welding bar design or with the welding process or with its method of application.

In discussing the theoretical side of this problem, an engineer recently said that to secure ideal conditions the moment of inertia of the rail section, as it passes through the joint, should remain constant. This, if possible to accomplish, would certainly provide a theoretically perfect joint, and is exactly what joint plates of the 100 per cent Duquesne, Bonzano and similar types were designed to approximate, the moment of inertia of the two bars at the center of the joint being approximately equal to that of the unbroken rail section. Such a construction is of especial importance in open track with bolted joints, particularly on steam roads where both the wheel loads and the speed are greatly in excess of those usually encountered on electric railways, and where the elastic nature of the roadbed permits relatively free wave action throughout the entire track under wheel loading. In such circumstances, it is essential that the stiffness of the rail at the joints should approximate very closely that of the unbroken rail.

Unfortunately, in no welded joint so far devised can the moment of inertia of all sections throughout its length be constant or equal to that of the unbroken rail, because the moment of inertia of the two bars must be added to that of the rail itself from the rail ends to the outer ends of the joint plates. This makes the rail much stiffer between these points, and the use of a base plate welded to the rail base serves further to increase this moment of inertia. In one case recently called to my attention where base plates welded to the rail base had been used sections of the rail base broke off when the joints were being spiked to the ties. Subsequent investigation showed that the base plates were decidedly concave toward the rail base, and that in the welding process this had apparently caused stresses to be transferred to the rail base, sufficient to cause breakage when the joint was spiked to the ties.

The nearest approach to the ideal condition is probably the butt weld, with the Thermit weld next in line. In the case of bolted joints, although the bolts are drawn up as tightly as possible, there is nevertheless always a slight movement between the fishing surfaces of the rail and splice bars. This tends to permit the rail to act somewhat independently of the bars as far as the wave motion is concerned, so that if the two bars have a combined moment of inertia at the center equal to that of the unbroken rail, ideal conditions have been approximated as closely as possible.

CONDITIONS DIFFERENT IN CLOSED TRACK

However, the theory which controls in the case of steam road practice is not so applicable to street railway conditions. This is particularly the case in city paved track, where the roadbed elasticity is either greatly restricted or may be entirely eliminated, in the case of track constructed with a relatively heavy rail on steel ties embedded in a solid concrete base. Thus, an engineer of a large Eastern street railway, whose track is being constructed with a 141-lb. 9-in. grooved girder rail on wood ties laid on natural ballast, said that with this construction he considered there was practically no wave motion in the rail while it was under car loading.

Ties in track in paved streets are usually spaced not over 2-ft. centers. For this span, the moment of inertia in the rails or splice bars usually used is far in excess of that actually required and the extreme fiber stress in bending actually experienced will not approach anywhere near the elastic limit of the material. Actually a rail section with a moment of inertia considerably less than that usually used would satisfactorily meet bending conditions, particularly where the joint plates are welded to the rail and are therefore in a position to develop their maximum resistance to bending. Inequalities in rail and splice bar sections, burred rail ends, etc., are not considered in this discussion as affecting in any way the stresses in the joint by reason of hammer blows which they would cause, as it is assumed that good practice requires the careful grinding of rail heads and the closure of the space between the rail ends for all welded joints and that in every case this will be done as well as practical considerations will permit.

In the case of standard T-rail sections, there is really not as much difference between the moment of inertia of rails and the standard sections of splice bars which are ordinarily furnished as one might imagine from merely a casual consideration of the subject. To be definite, the "Carnegie Steel Handbook" gives the moment of inertia of an 80-lb. A.S.C.E. rail section as 26.38, while that for two standard splice bars is 23, a difference of only 3.38. In the case of an 80-lb. A.R.A. type-A rail, the moment of inertia is 28.80, while that for two standard splice bars is 26.86, a difference of only 1.94. It should be a simple matter so to design the splice bars at the center as entirely to eliminate this difference, should this prove to be necessary or the desirable thing to do. In the case of the butt-weld joint, although the difference is undoubtedly not very large, an analysis will show that it does exist because of the enlarged section due to the squeezing out of the hot metal when the rail ends are pulled together by the hydraulic press. With the girder rail sections, however, the difference between the moments of inertia of the unbroken rail and its standard splice bars is considerably greater. In the case of L.S. 101-486, a 7-in. curved head tram, for example, the moment of inertia of the rail is 63.21, while that of a pair of standard splice bars is only about 24. The moment of inertia of the A.E.R.E.A. standard 7-in. grooved girder rail section L.S. 122-467 is 77.46, while that of the splice bars is only about 26.3. But, as explained above, conditions in paved street railway track construction do not require that the two should have equal moment of inertia to the same extent as in steam road practice.

Users of joint base plates certainly show a lack of confidence in either the strength of the bars or that of the seam welds. A better solution of the problem would seem to be to design the splice bars so that they would have whatever additional strength the situation requires and at the same time arrange the portion where the welds are to be made to facilitate to the greatest extent the process of welding. This will never be satisfactorily accomplished by office or laboratory studies alone. It is going to require considerable experimentation with different types and the knowledge of the men in the field that has been gained as the result of many unsatisfactory experiences.

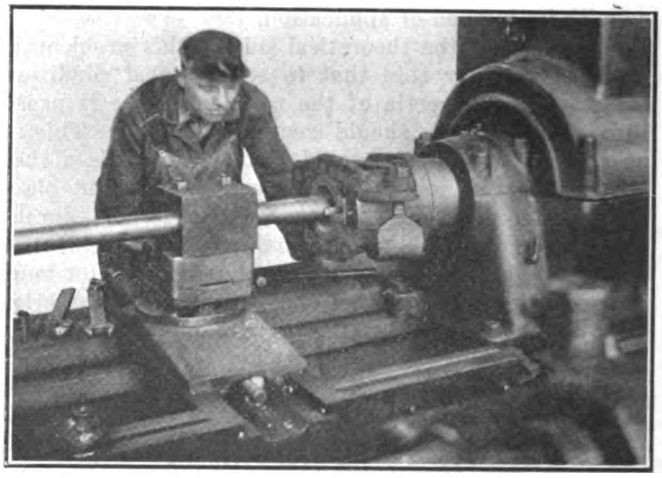
EXPERIENCE OF PUBLIC SERVICE RAILWAY

The Public Service Railway has welded approximately 130,000 joints on both old and new rail, covering a great many different sections in both open and closed track, with the Lorain bar weld process, and in not a single instance has a base plate been used or considered necessary, although several radical changes in the design of the welding bars had to be made since 1907 when the use of this type of joint was begun by the company. During the past few years we have also welded about 15,000 joints with the arc-weld process and the same statement applies to these joints, except that no material change has ever been made in the joint plate design from the usual typical standard bolted type.

To the best of my knowledge and belief it is an extremely rare occurrence to find a welded joint failure due to breakage of the bars at the rail ends or any other part of the bars. Almost without exception such failures as occur have been due either to pulling apart of the bar from the web of the rail at the point of weld, generally caused by failure to accomplish a proper weld, or, as is by far more frequent, by breakage of the rail itself just outside the outer weld, yet the total annual percentage of breaks is not excessive, considering all the circumstances of the rail welded. These results indicate very strongly that for ordinary street railway conditions (the track described being entirely of the ballasted type with wood ties laid on 2-ft. centers) the splice bars or weld bars commonly furnished for track joints have sufficient strength to meet any loading conditions ordinarily imposed on them.

It would therefore seem to be the logical conclusion that not only are joint base plates unnecessary, but they constitute an economic waste, both in total weight of metal in the joint and in the amount of welding required. Certainly, if the splice bars can be properly designed for welded joint work, and there is no reason to believe otherwise, it should result in a much more economical joint. A base plate will probably add about $2 to the cost of a welded joint, including the cost of the plate and the extra labor and welding involved, and it is very unlikely that the additional cost of a correctly designed welding bar would be anything like this amount more than the cost of the welding plates now being used. In open track the problem of rail joint breakage with the bolted type of joint has been very largely solved by the design of splice bars with depending flanges through the center section where the bending stresses are greatest, and it may be that a modification of splice bars of this general type to meet welding requirements and the introduction of this feature in the design of splice bars for girder rails will prove to be the solution of the problem. With the design of the plates properly worked out from the standpoint of mechanical strength as a beam, it should not be a difficult matter satisfactorily to complete the details of design from the standpoint of welding requirements, both as to the required length and cross-sectional area of the weld metal necessary to hold the plates in position indefinitely and, at the same time, provide the necessary electrical conductivity.

Convenient Jig for Boring Axle Brasses



JIG FOR BORING AXLE BRASSES

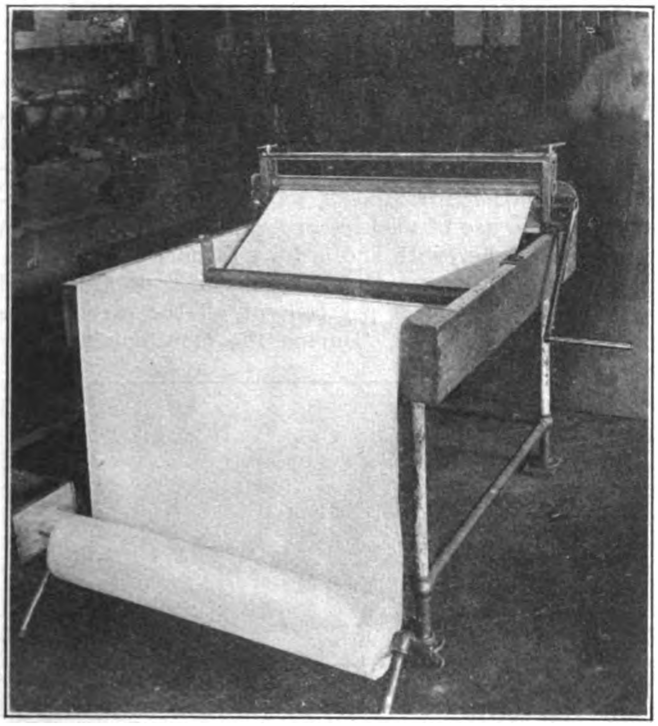
THE accompanying illustration shows a method of boring axle bearings as used by the Northern Ohio Traction & Light Company, Akron, Ohio. A special jig arranged to fit the headstock of the lathe is used. It has two clamping parts which clamp around the axle brass and hold it in position so that it can be readily bored out.

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Convenient Machine for Oiling Canvas

THE New York State Railways uses canvas pads between the field coils and the frame of railway motors in order to insure that the fields are kept tight. These canvas pads are oiled with linseed oil to insure their durability and to keep out moisture. The accompanying illustration shows a machine designed and built by F. W. Seeney, superintendent of shops for the railway company in Rochester. It consists of a wooden box with zinc lining, 42 in. x 48 in. x 7 in. deep, through which the canvas is fed by means of rollers. A roller in the center of the box under which the canvas passes forces this into the linseed oil, while two steel rollers at the end act as a wringer, thus removing the excess oil and at the same time pulling the canvas through so that it is readily rolled up. The box in which the oil is placed is supported by a 1-in. iron pipe framework. The two rollers which serve as a wringer are operated by means of a lever on the outside end, while the two inside ends of the rollers are connected by herringbone pinions. These are some which were removed from old compressors. The rollers are kept in contact by means of two springs and the pressure can be adjusted as required. Canvas 36 in. wide is used. This is removed from a roll which is placed in position on two pipe supports which rest on the floor. After the canvas has passed through the linseed oil it is put in a drying kiln for from ten to twelve hours, when it is then ready to be cut into pads.



MACHINE FOR OILING CANVAS

Cars for Boston Tunnel Operation

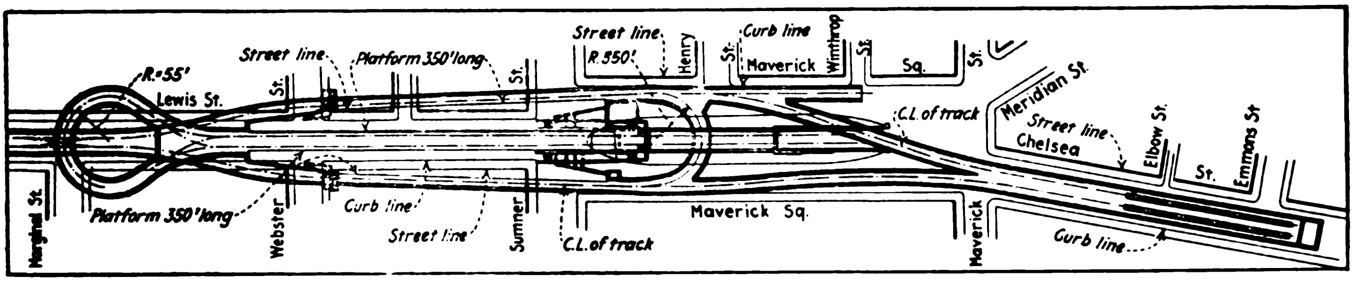
THE Transit Department of the city of Boston has made substantial progress in the construction of an underground terminal and loop at Maverick Square, at which point surface cars from East Boston and Chelsea will transfer passengers to the trains which will run from this terminal to Bowdoin Square. The Boston Elevated Railway will provide steel trains for this operation of a type similar to those now used in its elevated service. A comparison of the new cars with existing elevated rolling stock shows:

COMPARISON OF ELEVATED AND BOSTON TUNNEL CARS

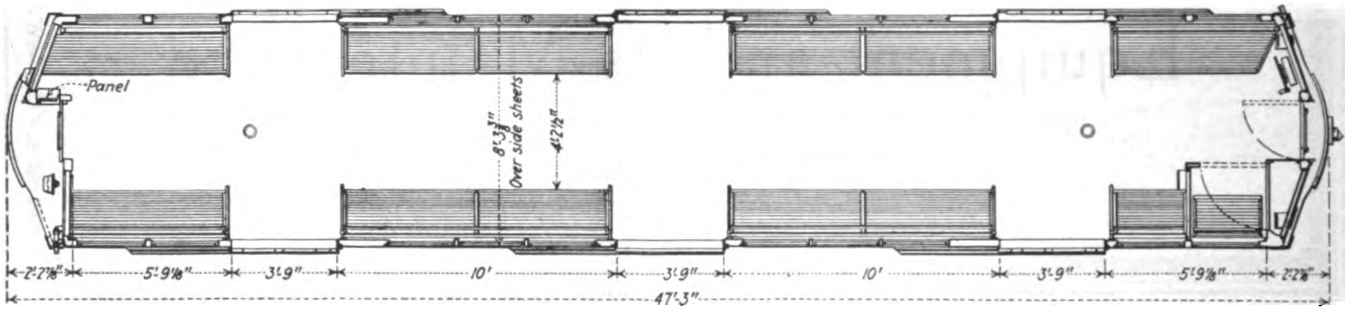
	No. 8 Elevated	East Boston Tunnel
Length over-all	46 ft. 7¼ in.	47 ft. 3 in.
Width over-all	8 ft. 9$\frac{7}{16}$ in.	8 ft. 7 in.
Number of seated passengers	44	44
Weight of car light	69,450 lb.	44,000 lb.
Weight, pounds per seated passenger	1578.4 lb.	1000 lb.

The new cars will be provided with three door openings on each side and will have longitudinal seats. As the cars will be operated in trains of two, four or six units, the cars will be permanently connected and will be separated only for repairs. With this method of operation, there will be a motorman's cab in one end of each car only, the cab ends forming the ends of the two-car unit.

On the present rapid transit cars the doors now are actuated by compressed air, which allows for the possibility of leakage of air at the various joints in the piping as well as at the door operators. On the new cars the doors will be operated by small motors with direct control connections to the operator. With this arrangement any air leakage or frozen pipes in cold weather will be obviated. The doors will be controlled



PLAN OF BOSTON TUNNEL EXTENSION



Floor Plan of New Cars

from the center of the two-car unit in a similar manner to the arrangement of the present cars.

The lighting of these cars will be provided by five 94-watt lamps with white opal reflectors as compared with the present arrangement of small lamps.

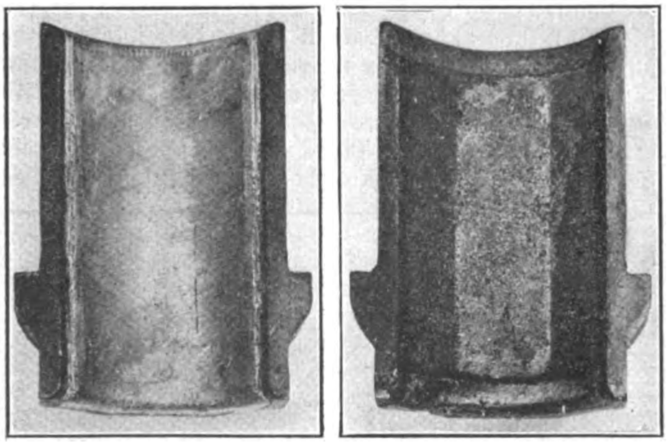
A new feature will be the "variable load brake," arranged so that the braking effort is increased as the passenger load is increased in an effort to obtain the maximum efficiency of the brakes at all times.

The East Boston Tunnel was originally constructed for surface cars and opened to the public on Dec. 30, 1904, as far as Scollay Square at a cost of $3,595,000. Its later extension to Bowdoin Square was opened to the public on March 18, 1916. The extension cost $2,389,000, making the total cost of the tunnel as it now exists $5,985,000, and up to the present it has been operated with surface cars in two and three-car train units.

The total traffic passing through the tunnel in both directions daily is 80,000, and under existing methods of operation it is impossible to provide adequate service. It is estimated that the construction of the terminal and changes in the tunnel itself will cost $2,750,000, and will make possible the operation of four-car trains and ultimately trains of greater length. This will permit third-rail operation with automatic safety stops, and in connection with this change the Boston Elevated has designed and contracted for forty steel cars for this service.

Anchoring Bearing Linings

THE accompanying illustration shows a type of journal bearing developed by J. E. Hester, master mechanic of the Union Traction Company, Anderson, Ind., to provide for anchoring the bearing lining and to eliminate the necessity for machine work and tinning. The portion of the bearing which is to receive the lining has beveled flanges at either end and at the sides, so that when the lining is poured into place it cannot get out of position. The bearing was designed primarily for use with lining metals, such as "Frary" or "Promet" metal, that have no tin content and that cannot be sweated to brass or bronze, but the scheme will work satisfactorily with any kind of lining metal.

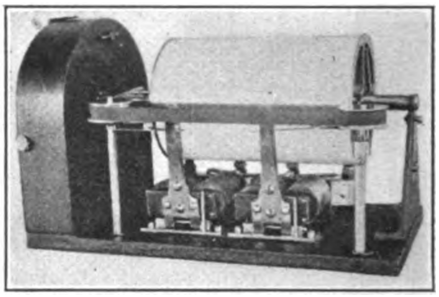


Journal Bearing Before and After Lining Has Been Installed

Headway Recorders Assist in Checking Schedules

THE USE of automatic headway recorders for checking schedules in Baltimore was referred to in a letter from Carl P. Nachod, published in the *Electric Railway Journal* for June 3, page 901. A further example of the use of such recorders for keeping cars on time is given herewith and is for a Middle West city.

Results for the month of April, 1922, on this road show that less than 1 per cent of all the cars in the city were off schedule. During the month there were 34,610 total scheduled car passes, of which 34,076 were checked by the recorder instruments. Of these 157 cars were two minutes or more early; 167 cars were five or more minutes late. This makes the total number of cars off schedule as 324 or 0.95 per cent. The 157 cars ahead of time totaled 315 car-minutes early and the 167 cars late totaled 960 car-minutes late.



Headway Recorder Removed from Weatherproof Box

Delays caused by general traffic conditions occurred on eighty-four cars which totaled 474 car-minutes. These were made up of delays due to heavy travel on thirty cars, totaling 173 car-minutes; delays due to weather conditions for one car, with 8 car-minutes; accident delays on five cars totaling 31 car-minutes, and delays due to cars being off schedule for forty-eight cars totaling 262 car-minutes. Forty-three cars were off schedule due to operating failures, totaling 248 car-minutes. These operating failures were divided into various causes, as follows: Track, nine cars, 50 car-minutes; power, four cars, 29 car-minutes; rolling stock, fifteen cars, 84 car-minutes, and transportation, fifteen cars, 85 car-minutes.

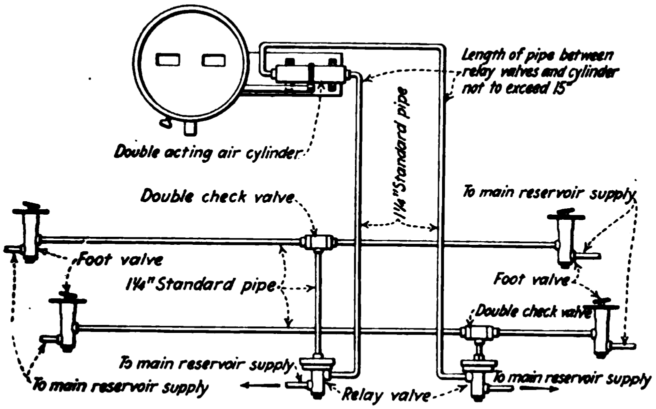
The delays due to foreign causes involved twenty-nine cars with a total of 167 car-minutes. Of these three cars or 24 car-minutes were due to vehicles on the track; five cars or 29 car-minutes were due to bridges; twenty-one cars or 114 car-minutes were due to steam railroads; and eleven cars, totaling 71 car-minutes, were late from a previous trip.

The total recorder hours for the month of April was 2,880, fifty-eight of which were lost. Of those lost twenty-four were due to the stoppage of the recorder clock, thirty hours were lost due to the operator forgetting to wind the clock, and there was a period of four hours in which the cars were off schedule and where no records were made. These fifty-eight hours amount to 2 per cent of the total recorder hours for the month.

What's New from the Manufacturers

Pneumatic Register Ringing Device

PNEUMATIC operation for overhead registers has been developed by the Pneumatic Register Ringing Device Company, St. Louis, Mo. This device is intended to simplify register ringing and eliminate the usual rods, brackets, and ropes extending throughout the car. To operate the register a double-acting air cylinder is mounted alongside and this is piped through a relay valve, which in turn is connected to foot valves for operation. The equipment is arranged to control either single or double-acting registers. The accompanying diagram of piping is for a double-end car with double-acting register.

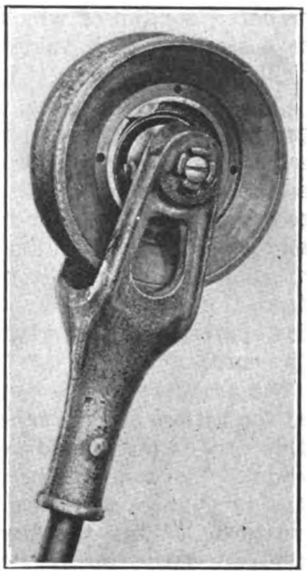


PIPING DIAGRAM FOR PNEUMATIC OPERATION OF DOUBLE-ACTING REGISTER ON DOUBLE-END CAR

Sliding Type Trolley Wheel

A TYPE of trolley wheel which has a sliding resilient motion when traveling in the forward direction, but which can rotate freely in the reverse direction has been designed and patented by Joseph L. Gutweiler and Frederick W. Kublin of St. Louis, Mo. A test of this type of wheel, mounted on a large freight locomotive, was made on the Decatur division of the Illinois Traction System.

The construction of the wheel is shown in the accompanying illustration. It consists of a steel outer rim which has a groove of the usual shape to receive the trolley wire. A split friction ring is fitted to the inside of this outside portion and a heavy flat coiled spring is connected between this friction ring and a clutch which is connected to the hub and shaft through a pawl. This construction gives the wheel a resilient motion under ordinary conditions when the car is traveling forward. The coiled spring holds the wheel so that sufficient tension is provided to give considerable friction between the friction ring and the outer portion of the wheel. However, should the wheel be subjected to a blow or excessive pressure, it can rotate in the forward direction. Thus when traveling forward around sharp curves the friction will sometimes be sufficient to cause the wheel to rotate. The same condition prevails under bridges, and at other locations where there is high pressure between the wheel and the wire. This occasional rotation in the forward direction is an advantage in providing a new spot for the sliding contact, so that the entire surface of the groove is used at frequent intervals.



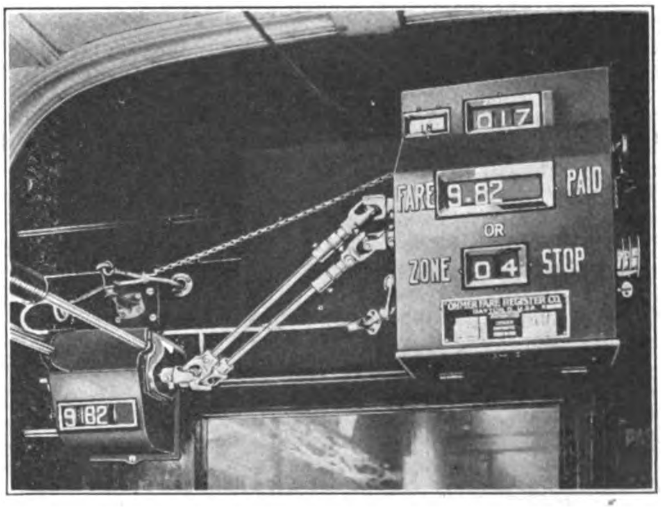
NEW TYPE SLIDING TROLLEY WHEEL

While the wheel is normally a sliding contact type when traveling in the forward direction, the hub and pawl construction permits free rotation of the wheel when the car is being backed up and thus prevents any liability to dewirement. The size and construction of the wheel are such that standard trolley harps can be used.

New Fare Register

THE Ohmer Fare Register Company has placed on the market its new No. 62 detail fare printing interurban register. The new register is designed for use where a very large variety of cash fare values are handled as well as the usual paper fares, and where a detailed printed record of each fare is desired with the origin of the fare indicated and the registrations in each zone shown.

The register has a capacity for handling any cash fare from 1 cent up to $9.99. It also handles the various non-cash denominations such as tickets, pass, commuter, round-trip, half-fare, coupon, mileage, school,

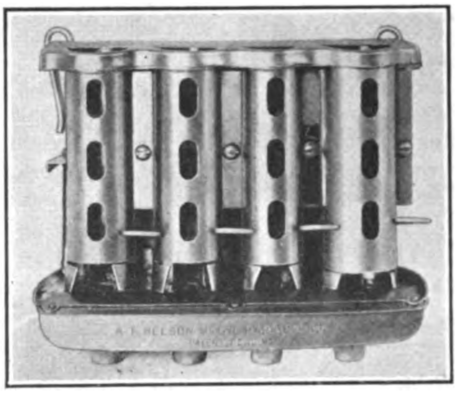


NEW REGISTER GIVES DETAIL RECORD OF EACH FARE transfer, etc., all of which may be registered according to designated cash values as well as under their particular denominations if it is so desired.

The amount and the classification of each fare is printed in the record, together with its consecutive number and the number of the zone in which it was collected. The register is operated in a manner similar to other types of Ohmer registers by means of two rods and a cord. The auxiliary indicators which are placed at each end of each compartment differ considerably from the dial indicators used in other types of Ohmer installations. The registration is completed by pulling the cord.

An auxiliary cord is connected with the zone indicator at the bottom of the register. As a new zone is entered this cord is pulled and the zone indicator advances one count. The zone number is printed on the record with the amount of the fare. The zone indicator counts up to 99. When the direction indicator is changed at the end of the line and the trip count set back to zero, the zone count reverses automatically. Improvements provide against the register getting out of order and for convenience in operation.

New Features in Change Carrier



IMPROVED CHANGE CARRIER

THE Cleveland (Ohio) Fare Box Company is distributing an improved type of Nelson change carrier. The size, weight and number of parts have been reduced from the type previously sold. To avoid breaking special attention has been given to the springs used. The change carriers are made with four tubes, but the end frame is so designed that an extra tube for pennies or tokens can be added if desired. A positive safety lock is provided on the ejector adjustment. Other details were published in *Electric Railway Journal* for Sept. 17, 1921, page 448. The tubes are 4 in. long.

National Personnel Association Formed

TO STUDY the human factor in American business and industrial life, to solve the problems which confront the management of the nation's industrial enterprises, and to bring about a better understanding of the labor question, leaders of organized engineering, representatives of large industries, insurance companies, railroads and publishers, and members of university faculties have organized the National Personnel Association.

The announced purpose of the movement is "to advance the understanding of the principles, policies and methods of creating and maintaining satisfactory human relations within commerce and industry." The new organization takes over the activities of the National Association of Corporation Training and the Industrial Relations Association of America. It will aim to aid business executives in solving problems of personnel administration. Co-operative research will be conducted on a nation-wide scale, and close relations will be established with colleges and universities in carrying out an extensive educational program.

W. W. Kincaid of Niagara Falls, head of the Spirella Company, has been named president of the new organization. Earl B. Morgan, the Curtis Publishing Company, Philadelphia, is vice-president, and Montague A. Clark, E. I. du Pont de Nemours & Company, Arlington, N. J., is treasurer. W. J. Donald, 20 Vesey Street, New York City, is the managing director and secretary.

An executive committee and a board of directors, representative of many of the country's biggest institutions, have been chosen. Members of the executive committee, whose election has just been announced, include: Sam A. Lewisohn, Miami Copper Company, New York; John McLeod, Carnegie Steel Company, Pittsburgh; J. M. Larkin, Bethlehem Steel Company, Bethlehem; C. S. Ching, United States Rubber Company, New York; Ben A. Franklin, Strathmore Paper Company, Mittineague Falls, Mass.; W. H. Winans, Union Carbide and Carbon Corporation, New York; J. W. Dietz, Western Electric Company, New York; Harvey G. Ellers, Armour & Company, Chicago; Francis Farwell, Worthington Pump & Machinery Corporation, New York; Milton D. Gehris, John B. Stetson Company, Philadelphia; Harry A. Hopf, H. A. Hopf & Company, New York; George F. Quimby, Associated Industries of Massachusetts, Boston; S. R. Rectanus, American Rolling Mill Company, Middletown, Ohio; and Arthur H. Young, International Harvester Company, Chicago.

The board of directors includes a long list of prominent men, among whom are: L. P. Alford, New York, vice-president American Society of Mechanical Engineers and a member of the executive board of the American Engineering Council; L. W. Wallace, executive secretary Federated American Engineering Societies, Washington, D. C.; Alvin E. Dodd, United States Chamber of Commerce, Washington; E. S. McClelland, Westinghouse Electric & Manufacturing Company, East Pittsburgh; Miss M. T. Reuse, American Telephone & Telegraph Company, New York; F. W. Thomas, Atchison, Topeka & Santa Fé Railroad, Topeka; Kendall Weisiger, Southern Bell Telephone Company, Atlanta.

Sixteen committees, which during 1922 will make reports on national economic and industrial problems, have been selected. The sponsors of the movement, it was said, feel that the work of the association is certain to have a beneficial effect on industry and commerce generally.

American Association News

Procedure for Obtaining Coal

THE American Electric Railway Association has sent to all member companies information as to the suggested procedure for obtaining essential fuel supplies.

In general there will be two main classes of conditions which may confront electric railways. They may have a contract with a coal company which has mines in operation, or they may have no contract, or the contract may be with a company which is not producing coal. In either case, as a utility, the railway automatically belongs in priority Class No. 2, under Interstate Commerce Commission Order No. 23.

If the railway has a contract with a company now producing coal it should communicate at once with the coal contractor and call attention to the fact that the railway as a utility belongs in priority Class No. 2; ask him to see to it that all bills of lading for coal consigned clearly indicate that the coal is for a public utility and is furnished under priority Class No. 2 and request that he take vigorous steps to have his full share of cars allotted to him for handling the coal.

Then, if the coal company is unable to get adequate car allotment, or if the coal is seriously delayed by car congestion, or other railroad troubles, or if the coal is confiscated, advise J. P. Jackson, national representative of the joint fuel committee of the Utilities Associations, 949 Munsey Building, Washington, D. C., giving full information, including a copy of all important correspondence and papers in the case.

A railway with no contract or one with a company not producing coal, should buy coal at "Hoover price," if possible, and proceed as above.

If the condition becomes desperate, whether the railway has a contract or not, it should apply to the state fuel authorities for approval of a Class 1 priority application. Form No. 50 should be filled out, together with affidavit and guarantee of payment. In addition, the Washington representative, Mr. Jackson, should be notified, giving full particulars. Class 1 priority will be granted only in cases of very great emergency where shutdown would be serious to the public welfare.

The Federal fuel distributor, Mr. Spencer, specifically requests that utilities avoid bidding against each other for coal and thus raise the price. Co-operation with the authorities both on matters of supply and price is essential. It should be appreciated, however, that the obligation of railway franchises and to the public require the uninterrupted operation of these public services and every company will spare no effort to insure continuity of service.

T. & T. Executive Committee

ON JULY 29 a meeting of the executive committee of the Transportation & Traffic Association was held at the Secor Hotel, Toledo. Those in attendance were L. H. Palmer, president; G. T. Seeley, first vice-president; and T. C. Cherry, J. H. Hanna, C. E. Morgan, W. H. Boyce, H. B. Flowers, E. M. Walker, and James W. Welsh, executive secretary. The meeting was called primarily to review reports and prepare for the Chicago convention.

The first matter taken up was the suggestion of Past-President Stevens at the last convention that the number of vice-presidents be changed and that the work of the association be begun each year more promptly after the close of the convention. The decision was reached not to recommend any change in the constitution with regard to the vice-presidents, but to adopt the second recommendation of Mr. Stevens. During the coming year committees will be instructed to hold their first meeting not later than Dec. 1.

The secretary reported that he had included in his Aug. 1 service letter an inquiry on the present use of the classification of freight accounting.

The reports on merchandising transportation and traffic regulations were then presented and approved. An abstract was also presented of the forthcoming report of the committee on safety. It was referred to L. S. Storrs, publication committee, for final approval. C. E. Morgan outlined the report of his committee on one-man car operation, which is to come up for final approval at the next meeting of the executive committee of the American Association, to be held on Aug. 25.

It was decided not to make any additions to the interurban rule book. The secretary was instructed to compile a list of the special requirements on safety devices adopted by the various public utility commissions.

Plans to stimulate discussion at the various sessions were then discussed. It is expected that there will be a discussion of the weekly pass during the report of the committee on merchandising transportation, and of turnstile cars and light-weight interurban cars at the meeting at which one-man car operation will be considered. President Palmer explained that at the meeting at which the report on traffic regulations and safety work will be considered, the Claims Association will be asked to participate in the discussion.

It was decided not to make a general distribution of advance copies of the reports this year, but the reports will be printed and copies will be sent to those who expect to make a formal discussion of them or who make special requests for such reports. Printed copies of the reports will also be available at the meetings.

Executive Committee of the Engineering Association

A BRIEF NOTE was printed in last week's issue of this paper about the meeting of the executive committee of the Engineering Association in New York on Aug. 9. It was an all-day session, as this is the final meeting of the whole committee before the time of the October convention, and much business was transacted.

Resolutions were passed on the death of A. B. Stitzer, vice-president of the association. They will be engrossed and signed by each member of the committee and then will be forwarded to the family of Mr. Stitzer.

Secretary Welsh and G. C. Hecker, special engineer, were asked to investigate and report on some method by which headquarters can be advised of legislation passed in any state regarding engineering specifications. E. M. T. Ryder, at the request of Mr. Cram, outlined the work of the welded rail-joint committee of the American Bureau of Welding, and explained how his subcommittee had co-operated with that committee. He also urged the authorization of an appropriation of $20,000 from the American Association to finance the proposed test on rail joints recommended by the way committee. At the request of Mr. Kimball, Messrs. Cram and Ryder will prepare a budget of the expenses and a statement of the reasons for engaging in the test, and the matter will be presented to the executive committee of the American Association at its next meeting. A request from H. H. George to have certain German pamphlets on wood preservation translated was considered. This request was indorsed by Mr. Cram, who explained that these pamphlets described the use as a preservative of sodium fluoride, with which there had been very little research work in this country, and the results in Germany indicate that this material has great possibilities as a wood preservative. The pamphlets were turned over to Mr. Harte, who will have this work done.

At the suggestion of Mr. Harte, the president was authorized to appoint a special committee to prepare suitable specifications covering air tanks for use on electric railway cars to be offered to the boiler code committee of the American Society of Mechanical Engineers in connection with the specifications which that committee is developing for unfired pressure vessels. The special committee was also asked to request that the boiler code committee include in its specifications pressure tanks used for oil burning and gasoline burning heated torches, and to co-operate as far as possible with the special research committee of the American Bureau of Welding, which is also studying the subject of pressure tanks.

An invitation was then read from the commercial attaché of the Brazilian Embassy to the association to send a representative to the International Congress of Engineers, to be held under the auspices of the Brazilian Government at Rio de Janeiro, Sept. 7 to 30. The committee voted to recommend to the American Association that V. L. Havens, editor *Ingeniería Internacional*, be appointed representative of the association.

It was decided to appoint a special committee to (1) study and make suggestions for the revision of the mechanical form of the *Engineering Manual* and (2) supervise from year to year all specifications adopted and revised and see that the *Manual* is kept up to date, co-operating with the secretary's office, particularly with respect to elimination of errors in specifications. This committee will be made up of three members of the executive committee, with terms of office so arranged that after the first year there will always be at least one member of the committee having had one or more year's experience on the committee.

A set of rules to govern the discussion of papers at the convention was submitted and accepted, and the secretary reported that the chairmen of the different committees had been asked to suggest the names of men to discuss their reports. The report was also read of the committee on reorganization of the methods and practices of the Engineering Association. It evoked a great deal of discussion, but no final action was taken on it. The tentative program for the October convention was approved.

Special reports were also received from F. J. White and C. R. Harte, representatives on the sectional committee of the A.E.S.C. on the standardization of wires and cables, and from F. McVittie, representative on the sectional committee of the A.E.S.C. on lightning protection. The members of the executive committee expressed their appreciation of the work of the representatives of the association in making these special reports.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

All Buffalo Places Filled

Lines There Now Fully Manned—Company Preparing to Start Up in Niagara Falls

Employees of the Philadelphia Rapid Transit Company who have been in Buffalo operating cars for the past month, because of the strike of trainmen on the local and interurban lines of the International Railways, are starting to return home. Their places are being filled by permanent employees recruited in all parts of the country.

New Organization Now Functioning

In this manner the International is building a new organization of trainmen and a new permanent seniority list has been started so that employees on strike who return to work will be re-employed only after they have applied for work as new employees and will thus be required to take their places at the foot of the seniority list. Just now the company has more men than is necessary to give normal service on all local and interurban lines.

Traffic has increased on the West Side and the interurban lines, but practically no passengers are being carried on the East Side lines, which serve sections of the city populated largely with foreign-speaking people.

Despite the decision of the courts that the jitneys are running in defiance of the law, few arrests are being made and many people are using this means of transportation. Jitneys are running without distinguishing signs and fares are collected in the form of donations.

In his decision which followed the appeal of the municipal authorities from the ruling of Justice Pooley that the Mayor should enforce the state law against jitneys which have not secured the necessary permits, Justice Krause of the Appellate Division stays the mandamus order until an appeal can be taken to the Court of Appeals in September. He has ruled, however, that:

Mayor Made Responsible

> The stay is not a license for unlawful jitney service, nor does it lessen the duty of the Mayor to enforce the law. It merely suspends during the pendency of the appeal specific directions contained in the mandamus order, leaving the Mayor unhampered in the discharge of his official duties, which he has sworn faithfully to discharge.

The court also rules that:

> It is unlawful to operate upon the streets of the city a bus line, stage route or motor vehicle line or route, or any vehicle in connection therewith or any vehicles carrying passengers at the rate of fare of 15 cents or less for each passenger, within the limits of the city, or in competition with another common carrier which is required by law to obtain the consent of the local authorities, without the consent of the local authorities and a certificate of convenience and necessity from the Public Service Commission. Unlawful jitney service is a misdemeanor under the provisions of section 29 of the Penal law (People *ex rel.* Weatherwax *vs.* Watt, 115 Misc. 120; 197 A. D. 929).

At a meeting of the general executive board of the Amalgamated in Detroit, a fund of $15,000 a week was voted for the support of the strikers in Buffalo. It is reported that no strike benefits have been paid although the strike is now in its eighth week.

Owl car service has been restored on several of the local lines of the International, making complete the restoration of local service. Early in the week it was proposed to start local service on the lines of the International in the city of Niagara Falls. Service already is being given on the Park & River division and across the upper steel arch bridge over the Niagara gorge. Local service has not been started in the city of Lockport. Cars are being operated over the Olcott-Lockport division and fruit trains hauled by electric locomotives are being handled over this division.

Judge Harlan N. Crosby, sitting in equity term of the Supreme Court of Erie County on Aug. 16, granted the company's request for a blanket injunction against the Buffalo Jitney Owners' Association and its 200 members restraining them from operating jitney and bus lines within the city. The injunction is non-returnable so that jitney drivers who are arrested by city police or detectives of the International will be brought directly into the Supreme Court and committed to jail for contempt. Passengers riding in jitneys when arrests are made will be taken to police headquarters where they will be required to make signed statements. President Tulley of the railway believes the blanket injunction will put an end to the unfair jitney competition.

Arbiters Decide on Cut of Five Cents

According to a decision of the arbitration board employees of the Memphis (Tenn.) Street Railway must accept a decrease of 5 cents an hour instead of receiving an increase of 7 cents which the men had sought. The reduction is retroactive to Aug. 1.

According to the findings of the board, first year men will receive 38 cents an hour; second year men 43 cents an hour and third year men 48 cents an hour. The wage contract which expired on July 31 called for 43, 48 and 53 cents.

The decision was signed by F. N. Fisher representing the railway and Judge A. B. Pittman, the neutral member. Considerable agitation has been aroused over the decision and a mass meeting of motormen and conductors has been called by union leaders.

Bar Association Condemns Bacharach Bill

At sessions of the American Bar Association held in San Francisco, Aug. 7 to 11, discussion of the Bacharach bill and similar legislation resulted in the adoption of resolutions placing the association definitely on record as opposing that type of legislation. At a meeting of the public utility section of the association on Aug. 8 the following resolution was adopted:

> *Resolved*, That the section on public utility law of the American Bar Association hereby expresses the emphatic opposition of its membership to the Bacharach bill, now pending in Congress (H.R., 10,212), and to any similar legislation designed to limit or destroy, as to any particular class of litigants or rights, the present equitable powers of the federal courts to enforce the guaranties of the Federal Constitution for the protection of persons and property.
>
> *Resolved* further, That the section asks its chairman in his report to the association to present at least in outline the considerations which have been developed in the discussions before the section as demonstrating the extreme unwisdom of any such radical curtailment of the Federal judicial power.
>
> *Resolved* further, That the chairman of this section and the special committee created at to-day's session are authorized in behalf of the section to take such further steps as in their judgment may be advisable to bring about an indorsement by the association of the action of its committee on jurisprudence and law reform in actively opposing the Bacharach bill at the present session of the Congress, and also to support before the association any suitable resolutions which may be offered in condemnation of that or similar legislation.

At a general session of the association on Aug. 10, the committee on jurisprudence and law reform, Henry W. Taft, chairman, presented its report, including as a part of that report the resolution adopted by the public utility section and expressing definite opposition to the Bacharach bill as follows:

> Three hearings have been had upon this bill. At one of these a member of this committee, Mr. Harriman, attended and pointed out the objections to it upon the grounds referred to in the previous reports. The chairman also presented a similar statement. After considering the subject carefully this committee unanimously voted that it disapproved the bill. Information as to this vote has been presented to the judiciary committee of the House, which has had the matter under consideration.

The committee report was unanimously adopted by the association.

Another Utility Sheet Appears

Another property which wants the good will and co-operation idea fostered is the Interstate Public Service Company, Indianapolis, Ind., publishers of a new sheet called *The Interstate News*. The pamphlet will be issued monthly and according to Harry Reid, president of the Interstate Company, its columns will keep the public informed of the railway's doings and its plans for future operation. The première of this paper outlines a plan of the company for the sales contest on the prior lien stock.

Louisville Grant Fails

Steps will be taken at once by the Louisville (Ky.) Railway to protect the company's property in the courts. Announcement to this effect was made by James P. Barnes, president, following the failure of the lower board of the General Council to pass the Mayor's fare ordinance, which came up for consideration during the week ended Aug. 12.

No legal action is contemplated until the fall term of the Federal Court, Mr. Barnes said, but attorneys have been instructed to proceed at once to obtain protection for the company's property.

It was reported that the company would give the General Council a limited time in which to pass the ordinance since it had been voted down by the lower board, as the board of aldermen was known to favor it, but Mr. Barnes stated that such was not the case. A statement by the company says:

> We have met the suggestions of the Mayor and city attorney in an earnest effort to arrive at a compromise that would end the litigation expensive to both sides and at the same time protect the interest of the public and our stockholders.
>
> In that spirit we agreed to accept a rate of return for the company which was less than we believed the investors were entitled to, and less than the courts would give an investor on the review of the evidence.
>
> I have no criticism to make of the acts of any city official, but as there has been a delay of several months, I have, in order to protect the interest of the company, instructed our legal department to proceed as rapidly as possible in the courts to obtain the full measure of protection under the Federal constitution for the company's property.

Interurban Wage Scale Renewed for Another Year

Continuation of the present wags scale for another year after Aug. 15 was provided in an agreement reached on Aug. 10 at Springfield, Ohio, between the Indiana, Columbus & Eastern Traction Company and its trainmen. The agreement affects all platform men employed by the line, as well as those employed on the Columbus, Newark & Zanesville Railway.

With one exception, the working conditions are to be unchanged. The exception, proposed by the men and readily accepted by the company, provides further recognition of seniority rights by permitting those longest in the service of the company to choose temporary runs of thirty days or more instead of regularly scheduled runs, if they so desire.

The wage scale agreement continues the rates which were decided by the arbitration board appointed last March to compromise the differences between the men and the company which existed at that time.

The scale for interurban motormen and conductors is 36 cents an hour for the first three months, 41 cents for the succeeding nine months and 47 cents an hour thereafter. Freight brakemen receive 34 cents an hour.

Conductors and motormen on the city lines operated by the companies at Lima, Newark and Zanesville receive 34, 39 and 44 cents on the same basis. Practically all of the men have been employed by the company for a period of more than a year.

The negotiations were marked by an unusually friendly atmosphere. The men first suggested a maximum of 51 cents an hour, but after Receiver J. H. McClure explained the difficult conditions facing the company the men agreed to continue the present scale for another year.

Normal Conditions Restored

Formal Wage Agreement Now Being Drafted Between Men and Management at Chicago

With the close of the strike and the resumption of service on surface and elevated lines in Chicago on the evening of Aug. 6, the only reminder of the six-day tie-up is a few 5-cent fare buses started by the city administration. At the height of the strike this competitive system was said to have included twenty-one buses. After a week it had dwindled to three vehicles, the rest having been abandoned as being unprofitable. It is said to be the intention of Mayor Thompson to keep these three in the field until November, when he hopes to have the voters approve his plan for investing $3,000,000 of the traction fund in a greater number of vehicles.

For a few days after the close of the strike it is said both companies experienced a small reduction in traffic, due to the fact that some persons were still using the commutation tickets purchased from steam roads. Business was said to be normal by the end of the first week of restored service.

The drafting of a formal contract for the new wage scale had not been concluded between surface car trainmen and the management up to Aug. 15, but no difficulty is expected over this because the only change will be in the new wage rates and the inclusion of a thirty days' cancellation clause to be used in the event that the rate of fare is disturbed by the Illinois Commerce Commission.

The new wage scale will be 65, 68 and 70 cents for the first three months, next nine months and after-one-year periods, respectively. The rate on night cars will be 72 cents. The contract will date from Aug. 7 and continue for one year. Practically all other employees will have their pay reduced on the same basis of 10 cents an hour.

Recreation Club Formed.—The Employees' Recreation Club of the Little Rock Railway & Electric Company, has been formed at Little Rock, Ark., with 131 pledged members. A tract of land near Little Rock has been purchased by officers of the company to be leased to the club. It is planned to erect bath houses, enlarge a bathing pool and to make other improvements to equip the place for swimming, fishing, hunting and other outings.

Indiana Cities to Seek Amendments to Commission Law

An organization of cities of Indiana to oppose increases in utility rates and to bring about legislation, particularly amendments to the public service commission law, was agreed on by mayors and city attorneys of several Indiana cities at a meeting held recently at the invitation of Mayor John C. Quick, Muncie, Ind.

Mayor R. O. Johnson, of Gary, argued that the law should be repealed and rate-making and control of utility corporations should be returned to city councils. Most of the city attorneys present, it was said afterward, opposed repeal of the basic law, but urged the need of amendments designed to open the way to a stronger presentation of the "case of the people" than under the present operation of the law. Cities represented at the meeting were South Bend, Hammond, Gary, Anderson, Newcastle, Elwood, Crawfordsville, Vincennes, Indianapolis, Muncie, Whiting and East Chicago.

It will be recalled that last Spring Mayor Lew Shank of Indianapolis declared that he intended seeing to it that some change was made in the law or the entire commission done away with.

Indiana Association Aroused to Action on Threatened Utility Legislation

A letter urging support of the principle of state regulation of utilities has been sent by the Indiana Public Utility Association to the 50,000 residents of Indiana who own securities of public utilities of the State. Charles L. Henry, president of the association, has issued a statement in the course of which he says in part:

> We are making this appeal for two reasons: We believe that future stability of the industry depends on continued regulation by the State, and we feel that the safety of investments made by Indiana people depends on regulation. Thousands of Indiana men and women have lent money to the utility industry because, under State regulation, they felt sure the industry would be permitted to earn a sufficient return to pay them reasonable interest for their money.

This action indicates that the association is now preparing to prevent radical changes in the utility laws of Indiana threatened to be made at the next session of the General Assembly. Those opposing the Public Service Commission, including Mayor Lew Shank of Indianapolis, and other city officials, are busy with their side of the campaign.

Mayor Lew Shank has already named a special committee which will recommend changes in the public utility law of Indiana. The Mayor never has wholly given up his idea of having the entire law repealed if it can be done, but the committee will meet early in September and will continue in session until some definite recommendations are ready to be submitted with reference to the present law. The state Legislature convenes in January.

New Incorporation in Prospect

After reaching a conclusion that there were too many disadvantages in an electric motor bus line, such as they had considered tentatively as a means of transportation between Fort Mitchell and Erlanger, Ky., citizens of the latter village recently decided to build a traction line instead. It is the intention of those behind the project to build tracks and erect the overhead wires from Mitchell to Erlanger and then lease the tracks to the South Covington & Cincinnati Street Railway, Cincinnati, Ohio, which will extend its Fort Mitchell line to Erlanger.

The 3¼ miles of traction line will be built by the Fort Mitchell, Erlanger & Elsmere Traction Company, which is to be incorporated for $75,000. Paul Hesser, Erlanger, has been elected president of the company. Other officers are: Judge H. F. Childress, vice-president, and Chester C. Davis, secretary and treasurer. These three men with George Rost and Attorney David C. Castleman, Covington, Ky., will constitute the board of directors.

Before selecting the traction line as the better means of transportation, those who are promoting the company said that they obtained assurance from the South Covington & Cincinnati Street Railway that the electric cars operating to Fort Mitchell would be extended to Erlanger, if the tracks were built and leased to the company at a reasonable figure. The proposition has not gone as far as a written agreement, but the citizens interested feel that they are justified in going ahead with the organization of the company.

As the Dixie Highway does not follow a straight line into Erlanger, the tracks will be laid on a private right-of-way. In some places it will be near the highway, but in others as far as a half mile or more away. It is estimated that about 3¼ miles of track will be needed to put in the extension.

Finishing Touches Being Put on New Orleans Ordinances

Paul Maloney, commissioner of the Department of Public Utilities, has introduced three ordinances in the Commission Council of New Orleans which, if adopted, will reduce fares in New Orleans to 7 cents and make the basic gas rate $1.30 per 1,000 cu.ft. from Sept. 10. The New Orleans Public Service Corporation, the successor under the reorganization to the New Orleans Railway & Light Company, will have three months to accept the conditions named in the new ordinances. These ordinances went over for adoption from Aug. 8 until Aug. 15 under the rules.

It is understood—and Commissioner Maloney has so expressed himself—that with the adoption of the ordinances on Aug. 15 the new corporation would go into court on Aug. 17 and take over the various subsidiary organizations controlled by the New Orleans Railway & Light Company. This action will now be delayed, however, on account of developments in connection with the foreclosure sale noted on page 275.

The first of the three ordinances provides that the city shall have a perpetual option on all property of the original company up to $11,048,000 plus or minus an amount equal to the additions to or deductions from the rate base made to the electrical system subsequent to Dec. 31, 1920.

The second ordinance covers the subsidiaries, and includes an option of $25,000,000 worth of property, under the same terms.

The third ordinance gives an indeterminate permit to the New Orleans Gas Company to operate in the city and gives the city an option over all the property.

Praises Advertising Delegation

Ad club members of Pine Bluff, Ark., met recently to show their appreciation of the advertising Pine Bluff received at the convention of the Associated Advertising Clubs at Milwaukee. In the absence of B. W. Benton, president, J. L. Longino, manager of The Pine Bluff Company, presided. He praised the endeavors of the Pine Bluff delegation and announced the purposes of the meeting. The speakers announced that Pine Bluff was ready to take care of any increased population or additional industries which might result from the advertising which the city received.

News Notes

Wages Cut.—A new wage scale affecting the employees of the Stark Electric Railway, Alliance, Ohio, was put into effect on May 1 and will terminate on May 1, 1923. The new schedule is a cut of 5 cents an hour, the maximum pay being 50 cents and the minimum 45 cents for the interurban men with 47 and 42 cents for city men.

No Change Contemplated.—No change in the superintendency of the Seattle Municipal Railway is contemplated by the present city administration, D. W. Henderson continuing as general superintendent of the railways. George F. Russell, new superintendent of public utilities, states that Mr. Henderson's powers are to be concentrated, not diminished.

Franchise Transfer Authorized.—Permission has been granted the Cincinnati, Newport & Covington Railway to assign its franchise to operate within the city of Cincinnati, Ohio, to the South Covington & Cincinnati Street Railway. The ordinance granting the transfer was favorably recommended by the committee on street railroads. The transfer will be made as a refinancing measure.

Service Temporarily Suspended.—As a result of a strike by the power plant employees of the Boston & Maine Railroad at Franklin the Concord (N. H.) Street Railway had to suspend service for a day or two. The railway is dependent on the plant for power. Service was resumed, however, power being supplied from plants at Newport, in Concord and on the Merrimack River at Gavin's Falls.

Agreement Renewed on Engineers' Wages.—The Cincinnati Traction Company and the Stationary Engineers' Union have reached an agreement, whereby the scale now in effect will be continued another year. The engineers took a considerable reduction a year ago following a strike. The stationary firemen and oilers, who had an arbitration award a year ago, are awaiting another decision to be rendered as soon as the State Industrial Commission appoints a neutral chairman.

Paving Ruling Stirs Kokomo.—The case of the petition of the Indianapolis (Ind.) Street Railway before the Public Service Commission which provided that the company should not be made to pave between its tracks in Indianapolis and which was decided in favor of the company may be made a precedent for the entire state of Indiana. Steps now are being taken in Kokomo to get through an ordinance which will specifically specify that the Indiana Railways & Light Company there be compelled to pave between its tracks and that the case be carried to the Supreme Court of the State.

Reports Against Trial Bill.—The Senate committee on corporations of the General Assembly of Louisiana, now in session at Baton Rouge, has unanimously reported adversely the bill recently introduced, at the request of the street car men of New Orleans, to provide trial of all employees of public service corporations before dismissal on charges. The Car Men's Union was represented by James Keenan, its president, and Gus Heintz, member of the executive committee; Receiver J. D. O'Keefe of the New Orleans Railway & Light Company and Abe Goldberg, attorney, appeared for the railways.

New City Plan for Worcester.—Publication in full has been made of the text of the city plan for Worcester, Mass., which has been in preparation since 1915 under the direction of the City Planning Board and a group of New York experts. It is said that through the report the city has discovered that it can save the equivalent of $6,500 a day every day in the year by improving street facilities and traffic methods in a way to make them adequate to the amount of traffic carried. All the usual provisions of city plans are included, such as coordination of street cars, trackless trolleys, motor buses and steam roads; relocation of freight yards and tracks so as not to impede the proper expansion of business or residential districts; amplification of sewage and water supply systems.

Financial and Corporate

Car Trusts Sold

$4,864,359 Represents Amount of Depreciated Value of Equipment Secured by P. R. T.

Dillon, Read & Company, New York, N. Y., offered for subscription an issue of $2,150,000 Philadelphia (Pa.) Rapid Transit Company's 6 per cent equipment trust certificates. They were offered at prices to yield from 5 to 6 per cent, according to maturity, and are due in equal semi-annual instalments from Feb. 15, 1923, to Aug. 15, 1932. The certificates are issued by the trustee against standard street railway equipment, comprising 600 cars, with a present depreciated value appraised by the builders at $4,864,359. The issue was oversubscribed by a large amount.

The offering was significant for several reasons. First, the amount involved was large for an issue of this kind. Second, the interest rates were well within the limits which money loaned for similar purposes has commanded recently, thus reflecting the good credit standing of the company. Third, it is said that this was the first instance in recent years if not in the history of the company that financing has been done by the company through other than the Drexel or allied interests in Philadelphia.

The floating of the certificates is said to have followed directly a conference between members of the United States Shipping Board and Thomas E. Mitten, president of the company, in Washington. The greater part of the funds from the trust certificates will be used to purchase 100 large yellow Hog Island cars (out of a total of 210), power equipment, track and other facilities, from the Government. The Philadelphia Rapid Transit Company has had the cars and equipment under lease from the Government since their construction in 1918.

According to the company statement, "Series F" will cover 500 near-side or center-exit cars and all or part of the 210 Government cars furnished during the war. All of the 710 cars are now in operation on the lines of the P. R. T.

Five hundred thousand dollars will be spent to retire equipment trust certificates now outstanding against the 500 near-side or center-exit cars; $1,200,000 will be used for the purchase of the Government cars and equipment, and $450,000 will be held available for further improvements and additions to property.

Six hundred standard steel cars, part of which were constructed in 1913 and part in 1918, constitute the equipment which was pledged for the issue. As stated previously, it is estimated that the depreciated value of the cars is $4,684,359, or more than double the amount of the certificates.

To what extent the additional $450,000 from the series "F" fund will be used "for further improvements and additions to property" was not made known. At present it will be held in reserve pending the development of future plans, it was declared.

Power Project Taken Over by Graham Interests

The property and franchise of the Washington County Light & Power Company were sold at Machias, Me., on Aug. 7 by Receiver Irving E. Vernon, Portland. They were purchased by Edward M. Graham, president of the Bangor Railway & Electric Company.

The Washington County Light & Power Company was chartered by the Legislature about four years ago. The company purchased the lighting company doing business at Machias. It began its development at Columbia and had a dam at the place about 75 per cent completed when financial difficulties were encountered and early in the present year a receiver was appointed.

With the Bangor Railway & Electric Company, the Union River Light & Power Company at Ellsworth and the Washington County Light & Power Company practically under one management, President Graham by his purchase became identified with a lighting and power system which will eventually extend from Lincoln to Eastport, a distance of practically 200 miles.

Bondholders Buy Ohio Electric for $2,000,000

Bondholders of the Ohio Electric Railway, Springfield, Ohio, represented by Thomas Newhall, Philadelphia, bid in at the upset price of $2,000,000 the property of the company, consisting of the interurban line between Lima and Toledo, power and heating plants at Lima and the city street railway system there, at the special masters' sale at Toledo, on Aug. 15. Mortgages totaling $4,200,000 were foreclosed recently and the property ordered sold by the Federal court.

B. J. Jones, receiver, who was made special master to conduct the sale, said that operation of the line would not be interfered with by the sale. City commissioners of Lima and representatives of the street railway and power interests have agreed upon new franchises there. It is expected that those local properties will be grouped under separate management.

It was agreed to put $200,000 of new capital into improvements on the Lima properties.

Reorganization of the Ohio Electric interurban property will probably follow the confirmation of the sale by Judge John M. Killits at Toledo.

Sale of Property Delayed

City Attorney Charges Sale of New Orleans Road Should Have Been Advertised Fifteen Days

City Attorney Ivy Kittredge has called a halt in the proposed public sale of the New Orleans Railway & Light Company, New Orleans, La., which was advertised to come off Aug. 17. In an opinion to the members of the Commission Council, made public on Aug. 13, the city attorney holds that, under Section 28 of the city charter, which has not been repealed and which is not affected by the indeterminate act of the Constitution of 1921, it is specially provided that every ordinance mentioned in the charter granting use of a public street, whether for pay or not, must be advertised fifteen days before the City Council can adopt it.

When the question was raised regarding the legal features of the proposed sale under authority of the indeterminate permit accorded the City Council, without having previously advertised the permit to do so, for fifteen days, as required by the city charter, counsel for the company, H. Generes Dufour, held that the matter came under Act 94 of the Constitution of 1921 and could not affect the legality of the proceedings or sale.

The city attorney to whom the matter was referred by the Commission Council now declares that the indeterminate act, alluded to, specifies no details or forms, delays or advertisements that the Council must pursue and hence to conduct the sale, in strict accordance with law, the permit must be advertised for fifteen days.

C. C. Chappelle, representing the eastern stockholders, who attended the conference held between the members of the Commission Council and the representatives of the railway company, was for proceeding with the consummation of the sale, in strict accordance with law, although he was anxious to hasten matters. If the city attorney was of opinion that the permit should be advertised, he (Chappelle) would offer no objection, although the conference was undecided whether such further advertising was necessary.

Commissioner of Finance Murphy in expressing his pleasure over the result of City Attorney Kittredge's counsel, said he was just as anxious to have the matter cleared up legally as he was to have it disposed of quickly, and did not apprehend that more delay would affect the reorganization of the company.

Commissioner Maloney of the Department of Public Utilities, while declaring that he did not agree with the legality of the opinion of the City Attorney, thought the city attorney was acting for the best interests of the city and that he therefore would vote to advertise the permit.

The ordinance was to have come up for adoption on Aug. 15. This hiatus will of course not only delay the sale of the property but will postpone the contemplated reductions of both street car fares and the gas rate.

Receiver Appointed for Ogdensburg Street Railway

The Ogdensburg (N. Y.) Street Railway was placed in the hands of a receiver on Aug. 12 following an action commenced before Justice John C. Cropsey in Supreme Court by trustees named in the mortgage given by the railway to secure the payment of $150,000, together with interest amounting to $125,000. James E. Kelly, president of the St. Lawrence County Savings Bank, Ogdensburg, was named receiver. A large amount of the company's indebtedness is to the city of Ogdensburg, statements indicated.

Another Dividend Re-established

The United Railways & Electric Company, Baltimore, Md., has declared a quarterly dividend of 50 cents a share on the common stock payable on Aug. 15 to stock of record Aug. 3. This is the first dividend on the issue since January, 1919, when a quarterly distribution of the same amount was made.

Will Petition for Removal

The Northern Ohio Traction & Light Company, Akron, Ohio, will seek permission of the State Public Utilities Commission for authority to remove its railway system in Massillon. An announcement to this effect was recently made by General Manager A. C. Blinn to the Massillon City Council. City officials have been told by General Manager Blinn that the company is losing $25,000 a year on this city line. The company also objects to an estimated assessment, said to be large, as its share of the paving of two streets in Massillon. The company plans to build an interurban line to connect with the Massillon-Dover line. This interurban, the company claims, can be built for less than it will have to pay for the street improvements.

Subsidiaries Make Claims of $749,274

An order issued in United States District Court directs the receivers of the Pittsburgh (Pa.) Railways to show cause why they should not pay claims amounting to $749,274 made in behalf of two subsidiary companies. Six petitions were filed separately on behalf of each company but all concern rentals of leased property which the Pittsburgh Railways had contracted to pay.

The rentals were paid by the Philadelphia Company, which had guaranteed to pay all such claims in case the Pittsburgh Railways was unable to meet the payments. The petitions assert that the subsidiary companies must receive the money from the Pittsburgh Railways to discharge the indebtedness to the Philadelphia Company that they have thus incurred.

The petitions are: The Consolidated Traction Company for $473,100, $24,100 and $84,600 and the United Traction Company for $15,200, $1,974 and $150,300. The obligations were incurred by the Pittsburgh Railways Company by agreements made when mergers were effected with the subsidiary lines.

Reorganization Being Arranged

Final arrangements are rapidly being made for completing the reorganization of the South Carolina Light, Power & Railways Company, Spartanburg, S. C. As noted in the *Electric Railway Journal* for Aug. 5, page 211, the entire property of the company was purchased at receiver's sale on July 31 for $1,000,000 by the representatives of the bondholders.

It is proposed to transfer the property as a going concern to the South Carolina Gas & Electric Company. The new company will be capitalized as follows: $1,000,000 of 6 per cent preferred stock is to be issued, $2,000,000 of authorized 7 per cent prior preferred, 12,500 shares of no par common, $3,497,000 of first mortgage 6 per cent bonds and $650,000 of 6 per cent general mortgage bonds. The former outstanding issue of $3,497,000 of first mortgage 5s and the $176,000 of secured bank loans will be paid or refunded by new first mortgage 6s to a similar amount, and the $650,000 of 7 per cent 5-year notes will be paid or refunded with the 6 per cent bonds.

The unpaid interest and the unsecured claims will be paid or refunded by scrip. Holders of preferred stock in the old company will receive share for share preferred stock as the new company and present holders of common will receive one-half share of new no par value common for each share of old. The new prior preferred stock will be held in the treasury subject to conversion therein of the 6 per cent general mortgage bonds at 90 per cent.

For more than a year now the company has been operating under conditions which have constantly been growing better. Rates have been advanced and as no interest has been paid for some time now on the funded obligations, a cash balance has accumulated which will be used for improvements.

Earnings of the company under the new rates are said to show a very satisfactory ratio above fixed charges imposed by the new capitalization.

Redemption and Conversion Notice Announced

The Toledo Traction, Light & Power Company, Toledo, Ohio, has announced that on Sept. 1 it will make payment on its first lien 7 per cent gold bonds dated Sept. 1, 1921. The holders of these bonds will be paid the principal together with a premium of ½ per cent of such principal and interest accruing to Sept. 1, 1922.

It was also announced that the privilege of converting and exchanging these first lien 7 per cent gold bonds into Cities Service Company Series D 7 per cent convertible gold debentures will expire on Sept. 1, 1922.

Financial News Notes

Land Sold.—The Detroit (Mich.) United Railway has sold a 12-acre piece in the Grand River section of the city. The sale price is said to have been $350,000.

Net Income of $602,272.—The Market Street Railway, San Francisco, Cal., for the six months ended June 30, 1922, reports a railway operating revenue of $4,675,810 and expenses totaling $3,421,877. The net income is $602,272, which includes no provision for Federal income tax sinking fund or betterments.

Railway Included in Merger. — The property of the Water, Light & Transit Company, Carrollton, Mo., was included in the deal under which the properties of the Kansas City Light & Power Company and the Carrollton County Power & Light Company were brought together in consolidation. Only 2 miles of electric railway are included.

Buys Railway Property.—B. F. Loos of Minneapolis has bought the property owned and controlled by the Iron River, Strambaugh & Crystal Falls Street Railway, Iron River, Mich., for $109,797 based on appraisal by the Rau Appraisal Company of Milwaukee. The property includes ten street cars, repair houses, station houses, equipment and trackage.

Net Income of $3,000,000.—Total operating revenue of the Brooklyn (N. Y.) Rapid Transit Company for the year ended June 30, 1922, was $34,544,093 against $30,972,085 for the previous year. Operating expenses decreased from $26,425,704 to $22,040,554 for the period ending June 30 of this year. The net income for this year's period was $3,087,419 against a deficit a year ago of $4,880,934.

Stock Issue Approved.—The Board of Public Utility Commissioners of New Jersey has granted approval to the application of the Morris County Traction Company operating in Morris County, to issue $1,600,000 mortgage bonds; $1,500,000 par value of its preferred stock and $1,179,000 common stock. The issuance of the additional capital stock is to make extension to the company's property.

Gold Certificates Sold.—The Cincinnati (Ohio) Traction Company has sold an issue of $725,000 of 6 per cent equipment trust gold certificates to Halsey, Stuart & Company, Chicago, Ill. The proceeds of the sale are to finance the purchase of seventy-five new double-truck cars, which have been ordered by the company and which will be built at the plant of the Cincinnati Car Company. These cars will be ready for operation late in the fall and will supplant the present single-truck cars.

Traffic and Transportation

Safety Responsibility Partly in Hands of Public

An important decision has been handed down by the Massachusetts Department of Public Utilities relative to the warnings that the Boston & Worcester Street Railway shall be required to give the public in the town of Shrewsbury. The selectmen of Shrewsbury sought to enforce certain old franchise requirements regarding signals, and in addition to this they wanted automatic swinging arm or flashlight signals, similar to those recently installed on some of the railroad crossings in Massachusetts. In its decision the Department of Public Utilities lays down the principle that the travelling public must assume some of the responsibility for safety at crossings. It declares bell signals that were practical before the days of the automobile horns to be less useful at the present time. The commission says:

> The commission has given much consideration to requiring the company to make a full stop before proceeding over the crossing. The grade on the railway at some of these crossings is so steep that it would seriously interfere with the operation of freight cars, as well as slow up the schedule of passenger cars, to make a full stop at all of the crossings. Furthermore, if cars stop at some crossings in one direction and not in the other, it is apt to mislead travelers on the highways.
>
> After consideration of all the facts and circumstances in the case, including the duty of travelers upon the highway to exercise due care and not throw the whole burden upon the street railway, we are of the opinion that reasonably adequate protection would be afforded the traveling public on these highways if, in addition to the maintenance of the signs now installed, all cars sounded their whistles 500 feet from the crossing and again at 250 feet and reduced their speed over the same to 5 miles per hour.
>
> It is therefore
>
> Ordered. That the Boston & Worcester Street Railway Company in the operation of its cars over the crossings known as Fruit Street, South Street, Grafton Street, Lake Street and Turnpike, in the town of Shrewsbury, in addition to the maintenance of signs as now installed, sound a whistle five hundred (500) feet and again at two hundred fifty (250) feet from each crossing and reduce the speed of its cars to five (5) miles an hour over the same.

Bus Lines Purchased to Improve Service

The Puget Sound Electric Railway, Tacoma, Wash., in an effort to improve its service to the travelling public, has purchased the auto bus lines between Tacoma and Olympia, 32 miles, from Thompson-Smith interests. The deal approximates a consideration of $150,000. According to A. W. Leonard, president of the company, the bus lines were purchased to provide better connections for the travelers from Seattle to Olympia, and better service from Tacoma to Olympia. The company will not extend its transportation beyond Olympia, Mr. Leonard states, and the report that the bus lines from Olympia to Aberdeen have been purchased is untrue, he further advises. "We are in the transportation business, and this extension is not an effort on our part to effect a monopoly, but solely in the interest of better transportation," said Mr. Leonard.

Railway and Stage Lines Join in Protest

Protests against the new time schedule filed recently by H. E. Knowles, operating jitney buses between Seattle and Bryn Mawr and Seattle and Rose Street, under his Seattle-Renton certificate, have been filed with the street department of public utilities at Olympia by the Seattle & Rainier Valley Railway and the Seattle-Renton stage lines. The railway protests that the time schedule shows an operation entirely within the city limits, between Seattle and Graham Street; that the railway service is adequate, that Knowles is operating without proper authority from the state, and that the department has no authority to permit the filing of a time schedule for strictly city operation. The stage lines' protest is based on the claim that Knowles is not a good faith operator, and has no right on the run. Knowles in his time schedule proposes one round trip per day between Seattle and Renton, forty-three extra trips between Seattle and Bryn Mawr, and fifty extra trips between Seattle and Rose Street. Hearing will be held in Olympia.

Wants Motorists' Help for Safety Campaign

The United Traction Company, Albany, N. Y., recently started a campaign for the prevention of accidents. H. B. Weatherwax, vice-president of the company, has sought the aid of owners of pleasure cars and commercial vehicles in the territory covered by the traction company in a letter requesting co-operation and offering ten suggestions for safe operation on routes traversed by the electric railway cars. The letter says in conclusion:

> You will be safeguarding your own interests and be of material assistance to us by observing the following precautions:
>
> 1. Make sure trolley car is not coming when starting out from curb, and give proper warning before starting if car should be near.
> 2. Do not trail the trolley car too closely.
> 3. Cross crossings cautiously.
> 4. Be watchful of trolley car making curve so as not to be hit by swing of rear end.
> 5. Avoid parking cars near trolley curves in narrow streets so as not to be caught "in the pinch."
> 6. Avoid speeding to get ahead of trolley when other cars are parked at the curb.
> 7. Avoid crossing in rear of trolley car, other cars, unseen, may be coming in the opposite direction.
> 8. To get ahead of trolley car, make sure it is well to the rear before cutting in front.
> 9. Observe law and do not pass trolley while taking on or discharging passengers.
> 10. When parking at curb in narrow streets, be sure there is plenty of room for trolley to pass.
>
> Safety First.

Case Before Special Master Being Concluded

Taking of testimony in behalf of the State in the 10-cent fare hearing before Special Master Haight was concluded on July 25 and the presentation of rebuttal evidence for the Public Service Railway was begun on Aug. 7. Summing up of the opposing attorneys and the submission of briefs will complete the case.

By consent of counsel, the special master agreed to have introduced as evidence, without reading, copies of municipal ordinances bearing on the operation of street railways. The special master also agreed that Mr. Petty and General Auditor M. R. Boylan of the Public Service join in correcting some minor errors in figures in the various tables submitted.

Tabulations made by the commission pointed to a heavy loss in revenue-producing passengers alleged to be due to the 8-cent fare. Figures submitted gave the number of passengers carried under the 8-cent fare as 394,858,000, while estimates of the number which would have likely been carried under the 8-cent fare fixed by the commission and suspended by the court increased this number to 416,605,000, a loss under the present fare of 21,747,000. Figures were introduced purporting to indicate that the increase in jitney passengers showed that a majority of this loss had gone to the jitneys.

While there was a loss in the number of passengers carried under the increased fare, the total operating income was slightly higher than it would have been under the 7-cent fare. The additional sum, however, was held by the commission to be insufficient to warrant the efforts made to secure the higher fare. The income under the 8-cent fare was given at $6,321,691, while the estimated revenue under the 7-cent fare was given at $6,018,778.

Figures submitted showed that the actual net income of the company was $269,000 in excess of the estimate, or approximately $6,740,000 on something over a 7 per cent return on the valuation fixed by the commission on the company's property.

An attack was made on the amount set aside by the Public Service for claims, it being asserted that the sum was in excess of that necessary.

Second One-Man Car in Operation

The Olean, Bradford & Salamanca Railroad recently put its second one-man car in operation in Bradford, Pa. Several months ago the first one-man car was put into service and proved a success. General Manager Wheeler announces that this service will be extended to the cities of Olean and Salamanca. The company has presented a new fare schedule to the Public Service Commission, which will cut fares between inter-stop points in Bradford about 10 per cent, while terminal tickets will be reduced to the level of steam railroad prices.

Interchangeable Transfer System Recommended

In December, 1921, the California State Railroad Commission recommended an increase in the fare on the Pacific Electric Railway lines, effective on Jan. 1, 1922, and urged that each individual city served by the company should confer with the commission's engineers and representatives of the railway to adjust the matter of local fares, service and jitney bus competition. These conferences as regards the city of Pasadena have been concluded and on July 26 a report was presented by the two consulting engineers representing the city, Franklin D. Howell and T. D. Allin, who had studied the subject with F. E. Geibel, special engineer of the Pacific Electric Lines. The report recommended that the local car service should be retained. Pasadena has a population of over 40,000 and a local street car mileage of 40.9 equivalent single track. For several years there has been considerable jitney bus competition.

On this point, after recommending certain changes in railway trackage and bus routes so as to reduce this competition, the engineers declare definitely that all bus and rail lines should issue transfers, one to the other, whether operated by the same or different companies and that a responsible company only should operate city buses. In general the buses should give the crosstown traffic.

Considerable space is given in the report to the paving charge and to the expense to the railway company of abandoning first class track on account of city requirements before the life of the track had run. On this point the report says:

> The track once laid should be allowed to be maintained until at least 80 per cent of its usefulness has been realized; girder rail construction should not be required except on such streets as are through, main arteries of general travel; paving should be eliminated from railway investments or expense, except so far as the railway company cuts paving for purposes of construction or repair, in which cases it should replace the cut portions only.

In short, the engineers recommend that all possible expense not directly contributing to railway operation be eliminated as a means of reducing the excessive costs mentioned.

Opposes Fare Reduction in Kansas City

Francis M. Wilson, receiver of the Kansas City (Mo.) Railways, recently commented on the agitation for fare reductions and the talk about new wage schedules. In answer to the demands contained in the 5-cent fare resolution proposed by the Central Labor union of Kansas City, he said that a return to a 5-cent fare would bring about a reduction in trainmen's wages from 53 cents an hour to 33 cents. Further that the receipts of the company would decrease $3,300,000 a year, which would destroy the receivership and defeat the end for which it was established. Besides this, service would have to be curtailed and the abandonment of several lines would follow.

He said that he would indorse any movement having for its end a reduction in fare provided this could be done without serious consequences to the riding public. In his opinion no fare reduction could be effected until wages were reduced and he said that he would never agree to a reduction in wages "of efficient and courteous employees until economic conditions justify the decrease."

Transportation News Notes

Consideration for Summer Passengers.—According to a recent order of the South Carolina Railroad Commission the Augusta-Aiken Railway & Electric Corporation must provide ice water on its cars from March 1 to Oct. 1.

Pass Meeting With Success.—Officials of the Tacoma Railway & Power Company, Tacoma, Wash., report that the success of the weekly pass system has been beyond expectations. The second week of the pass considerably exceeded the first week, when 7,004 passes were sold.

Increase Fares.—Increase in fares to a flat 6 cents from a rate of 5 cents for adults and 3 cents for children has been granted the Dayton & Troy Electric Railway by the Piqua City Council. As a result the railway has promised to install several additional cars, probably of the one-man type.

Will Seek Franchise Amendment.—It has been announced by C. G. Holland, president of the Danville Traction & Power Company, Danville, Va., that the company will ask the City Council for an amendment to the railway franchise which will permit the use of one-man cars on the system. The present franchise specifies that all cars shall be operated by two men.

Cars Marked to Assist Patrons.—In line with its consistent policy of bettering the service the Des Moines (Ia.) City Railway recently announced that all cars would be marked with a large number to assist the public in locating cars. Each line in the city has been assigned a number running from one to twenty-six and a sign bearing the number of the line will be displayed conspicuously on the front of the cars.

Jitneys Barred—By an order of Brigadier-General Moseley jitneys have been barred between Battle Creek and Camp Custer, as a result of the Michigan Railway having agreed to increase its car service between the city and the camp. All jitneys have been eliminated from the reservation with the exception of the jitney under control of the post exchange which will meet all cars at Twenty-first Street, Camp Custer.

Trackless Trolleys in Prospect. — Charles R. Barnes Railway Commissioner of Rochester, N. Y., with James F. Hamilton, president of the New York State Railways, has under consideration the establishment of three trackless trolley lines in Rochester. Definite announcement of the details of the plan together with the approximate date of starting the service will be given out shortly.

Service Suggestion Wins Prize.—The transportation department of the Los Angeles (Cal.) Railway each month is offering cash prizes for valuable service suggestions by employees. Seventy-eight suggestions were submitted during the month of May for the first awards. The first prize of $50 goes to Motorman Estes, who suggested that efforts be made to broadcast some ideas on street car service and safety by the radiophone.

Free Rides for Veterans.—From June 17 to June 25 confederate veterans and boy scouts in uniform were presented with special free tickets for transportation on cars of the Virginia Railway & Power Company, Richmond, Va. Granting this privilege for re-union week was the result of a letter to General Manager Harvell from W. M. Myers, director of public safety, who said that this plan would work to the satisfaction of the veterans.

Confer on Relieving San Antonio Railway.—The San Antonio (Tex.) Public Service Company is losing more than $25,000 a month from the competition of the jitneys. W. B. Tuttle, vice-president and general manager, has informed Mayor Black that the company cannot continue the present service in face of this loss; that some lines must be discontinued, and that service on others will have to be curtailed. It is estimated that more than 30 per cent of the city's transportation is now done by jitneys.

Will Indorse Certain Bus Projects.—John S. Bleecker, general manager of the Indiana, Columbus & Eastern Traction Company, Cincinnati, Ohio, recently assured representatives of the Springfield-Mechanicsburg Motor Bus Company that he was ready to do all in his power to encourage bus lines to towns not reached by the traction line. Facing the prospect of being forced out of business by the terms of the licensing and regulatory ordinance recently adopted by the Springfield City Commission the bus men called on Mr. Bleecker to enlist his co-operation.

Railroad Victor in Jitney Issue.—The Board of Public Utility Commissioners of New Jersey announced recently the dismissal of the application of the Weehawken township committee and a number of jitney bus owners for an order restraining the West Shore Railroad from excluding jitney buses from space heretofore occupied by them at the Weehawken ferry terminal. The board said it was without jurisdiction to decide the title and easement of the space occupied by the buses, and held that under a former court decision the railroad has the right to regulate the movement of buses on its property.

Legal Notes

CALIFORNIA—*Duties of Cars, Other Vehicles and Pedestrians on Street.*

In an action by a pedestrian for injuries received in a collision between a motor truck and a street car, instructions that a street car has the right of way on that portion of the street on which it can travel, and that if the driver of the motor truck was using due care, no negligence should be imputed to its owner, and that in operating its cars along its tracks the street car company was obliged to use ordinary care to avoid coming into contact with vehicles driven across the tracks, considered as a whole, were not erroneous as being misleading. [Armock et al. vs. United Railroads of San Francisco et al., 204 Pacific Rep. 856.]

FEDERAL COURTS—*Public Service Commissions—Action Reviewable by Federal Court Only on Constitutional Grounds—Valuations.*

The action of a public service commission in prescribing rates to be charged by a public utility corporation is reviewable by a federal court only on the question whether it is an invasion of constitutional rights and such collateral questions as are incidental thereto, and the presumption is in favor of its validity.

A franchise for a public utility is granted on the implied condition that it shall be used for the public benefit and at reasonable rates of charge to the public, and in the computation of the value of the property used in the service by a public service commission for the purpose of establishing reasonable rates, the value of the franchise should not be taken into consideration. In ascertaining the present value of physical property in a period of changing values, a decided tendency to higher or lower may be recognized and considered; failure to earn a fair return in past years is not a factor to be considered nor is the federal income tax allowable as an expense of the business. [Georgia Ry. & Power Co. vs. Railroad Commission, 278 Federal Rep. 242.]

FEDERAL COURTS—*A Court in Enjoining Statutory Rate, May Fix Conditional Rate.*

While a court of equity has no power to fix rates of fare to be charged by a street railway company, it may, when granting a preliminary injunction restraining as confiscatory a rate established by a state board, name a rate as a condition of the injunction, beyond which the company may not go pending final adjudication and the determination of a just rate by a proper body, with provision for refunding of any excess above the bond rate in case that rate is finally sustained. [Public Service Ry. Co. vs. Board of Public Utility Commissioners, 276 Federal Rep. 979.]

GEORGIA—*State Commission Orders Are Superior to City Ordinances.*

A city ordinance requiring street railway companies to divide cars into separate divisions for white and colored passengers and to designate the divisions by a sign or placard conflicts to some extent with a rule of the Railroad Commission requiring white passengers to be seated from the front of the car towards the rear, and colored passengers from the rear of the car towards the front, and requiring each seat to be filled to capacity before taking the next seat. Hence, the commission's order had superior and binding force and effect as a civil rule to the exclusion of the municipal ordinance. [Savannah Electric Co. vs. Lowe, 108 Southeastern Rep. 313.]

MASSACHUSETTS—*A Street Railway Company Is Not Required to Protect an Intending Passenger Against Pushing by Crowd While on the Public Highway.*

A street railway company was not negligent in failing to restrain a crowd waiting for a car, at a stopping place where there was no station or platform, and passengers boarded the car from a public street, and it was not liable for the injury to a child pushed under the side of car by the crowd, assuming that she was a passenger. [Savickas vs. Boston Elevated Railway, 132 Northeast. Rep. 29.]

NEW JERSEY—*The Order of a Public Service Commission Requiring a Public Utility to Set Apart a Depreciation Fund Held Not the Fixing of a Just and Reasonable Rate. Where an Order on Rates is Not Supported by Evidence, the Court May Set It Aside and Remand the Proceedings.*

An order made by the Board of Public Utility Commissioners requiring a public utility to set apart yearly a depreciation fund of a fixed amount, and its refusal of a sufficient rate for services rendered to produce the necessary income for that purpose, is not the fixing of a just and reasonable rate. The court has no power to fix the rate, but where a commission's order on rates is not supported by the evidence, the court has the power to set aside the order and remand the proceeding to the commissioners to fix a just and reasonable rate, based on the evidence. [Public Service Ry. Co. vs. Board of Public Utility Commissioners, 114 Atlantic Rep. 323.]

PENNSYLVANIA—*Public Service Commissions Have no Jurisdiction Over Lessor Companies Which Have Ceased to Function*

The Public Service Commission has no jurisdiction over a public service company which under legislative authority has leased its franchise and property to another corporation and has ceased to function, since it has no rates to make or collect, no service to render the public, and no facilities to furnish or extend. The commission is concerned only with the rendition of service by the operating company at reasonable rates, and it is immaterial if the operating company under its lease must pay an unreasonable rental to the lessor and is thereby prevented from earning a reasonable return. [Philadelphia City Passenger Ry. vs. Public Service Commission of Pennsylvania et al., Appeal of City of Philadelphia, 114 Atlantic Rep., 642.]

PENNSYLVANIA—*Financial Condition Held Not to Excuse Failure to Improve Streets. Commission's Consent Unnecessary to Minor Changes of Street Grade.*

A street railway company is not excused from performing its contract to reduce its tracks to a new grade and pave the tracks by its financial embarrassment and difficulty in procuring material and labor, where the municipality offered to permit the company to use the existing material, and the improvement was undertaken before our entrance into the World War. In such a case the municipality is not required to get the consent of the Public Service Commission provided the change in grade was but a few inches and so inconsequential. [Borough of Sayre vs. Waverly, Sayre & Athens Traction Co., 113 Atlantic Rep. 424.]

TEXAS—*Injury to Child Playing on Pile of Cross-ties Held Not Actionable.*

Where a seven year old child injured while at play on cross-ties, piled partly on a public sidewalk, did not climb onto the cross-ties from the sidewalk, but from the adjoining vacant lot, it was held that no legal duty rested on the defendant street railway company to pile its ties so as to make them a safe place to play on, and it was not liable for the injury. [Charles vs. El Paso Electric Railway, 234 Southwest. Rep. 695.]

SOUTH CAROLINA—*Agreement by a Street Railway to Pay a Portion of Flagman Expense Does Not Cover Gateman.*

The grant by a railroad to a street railway of permission to cross the right of way of the former is sufficient consideration for a contract whereby the street railway agreed to pay one-half the expense of maintaining a flagman, or lights at the crossing, if they were required by city ordinance, even though the railroad did not own the fee of the right of way. But this agreement does not require the street railway to pay one-half of the wages of a gateman who raised the gates on the approach and passing of trains and gave no signals to the street cars, which still had to be flagged by their conductors. [Southern Ry. Co. vs. South Carolina Light, Power & Rys., 112 Southeast. Rep. 75.]

Personal Mention

Charles W. Wilson Takes Up Superintendent's Work

Charles W. Wilson, recently promoted to superintendent of the lines of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., has been identified with the street railway business for the past twenty-four years. A native of Philadelphia, he began work with the Philadelphia Rapid Transit Company as a conductor in 1898. A short time later he desired to work on the other end of the car and became a motorman. After working for that company for three years he became a conductor in the employ of the Philadelphia & West Chester Traction Company, remaining there for several years.

He at last returned to the Philadelphia Rapid Transit Company and ten years ago he went to Trenton, where he became identified with the New Jersey & Pennsylvania Traction Company. For nine years he was night dispatcher for that company, and one year ago was made day dispatcher, the position he held until his late appointment. He had also been acting as assistant to Superintendent Walter F. Tshudy for some time. The latter is now superintendent of the Philadelphia & West Chester Traction Company.

New Officers for Vincennes Railway

Under the reorganization of the Vincennes (Ind.) Electric Railway, Ewing R. Emison has been elected president, J. Hugh Powers vice-president and L. F. Gillett treasurer. Mr. Gillett was superintendent and purchasing agent during the period of reorganization. He is continuing his work as purchasing agent and in addition is also general manager. H. L. Bennett has been appointed secretary and auditor.

R. S. Persons Becomes President

Several changes have recently been made in the personnel of the Erie County Traction Corporation, Buffalo, N. Y. Richard S. Persons, who previously was secretary of the company, has been made president. W. J. Whuern is vice-president. Nathan A. Bundy, who was general manager, retains this position and acts also as treasurer. Fred Slade, formerly track foreman, is now engineer maintenance of way. The position of secretary is held by Harry P. Ward.

Mr. Morrison President at Corpus Christi

R. W. Morrison of San Antonio, who was influential in the organization of the Nueces Railway, which took over the railway property of the Corpus Christi Railway & Light Company, Corpus Christi, Tex., has been elected president of the company. A. C. Pruch, San Antonio, has been elected secretary, and E. H. Eldridge, Corpus Christi, treasurer and general manager.

A. J. Stratton Is Manager

Former Assistant Superintendent of Eastern Pennsylvania Railways Transfers to Southern New York Company

On July 1, just six months after A. J. Stratton was appointed assistant superintendent of the Eastern Pennsylvania Railways, Pottsville, Pa., he was made general superintendent of the Southern New York Power & Railway Corporation. By this rapid promotion, Mr. Stratton is placed in charge of the operation of more than 65 miles of track connecting Oneonta with ten outlying towns.

A. J. STRATTON

Mr. Stratton is a specialist on track construction. Since 1920 he has done engineering work for the J. G. White Management Corporation, and at the same time has carried on the work of superintendent of maintenance of way of the various lines associated with the Eastern Pennsylvania Railways.

Other positions which Mr. Stratton has held include that of engineer of the Mobile Light & Railroad Company, Mobile, Ala., and the Binghamton (N. Y.) Railway. From 1916 to 1918 he was assistant engineer of way and structures of the Brooklyn Rapid Transit Company, and from 1918 to 1920 he was assistant engineer of the valuation department of the Metropolitan Edison Company, Reading, Pa.

J. L. Adams, who has been vice-president and general manager of the Philadelphia & Western Railway, Norristown, Pa., has been elected president of that company.

F. Walker has been appointed purchasing agent and general freight agent of the Milwaukee Northern Railway, Cedarburg, Wis. This position was formerly held by Otto Maske.

C. E. Fahrney, general manager of the Ottumwa (Ia.) Railway & Light Company, has been elected a vice-president.

G. B. Darnell, formerly superintendent at Columbus of the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, is now roadway engineer.

C. L. Christopher is now engineer of maintenance of way, H. W. Wischmeyer engineer of power stations, C. O. Seaton engineer of overhead construction and John Zoll master mechanic of the Louisville (Ky.) Railway.

J. W. McNeeley, for many years associated with the Paducah (Ky.) Electric Company, is now superintendent. He was appointed superintendent of transportation in 1910. M. H. Hewett is purchasing agent.

A. C. Anderson has been appointed superintendent of railways of the Keokuk (Iowa) Electric Company. The position of claim agent is held by H. R. Miller, and that of engineer of overhead construction by G. W. Carlson.

Cyrus Corliss is engineer of construction of the Boston (Mass.) Elevated Railway, and J. J. Donahoe is chief engineer of the South Boston power station. Mr. Corliss has been construction engineer of the department of power.

C. G. Holland is now president of the Danville (Va.) Traction & Power Company, of which he was previously vice-president. J. F. Rison held the position of president and purchasing agent before Mr. Holland took over the work. J. I. Pritchett has been appointed vice-president.

Obituary

Mesheck Frost, who constructed the first street railway in Tiffin, Ohio, died on Aug. 6. In 1888 Mr. Frost was granted a franchise by the City Council which allowed him thirty-seven days to lay out the lines. In thirty-four days he had constructed and started operation on 2¼ miles of track. In 1892 Mr. Frost electrified the traction line. He later built another, known as the Highland line. For the past few years Mr. Frost had lived in New York City.

Walter G. Franz, consulting engineer of Cincinnati, Ohio, who had charge of the engineering work for the Dixie Terminal Building, the northern terminus of all cars of the South Covington & Cincinnati Street Railway, died of typhoid fever on Aug. 13 at Biddeford, Me. Mr. Franz was graduated from the University of Missouri and after practicing his profession in St. Louis went to Cincinnati in 1905. He had been prominently identified with the erection of some of the largest projects in Greater Cincinnati. For the past five years he was associated with William T. Fosdick, consulting engineer. Mr. Franz was forty-seven years old.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Coal Deadlock Broken

The agreement between the operators and miners of seven states at Cleveland this week breaks the deadlock and foreshadows the end of the strike for the present. It appears, however, that every issue involved in this strike must be fought out again. A truce now appears to be a certainty, but it will be a makeshift one.

The electric railway industry will be still concerned with the net effect of the strike. There has been a great industrial setback. There has been widespread unemployment. The nation's fuel bill for 1922 will be $300,000,000 more than it was in 1921. One-half of 1 per cent of the population has taken advantage of its position to dominate the supply of a necessity of life. The interests of 99.5 per cent of the population have been affected adversely. There has been no humbling of the organization responsible. No industrial disciplining has resulted. Nothing of permanent value to the public has come from the strike.

The Federal fuel committee is devoting its attention to spreading the limited coal supply over the various districts so as to avert possible shortage in the essential industries.

The U. S. Geological Survey has estimated that 765,000 tons of bituminous coal weekly will meet the immediate needs of gas and electric public utilities and domestic consumers in the territory east of the Mississippi River. Of this, New England would require 9.2 per cent; the non-coal-producing states of the coast region exclusive of New England, 21.6 per cent; coal-producing states of the coast region, 22.9 per cent, and Ohio, Indiana, Illinois and Michigan 46.3 per cent. Railroads in the same territory will require 2,000,000 tons weekly, making a total emergency requirement of 2,765,000 tons. The coal now produced in this territory is 3,800,000 tons weekly.

The railway mechanical situation on coal-carrying lines in the Virginias, which has been hampering the shipment of coal, continues to improve with the importation of mechanics from Eastern and Western lines. The requirements of the Chesapeake & Ohio and the Norfolk & Western systems are said to have been practically met, and mechanics are now being diverted to the Virginian Railway. Shipments of coal from southeastern Kentucky are being retarded to some extent by conditions at Corbin, Ky., where more than 300 railway mechanical employees are said to have left their employment because of threats of violence, but in the western Kentucky field coal production has been accelerated by a 100 per cent car supply.

The Department of Justice has rendered an opinion to the effect that priority orders for coal issued under Classification No. 1 of the Interstate Commerce Commission have preference over other orders which operators may have on their books.

A peculiar situation exists in the spot coal market. Prices are high but are not soaring, free coal is even more limited than a week ago, but the demand has declined apace with the amount of tonnage offering. The diminution of demand has been accomplished in many cases by the curtailment or complete shutdown of some industries which feel that this is preferable to paying the high premiums now secured by spot coal shippers.

Those who must keep in operation, and this class includes the railways and "essential" industries, are actively bidding for the meager current production that is available to the spot buyer. Priorities rule on the bulk of the tonnage moving but there is much confusion in carrying out these orders and railroad confiscations are heavy.

There is little of this spot coal available, for, although production is increasing, most of it is needed on priorities. Spot coal prices have risen to an average of $6.66 per net ton at the mines, *Coal Age* Index on Aug. 14 going to 550, as compared with 511 for the previous week. This is a rise of 39 points for the index and 48 cents in the average price for the week. The coal commission at Washington, recognizing usual expenses of certain operators now producing, has sanctioned an increase from the original $3.50 Hoover level to $4.50 for New River and $4.75 for Kanawha.

Railroads are functioning better, but the traffic congestion is still acute and lack of motive power is hampering dispatch of loads and the placement of empties. The roads are gradually enforcing the priority orders but State and Federal committees have not yet clamped the lid down on high prices.

Master Recommends Improvements on Pittsburgh Railways

Special Master Wasson in a report filed in the United States District Court has recommended that the receivers of the Pittsburgh (Pa.) Railways be authorized to spend $640,125 on improving the system. Among the important improvements will be the moving of the Jack's Run bridge which divides Pittsburgh from Bellevue. This moving will cost in the neighborhood of $20,000.

Other betterments recommended are:

Changes in the paint shop at the Homewood car barns. Estimated cost, $7,000.

Reconstructing double tracks in Wilkinsburg. Estimated cost $64,700.

Reconstructing tracks in Crafton at an estimated cost of $97,000.

Reconstructing tracks on Idlewood Avenue, Pittsburgh. Estimated cost, $15,600.

Reconstructing tracks on Main Street, Carnegie. Estimated cost, $70,000.

Reconstructing high tension lines and overhead feeders in Island Avenue, McKees Rocks; Stowe township, Neville township, Coraopolis and Moon townships. Estimated cost, $10,500.

Reconstructing tracks on Lincoln Avenue, Bellevue. Estimated cost, $77,600.

Reconstructing tracks on Grant Street at Second Avenue. Estimated cost, $6,000.

To install electric switch in Second Avenue at the junction of the Greenfield Avenue car line. Estimated cost, $300.

Reconstructing tracks on the approach to the Wilmerding viaduct. Estimated cost, $8,500.

To remove present tracks on Pacific Avenue, John Street and Windsor Street, McKeesport, and repave that part of the streets occupied by the tracks. Estimated cost, $5,000.

Reconstructing tracks on Third Avenue between Grant Street and Market Street. Estimated cost, $12,000.

Reconstructing tracks on Charles Street, Knoxville. Estimated cost, $40,000.

Reconstructing tracks, switches and frogs at the Riverview Passing siding on the Charleroi interurban division. Estimated cost, $3,500.

Constructing loop at the Riverview station on the route of the interurban line to Charleroi. Estimated cost, $10,250.

Reconstructing tracks on East Ohio Street from Sandusky to Chestnut Streets. Estimated cost, $52,500.

Reconstructing tracks on Allegheny Avenue between Western Avenue and Pennsylvania Avenue. Estimated cost, $24,000.

Reconstructing tracks on Federal Street between Ohio Street and North Avenue. Estimated cost, $22,500.

Reconstructing tracks on Fifth Avenue between Highland and Penn Avenues. Estimated cost, $55,000.

Constructing single line track from Larimer Avenue as extended from the present terminus in Broad Street, to Frankstown Avenue, a distance of 150 ft. Estimated cost, $5,400.

Purchasing land for the construction of a loop at the end of the Lincoln avenue car line. Estimated cost, $17,700.

Reconstructing tracks on the approach of the West Braddock bridge, Rankin. Estimated cost, $5,275.

Altering and changes at the Rankin car house. Estimated cost, $5,000.

Making repairs to stone abutments of the Duquesne viaduct No. 2, between Munhall and Duquesne. Estimated cost, $4,500.

Fire Extinguisher Forces Unite

Announcement has been made of the consolidation of the Foamite Firefoam Company and the O. J. Childs Corporation, Inc. The Foamite Company developed the application of the firefoam method of extinguishing fires. The O. J. Childs Corporation is the developer of chemical and motor fire apparatus. The new corporation will be known as the Foamite-Childs Corporation and will have its executive offices at Utica, N. Y.

Metal, Coal and Material Prices

Metals—New York	Aug. 15, 1922
Copper, electrolytic, cents per lb	14.00
Copper wire base, cents per lb	15.625
Lead, cents per lb	5.775
Zinc, cents per lb	6.50
Tin, Straits, cents per lb	32.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$10.125
Somerset mine run, Boston, net tons	......
Pittsburgh mine run, Pittsburgh, net tons	......
Franklin, Ill., screenings, Chicago, net tons	......
Central, Ill., screenings, Chicago, net tons	....
Kansas screenings, Kansas City, net tons	6.00
Materials	
Rubber-covered wire, N. Y., cents per lb.	6.05
Weatherproof wire base, N. Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.05
Linseed oil (5-bbl. lots), N. Y., cents per gal.	91.50
White lead, (100-lb. keg), N. Y., cents per lb.	12.50
Turpentine, (bbl. lots), N. Y., per gal.	$1.12

Track and Roadway

Muskegon Traction & Lighting Company, Muskegon, Mich., is spending about $70,000 in improvements, mostly for laying new rails on Western Avenue, for the entire length of the business section.

The Connecticut Company, New Haven, Conn., has started reconstruction of tracks on Burnside Avenue, Hartford, at an estimated cost of $25,000. New rails and ties with concrete base and surface of asphalt will be laid.

Wisconsin Rapids Street Railroad, Wisconsin Rapids, Wis., will extend its line as soon as the paving work makes laying of tracks possible. The Board of Directors recently voted unanimously for the extension.

Southwestern Traction Company, Temple, Tex., will build a 5½ mile extension to Lake Worth. At this point the municipal authorities have appropriated 500 acres of land for an amusement park. The railway cost is estimated at $400,000.

Omaha & Council Bluffs Street Railway, Omaha, Neb., has awarded the contract for double tracking the toll bridge between Omaha and Council Bluffs to the Mount Vernon Bridge Company. About 3,000 tons of new steel and 1,500 tons of remodeled steel will be used. The total cost of the entire reconstruction will be approximately $700,000. The contract specifies that the work should be finished by May 1, 1923.

Signal Equipment

Northwestern Elevated Railroad, Chicago, Ill., has placed an order with the Union Switch & Signal Company for materials involved in the installation of an electro-pneumatic interlocking at Howard Street Terminal. A fifty-one-lever Model 14 electro-pneumatic machine composed of twenty-three working levers for the control of forty-three signals and eight automatic train stops, nineteen levers for the control of eighteen switches and seven double slips, two spare levers and seven spare spaces, is required for the control of this interlocking. Model 14 electro-pneumatic switch and lock movements controlled by Style "C" cutoff valves will be used for the operation of all switches and slips. One and two-arm low-type electro-pneumatic signals as standard on the Northwestern Elevated Railroad will be used throughout. Electro-pneumatic train stops will be installed for the protection of all principal routes. Alternating-current track circuits will provide control for electric switch detector locking, sectional route locking and the control of an illuminated track diagram.

South Side Elevated Railroad of Chicago, Ill., has placed an order with the Union Switch & Signal for materials involved in the installation of an electro-pneumatic interlocking at Jackson Park on the South Side. The installation involves an eleven-lever frame, Model 14 electro-pneumatic machine composed of four working levers for the control of ten signals and three stops, four levers for the control of six switches, and three spare levers. Alternating-current track circuits will be installed for the control of electric detector locking. The switches will be operated by Model 14 electro-pneumatic switch and lock movements, controlled by Style "C" cutoff valves. All principal routes will be protected by electro-pneumatic train stops. The signals will be the electro-pneumatic one and two-arm low-type as standard with this railroad.

Rolling Stock

Chicago (Ill.) Surface Lines will build in its own shops the 69 two-man motor cars and the 45 d.t. one-man cars mentioned in the July 22 issue.

Jamestown, Westfield & Northwestern Railroad, Jamestown, N. Y., is planning on the purchase of several additional electric locomotives and possibly some car equipment.

Guelph (Ont.) Radial Railway announces that the City Council has approved an expenditure of $150,000 for putting its lines in good condition and for providing ten one-man cars.

Buffalo & Lake Erie Traction Company, Erie, Pa., will reconstruct its old type cars for one-man operation. A few months ago the company purchased twenty-five of the new type equipments.

The Toronto Transportation Commission has placed with the Canadian Car & Foundry Company, Ltd., an order for fifty electric cars of the Peter Witt type, together with an order for 100 modern passenger trailers.

Cincinnati (Ohio) Traction Company has ordered seventy-five double-truck cars from the Cincinnati Car Company, in line with the announcement made in these columns July 8. A rumor of proposed purchase of 200 additional cars is unfounded.

San Francisco Municipal Railway will receive bids Sept. 6 through the Board of Public Works for the construction and equipment of an additional twenty new cars. Bids are called for in four groups, covering the bodies, car trucks, motor equipment and air brake equipment.

The City Railways Company, Dayton, Ohio, is operating some double truck one-man cars provided with turnstiles at the rear. The cars were recently built by the Cincinnati Car Company and are operated as front-entrance, pay-enter, rear-exit. Drew mirrors are used on the outside to enable the operator to obtain a view of the rear steps. A signal indicates when doors are properly closed.

Detroit (Mich.) Municipal Railway has placed orders for 200 Peter Witt cars. The McGuire-Cummings Company will build twenty-five steel bodies, the St. Louis Car Company seventy-five, and the Kuhlman Car Company 100. The 100 pairs of trucks for the first two orders will be furnished by the Taylor Electric Truck Company and the remaining 100 pairs are to be furnished by the J. G. Brill Company.

Trade Notes

George S. Bigelow of the Mountain Varnish & Color Works, Toledo, Ohio, has resigned.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that it has recently extended its line of non-automatic and automatic manually operated oil circuit breakers by the addition of breakers of larger capacity, known as type F-22.

National Carbon Company, Inc., Cleveland, Ohio, announces the opening of two finishing plants, one in New York and the other in Chicago, for taking care of emergency requirements of carbon brushes for electric railways. Where quick service is necessary, users should send their orders to the nearest finishing plant.

A. R. McLean, formerly president of the Industrial Protective Company of Dayton, Ohio, and well known for his special work for electric railway companies, has become associated with the Corporation Service Bureau of Cleveland, Ohio, as general manager. D. H. Boyle is president of this concern and L. A. Christiansen vice-president.

G. A. Blackmore, first vice-president of the Union Switch & Signal Company, has had the additional duties of general manager added to his work. Mr. Blackmore entered the service of the company in July, 1896. In July, 1904, he was transferred to the New York office in connection with work on the Interborough Rapid Transit subways and the New York terminal of the Pennsylvania Railroad. In March, 1909, he was appointed assistant Eastern manager, with headquarters in New York, and in April, 1911, was made Eastern manager, in charge of the New York, Montreal and Atlanta offices. He was appointed general sales manager of the company in 1915 with headquarters in Swissvale, Pa., and was elected vice-president in January, 1917.

New Advertising Literature

Ford, Bacon & Davis, Inc., New York, N. Y., has recently issued Pamphlet No. 46 telling about the scope of its service including its engineering, construction and management activities.

The J. G. Brill Company, Philadelphia, Pa., has issued bulletin No. 264 giving instructions for placing Birney safety cars in service. A plan view of a double-end Birney safety car is given with various colorings for the different air lines. Equipment parts are designated by letters.

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No Lack of Discussion at Wisconsin Meeting

WISCONSIN electric railway operators were jubilant over the unqualified success of their first meeting held apart from the other sections of the Wisconsin Utilities Association and attended by at least one representative from nearly every electric railway in the State. They had a right to be, for they listened to papers that would recompense any conclave of managers, superintendents and master mechanics for the time spent. The exceptional interest was partly due also to the expeditious manner in which everything was conducted, from the opening session to the final golf game. This reflects the efficient and thorough preparations made under the direction of the chairman. There was no time during which the chairman had to beg for some one to end the silence, while occasionally the floor was in considerable demand. The success of this meeting again proves the value of the comparatively small informal gathering of men all interested in the same subjects.

Burning English Coal Gives Railways New Problem

THE use of Welsh coal to help out the fuel shortage has introduced a new problem to the power departments of the Boston and New York railways. The Interborough Rapid Transit Company of New York began using this coal under a number of its boilers last week. It was found that at boiler outputs of from 200 to 225 per cent rating, the coal burned beautifully, but when it became necessary to force the boilers to from 300 to 320 per cent rating, a thick crust would form over the fuel, which checked the air supply so that the steam pressure dropped nearly 25 per cent. Boston reported the same trouble, accompanied by a reduction of steam pressure of approximately 35 per cent.

In analysis, this coal is considered of superior quality. It has approximately 14,500 B.t.u., is approximately 15 per cent volatile and is low in ash. In order to burn it satisfactorily at the higher rating, provision must be made so that there will be no crust, or else some method must be provided for breaking it when it is once formed. The present design of stokers in use do not permit of the use of slice bars, but an attempt is being made to give increased air supply. This plan was adopted after consultation with the stoker manufacturers, who advised that better results may be expected if the air openings in the tuyeres are increased in size and the air velocity decreased.

There is no doubt that if burning of English coal is to be continued a satisfactory stoker design can be worked out, but as the use of this grade of fuel may be but temporary, extensive changes are not desirable. The Interborough Rapid Transit Company has reported that it has 30,000 tons of English coal in the harbor and 150,000 tons on the way. Owing to the inability of the company to get full generating capacity from its boilers with this coal under present conditions, it has been obliged to cut its subway and elevated rush-hour service approximately 10 per cent and this has been agreed to by the New York Transit Commission. Just how long the cut in service will continue will depend entirely upon the results of the experiments now going forward as to the burning of this fuel and also the quantity of American coal that can be obtained. In the meantime it is reported that considerable English coal is coming in, though as yet no other electric railway company in New York has used it.

Improving the Availability Factor

FOR YEARS the growth of traffic on the Chicago Elevated Railroads has been almost at a standstill, while that on the Chicago Surface Lines has increased enormously. This is accounted for primarily by the high "availability factor" of the street cars, though the excellence of the surface service must be mentioned as an equally important factor. In no city in the country is the competition given to the rapid transit system so severe in point of speed as in Chicago. The street cars there are everywhere, while the rapid transit system comprises only a single line into each main section of the city. As the result, practically all the short-ride business and much long-ride traffic goes to the surface lines. To a very large degree, only the long-haul passengers living within a radius of less than a mile purchase the faster "L" service. The long rider will walk several blocks to the elevated for the time he can save in the journey and for the more pleasant ride resulting from fewer stops and higher running speed. But when he is going only a mile or two he takes the more readily available service, which is nearly always the street car. And for his long ride, if he must walk far to get the "L," he takes the near-at-hand street car, which makes almost as good time, except for occasional delay.

Hence the problem of the Chicago Elevated Railroads has been how to increase the availability of the service. This would be one of the obvious advantages, of course, of consolidating the elevated and surface systems, for then the surface lines could be utilized as feeders for the "L." Every Chicago traction study made has recommended that plan. But the two systems continue as paralleling, competing services.

Now comes a new transportation tool—the bus—that requires no structure, no track, and no overhead or third rail construction—only the investment in the vehicle itself. Imagine hundreds of lines of motor buses, branching out in both lateral directions from each of the elevated rail line trunks, virtually bringing the rapid transit railway to every important neighborhood now remote from it. That this would greatly improve the availability factor of the elevated within the economic limits of investment seems apparent. The elevated organization has been quick to see the field of the bus as an auxiliary or feeder to the railway and is soon to start operation of three such bus lines. If these prove their value in bringing new traffic to the railway, there are actually hundreds of places in Chicago where they can be installed by the elevated company with equal profit.

Such extension of the service of the elevated railway should normally carry with it some added charge. But under the competitive conditions existing in Chicago, with a fare differential already present of 1⅔ to 3 cents in favor of the street car, it is probably impractical to charge for a transfer between bus and "L." The plan will be to issue free transfers, and dependence for more profit will have to be placed on the fact that considerable increase in volume of traffic can be handled on the railroad at a very small additional operating expense and without increase of fixed charges, taxes and overhead expense. Here is a fundamental and most interesting development in the urban transportation art in this country.

Chicagoans to Ride on Weekly Pass

WITH the proposed inauguration on Sept. 18 of a $1.25 unlimited-ride, transferable weekly pass on the Chicago Elevated Railroads, this blanket form of transportation will receive a trial on the rapid transit lines of the second largest city of America. Readers of this journal are, of course, familiar with the development of the idea in this country, through the publication of numerous articles on installations and results. At this time some fifteen cities in the United States and Canada have adopted the transferable weekly pass, following the pioneer installation at Racine, Wis., in August, 1919.

At first it seemed as if this pass would not find much attraction with operators or public in cities larger than 100,000—in other words, in communities too large for any extensive development of the home-to-lunch riding, which seemed to be the chief value of the pass. However, the experience of the Youngstown Municipal Railway, serving a community of 175,000 persons, not only showed the pass to be an effective eliminator of individually owned jitneys but also a powerful encourager of luncheon riding by all those within reasonable riding distance from their homes.

In taking the jump from Youngstown to Chicago, it is obvious that riding home for lunch will be a very small factor in a metropolitan city. To offset this is the condition that many thousands of Chicago's workers —such as the office men of the big factories—are within 1 to 3 miles of good restaurants. With the pass in their possession, there seems no question that they will gradually get the habit of riding down to the Loop or to some local center in the opposite direction, either for lunch or for a bit of shopping. Another important point is that the great diversity of instruction and entertainment in a large city like Chicago offers many incentives to riding. The student has a variety of night and day schools; the grown-up has his lodges, night shops, social obligations, etc.; and, of course, all ages are keen for amusements on holidays and evenings. The man who uses the "L" regularly for his home-to-office, long-distance riding will be strongly inclined to walk an extra few blocks to use the "L" for his short riding, if he has a pass that entitles him to a "free" ride. Likely enough he will have a companion or two who will also be induced to use the route the passholder desires. This will seemingly mean that the "L" will secure more short-haul passengers and derive a little more revenue from each of those who buy passes. The latter will use the service more at a lower cost per ride.

The bugaboo that an unlimited-ride, transferable weekly pass means unlimited riding has long been dispelled by the experience of pass users, both here and abroad. European experience with monthly and longer-period personal passes has shown that the holder does not tend to average more than four rides a day. The same general average has been found to hold true on American installations with bearer passes, the higher figures being found in smaller cities because of the immediate large increase in mid-day riding. In the case of a small city, these four rides a day are nearly always between the same or practically the same points, because nearly all the shopping, business and amusement activities are within a few blocks of each other.

In the case of Chicago, it is not to be expected that this will be so. The average length of ride is much too long to be taken four times a day and there would be no possibility of repeating the rush-hour pair of rides in any event. The most likely development is that the extra mid-day, holiday and evening rides will be but one-fourth to one-half the length of the rush-hour rides. In going to work, the passholder will take his usual long trip to the Loop or beyond it. In going to shop or play, the passholder will usually go to one of the great neighborhood centers which have grown up in Chicago within 1 to 3 miles or so from his home. Therefore, should the number of rides per pass per diem be as high as four or more, it would not follow at all that the doubling of trips had doubled the passenger mileage.

In putting on the pass, President Budd is embarking on a courageous adventure in gaining more good will from the public, aside from getting his patrons to think along the correct merchandising lines of "a wholesale rate for wholesale use." Therefore, whether the pass proves profitable or not, the management deserves praise for making it possible for its regular riders to get the maximum amount of service with the minimum amount of trouble and low cost per ride.

Disorder and Dynamite in a Failing Cause

AN ATTEMPT at murder was made at Buffalo a few days ago. As a result a score of people are in the hospitals. Reference is made to the derailing by dynamite of a train of the International Railway, the employees of which are on strike. The strikers and their sympathizers may not have had anything to do with causing the wreck, but suspicion points their way. It is not the first act of violence in connection with the strike, but it is by far the most appalling in its consequences to the public. Already a reward of $10,000 has been offered for the apprehension and conviction of those who had a hand in causing the derailment. It was a dastardly deed, the wrecking of this train of excursionists. The Mitten management, which runs the road, has been accused by the men on strike of being a benevolent despotism. However that may be, there are worse things than life under a benevolent despotism. And one of these is life under a despotism of disorder and dynamite.

The Butt-Weld Process of Rail Joinery

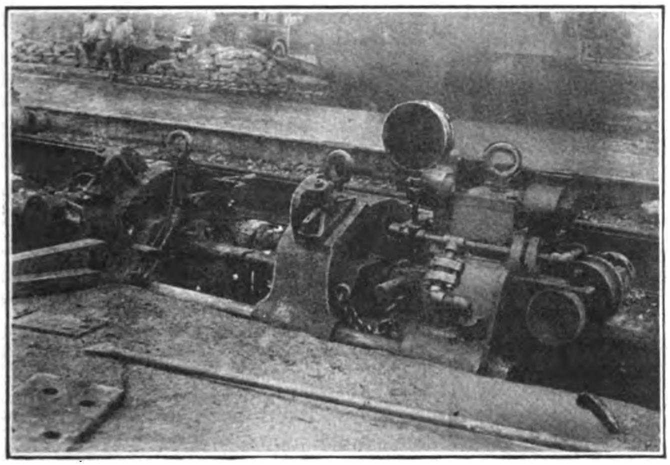
During Past Two and One-Half Years 1,000 Joints Made Under the Jacobs Patents Have Been Under Observation in Regular Service—They Appear to Be Giving Excellent Satisfaction

AT THE Quebec meeting of the Canadian Electric Railway Association, held June 1 to 3, 1922, a paper on welded rail joints was read by E. B. Entwisle, chief engineer Lorain Steel Company. In his paper* Mr. Entwisle gave a brief account of the new butt-weld joint which is being developed by his company under the Jacobs patents. Since the meeting Mr. Entwisle and his associates have furnished additional information as follows:

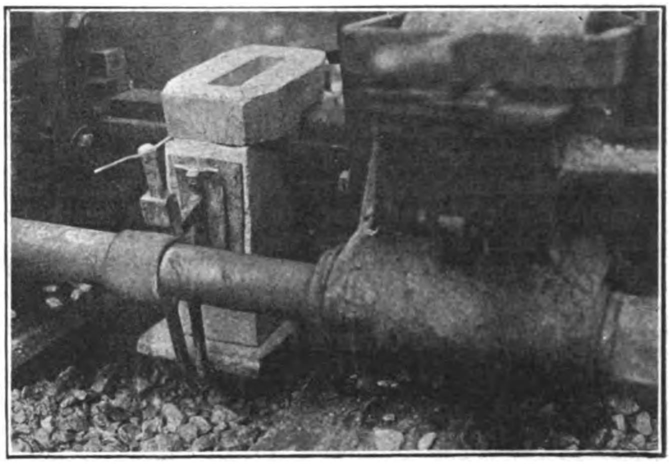
The Lorain Steel Company purchased the patents of Charles F. Jacobs in April, 1917, but owing to the war and the fact that considerable experimental work was required to make his process commercially practicable, active work was not begun until several years later. Most street railway men are familiar with the electrically welded bar joint which this company has been applying during the past twenty-five years, which process has still a wide field of application not only in the rehabilitation of old track but also in the welding of new rails where conditions make it desirable to lay the track in advance of welding the joints. Practically a million of these joints are now in use.

The butt-weld process consists essentially in heating the ends, or abutting surfaces, of the rails to be joined, by having them in contact with a liquid flux which is heated above the welding point of steel by the passage of a comparatively small electric current. When the rail ends have reached a welding heat, they are forced together by means of a powerful clamp.

The apparatus is mounted on two trolley cars, the first containing a 30-kw. motor-driven alternating-current generator, a motor-driven air compressor and a furnace for melting the flux. In addition this car carries the two rail clamps from job to job. At the rear of this car is a reheating torch attached by air and fuel hose. The car also contains tanks for fuel oil and compressed air used for operating the melting furnace and reheating torches, and a switchboard.



THIS CLAMP HAS NOT YET BEEN WEDGED TO THE RAIL. A WEDGE BLOCK APPEARS AT LEFT



THE MOLDS ARE IN PLACE BUT STILL NEED TO BE SEALED WITH WET CLAY

The second car carries on its front end a grinding machine for restoring the head and groove of the rail to original shape after the weld has been made. Inside this car is a molding bench where clay molds for holding flux around the rail end are made, and there is a bake oven here also for drying the molds.

HOW THE JOINT IS MADE

In the application of the process the rails are placed on the ties and spiked to a few ties only, sufficient to hold the rails to gage. If the bed is very uneven, sufficient ballast is thrown in so that a fair line and surface can be obtained. The first rails to be joined are left with an opening between them of about ½ in. Subsequent rails can be laid tight.

The rail clamp is then brought into position over the joint and two crossheads or yokes are securely fastened to each rail by means of wedge-shaped filler blocks which have a bearing against the web of the rail and fill the fishing spaces, thus automatically bringing the two rails into line with each other. A spacer is then inserted between the rail ends and a pressure of 5,000 lb. per square inch is applied to force the rails together. This is done by means of hydraulic pumps acting on two rams that engage the middle or sliding crosshead, the casting carrying the rams being secured to the other crosshead by means of the two side rods. The full pressure is applied before the molds are set in place to insure that the rails do not slip in the crossheads and that these will carry the rails with them when pressure is applied in making the welds. The pressure is then released and the spacer is withdrawn.

Four molds are next set around the rail ends, the opening in them forming a receptacle for containing the flux. The molds inclose the rails on all sides, so that only the end surfaces of the latter are exposed to the action of the flux. The opening in the top mold is made wider to form a reservoir.

After the molds have been put into position and the

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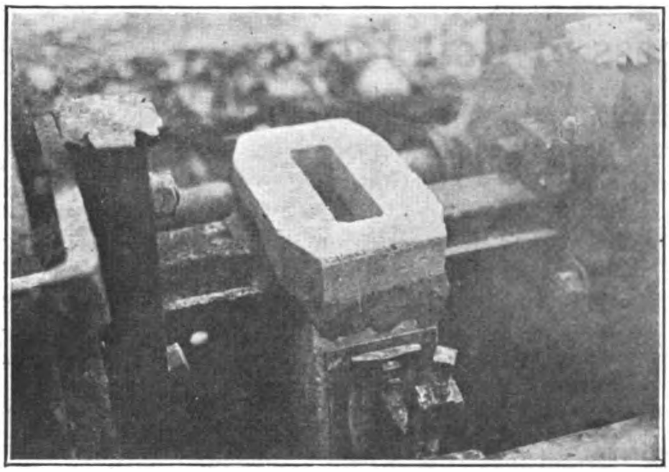
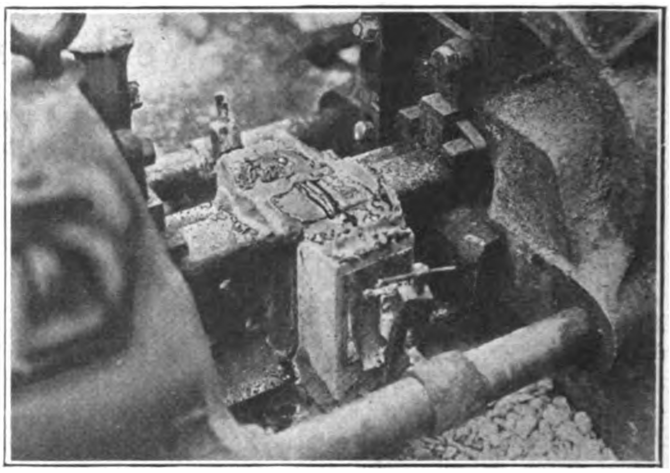
*See issue of this paper for June 10, 1922, page 940.



THE MOLDS SET AROUND THE RAIL ENDS ARE NOW READY FOR THE MOLTEN FLUX



THE WELD HAS BEEN MADE AND THE TOP MOLD REMOVED. HAMMERING COMES NEXT

joints between them and the rails have been closed by means of wet clay to prevent leakage, the cable terminals from the generator are clamped on to the crossheads and the generator is excited. As one side of the clamp is insulated, no current passes, as there is no contact between the two rails. The flux, which in the meantime has been heating in crucibles in the furnace carried at the front end of the car, is now poured into the molds, filling the space between the rail ends. Immediately the current flows from rail to rail through the interposed flux. In so doing it heats the flux to a high degree above the welding heat of the steel. The end surfaces of the rail, being in contact with the hot flux, themselves come to a welding heat.

HAMMERING GIVES A FORGING FINISH TO THE OPERATION

After about three and one-half minutes, for a 9-in. 141-lb. rail, the rail ends have come to the required temperature and pressure is applied. The rails are forced together and simultaneously the current is cut off. About a half minute before a welding heat is reached, the current reaches its maximum value of approximately 1,650 amp. This requires about 40 volts.

Immediately after pressure is applied the top mold is knocked off and the heated portion of the rail across the head is hammered, thus producing a forging effect. The pressure is maintained until the rail has cooled below its critical temperature, when the other molds are knocked off and the clamps are released.

The pressure upsets each rail about $\frac{5}{16}$ in., so that it is shortened about $\frac{5}{8}$ in. in the process of welding. The upset forms a "flash" about $\frac{3}{4}$ in. wide down the web and around the foot of the rail. Across the head the upset is somewhat wider due to the greater width of the opening in the top mold.

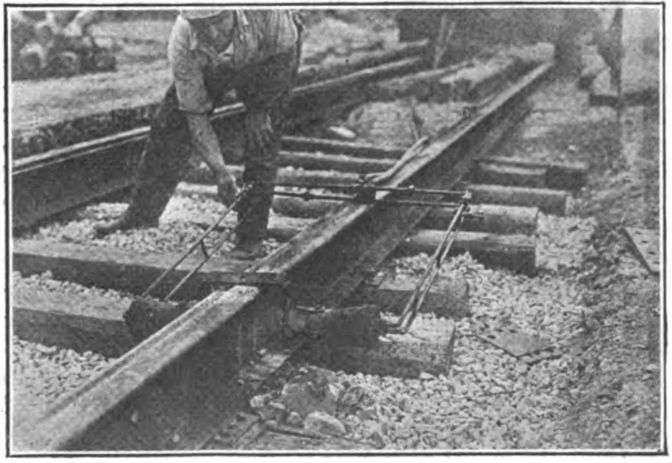
After the welding car has passed over the weld, the reheating torches are applied to reheat the web of the rail at the weld. The flame is directed to the center of the web, directly over the weld, and the web is reheated to about 1,500 deg. F., or just above the critical temperature. This relieves any stresses that may have been set up due to the end pressure or other causes. The grinder car is then brought into position and the top surface of the rail at the weld is restored to its original shape. Any irregularities which cannot be reached by the machine grinder are afterward removed by a small hand grinder.

As a continuous process, from two to two and one-half joints are welded each hour.

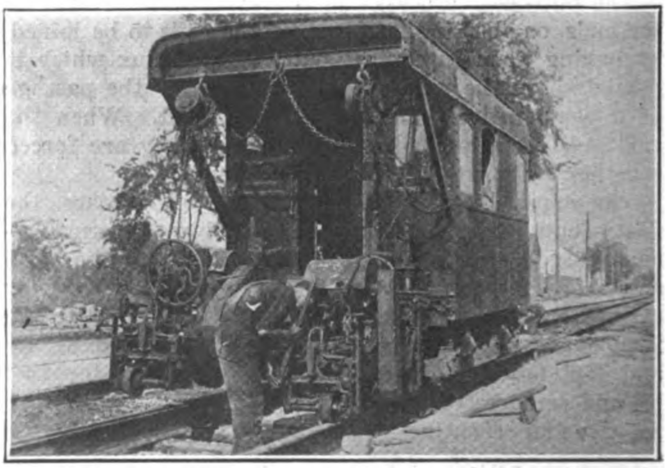
WHERE THE JOINTS HAVE BEEN INSTALLED

The first experimental installation of the process was made on Frankstown Avenue, East Liberty, Pa., on the tracks of the Pittsburgh Railways, in November and December, 1919. At first only 1,500 lb. pressure was used, but experience shows this to be insufficient and the pressure was gradually increased to 5,000 lb. per square inch.

In the early months of the experiment, difficulties were encountered due to a horizontal fracture that developed across the weld in the web, indicating a stress



THE WEB OF THE RAIL NOW REQUIRES REHEATING BY MEANS OF REHEATING TORCHES



THE GRINDING MACHINE RESTORES THE RAIL CONTOUR AT THE JOINT tending to separate the head from the foot of the rail. This difficulty was finally removed by reheating. At first, also, chill plates were used to prevent overheating of the web, but experiments at Johnstown during the winter of 1920 and 1921 showed that chill plates could be entirely dispensed with by changing the mold so as to restrict the flux more nearly to the shape of the rail section.

Experiments also showed that not only is the reheating beneficial immediately after a weld has been made, but it can be applied to old joints also. In every case it was demonstrated beyond doubt that, by reheating, the stresses are entirely relieved and nothing is to be feared from this source if the work has been properly done. Fracturing in the web was confined entirely to the 9-in. rails with their thin wide web, and in no cases were rails of 7 in. in height or less fractured. However, in practice all welds are reheated.

During the summer of 1921 butt welds were installed as follows:

Johnstown, Pa., on the tracks of the Johnstown Traction Company. Ninety-three welds on 134-lb. 9-in. rails. Two continuous rails were produced, each 2,700 ft. long. There have been no broken welds or other fractures on this work.

Boston, Mass., on the surface tracks of the Boston Elevated Railway. Two hundred and seventy-five welds on 122-lb. 7-in. girder rails, 118 welds on 100-lb. A. R. A. standard tee rail, ninety-four welds on 134-lb. 9-in. girder rail, and twenty-seven welds on 124-lb. narrow-groove 9-in. girder rail, a total of 504 welds. One weld on the 134-lb. 9-in. girder rail parted before the job was completed, due to insufficient heating.

Philadelphia, Pa., Philadelphia Rapid Transit Company. Nine hundred* welds on 144-lb. 9-in. girder rail. In Philadelphia the rails were welded on the side of the street before they were placed in the track, the welding apparatus being mounted on a motor truck. Sections from 600 to 900 ft. long were welded and afterward rolled over into position.

Some of the track welded in Johnstown was on curves of long radius. In such cases the rail to be welded was laid out straight ahead of the one to which it was to be joined. The weld was then made, after which the rail was sprung to the required curvature, the bend at the weld being accomplished the same as elsewhere along the rail without any indication of the location of the welds in the finished curves. In Boston, curves in which the rails had previously been bent to the proper radius were welded without any difficulty.

Outing Days by Trolley

"OUTING Days by Trolley" is the kind of publicity folder that makes you want to go. And in the last analysis that is saying that it is the highest form of advertising, for the principles which the ad writer keeps always in mind are: (1) Attract attention; (2) sustain the interest; (3) compel action. W. P. Strandborg, publicity agent of the Portland Railway, Light & Power Company, Portland, Ore., has done all three. Page one lists as attractions along the company's lines picnicking, camping, dancing, bathing, fishing and hiking, with a thought thrown in about chicken dinners. Best of all, the intending excursionist after having all these attractions called to his attention is told on page ten, the last page of the folder, that there are reduced round-trip rates, good Sundays only, to Ostacada at $1 and to Bull Run and Dodge Park at 75 cents.

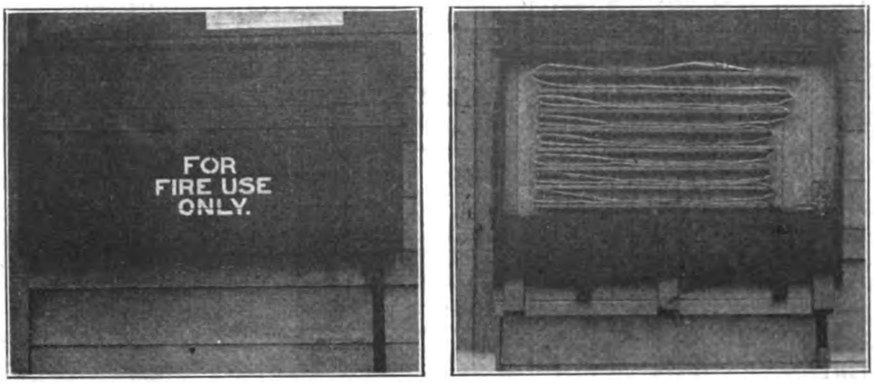
Pacific Electric Standardizes Fire-Fighting Apparatus

Employees at the Company's Stations Are Provided with Simple Equipment for Combating Incipient Fires and Holding Other Fires in Check Until Assistance Arrives

By Clifford A. Elliott
Cost Engineer, Engineering Department, Pacific Electric Railway, Los Angeles, Cal.

RECENTLY the Pacific Electric Railway has been making an extensive campaign to reduce fire hazards throughout the property. A feature was the more complete standardization of fire-fighting equipment at stations.

Among the features of the standardization was the placing on each freight platform of several water barrels supplied with fire buckets. Also, inside each freight warehouse two 2½ gal. chemical portable fire extinguishers were placed.



Hose Cabinet Placed Outside of Station of Pacific Electric Railway as Part of Fire-Fighting Campaign

On each of two sides of the station building a newly adopted type of fire-hose case has been installed. The case is of pine, 5 ft. long, 33 in. high and 8 in. deep at the bottom and 5¾ in. deep at the top, over all. Inside are eight wood hose shelves, giving a capacity for 75 ft. of 1½-in. fire hose. The cases are painted red and lettered: "For Fire Use Only."

The case is provided with two doors hinged respectively at top and bottom. It is sealed when not in use for fire purposes. A hydrant projects through a hole in the bottom of the case, the valve being inside and hence protected from interference. The hose is permanently attached to the hydrant.

Each station is also equipped with a ladder which remains outside the building. Of course, this ladder, as well as the hose and any other fire equipment left outside the building, is liable to be stolen. However, during three years there has been little if any loss of such equipment by theft, and it is felt that the slight risk in this direction is more than offset by the insurance against the spread of fire which this arrangement provides.

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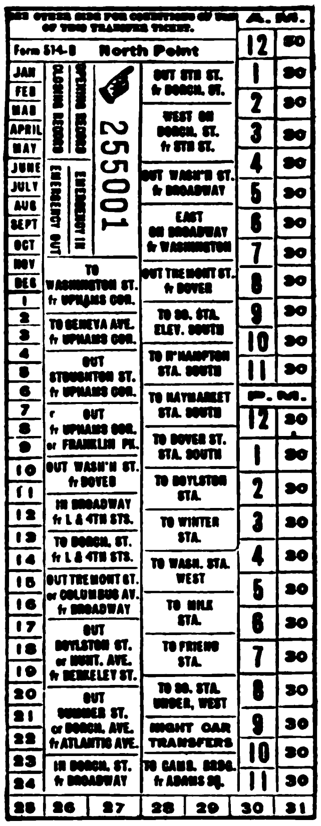
*The number will be one thousand by the end of this season.

Boston Tries New Transfer

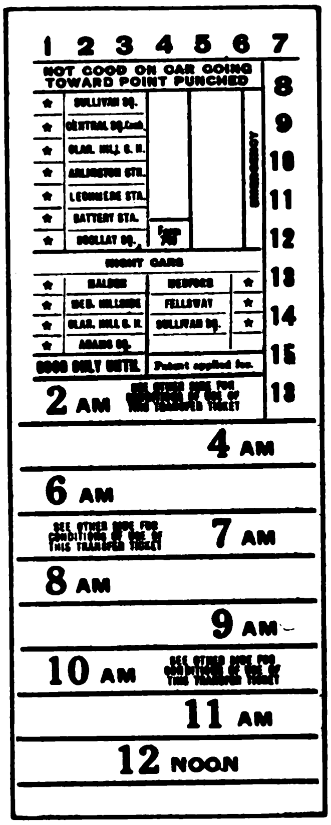
It Dispenses with the Need for Being Punched When Issued—Through Its Use the Number of Transfers Issued Has Been Reduced 25 per Cent

FOR many years there was a constant increase in the number of transfers required on the Boston Elevated system, and at one time the number of transfers issued daily amounted to nearly 200,000. The introduction of rapid transit service on elevated and subway lines with a number of inclosed transfer areas considerably changed the former transfer arrangements, so that now the number of paper transfer stations is about eighty-six and the number of transfers issued daily is about 150,000.

Until 1921 no essential change was made in the form of transfer tickets used in Boston. The present practice is for each conductor to carry two forms very much alike in arrangement except that they are different colors; one contains the inbound destinations and the other the outbound. It was found impracticable to combine these two tickets. One of these transfers is reproduced.


SEE OTHER SIDE FOR CONDITIONS OF USE OF THIS TRANSFER TICKET.
Form 514-B North Point
A. M.
12 30 1 30 2 30 3 30 4 30 5 30 6 30 7 30 8 30 9 30 10 30 11 30
P. M.
12 30 1 30 2 30 3 30 4 30 5 30 6 30 7 30 8 30 9 30 10 30 11 30
JAN FEB MAR APRIL MAY JUNE JULY AUG SEPT OCT NOV DEC
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
CLOSING RECORD
OPENING RECORD
EMERGENCY OUT
EMERGENCY IN
255001
OUT 5TH ST. fr DORCH. ST.
WEST ON DORCH. ST. fr 5TH ST.
OUT WASH'N ST. fr BROADWAY
EAST ON BROADWAY fr WASHINGTON
OUT TREMONT ST. fr DOVER
TO SO. STA. ELEV. SOUTH
TO N'HAMPTON STA. SOUTH
TO HAYMARKET STA. SOUTH
TO DOVER ST. STA. SOUTH
TO BOYLSTON STA.
TO WINTER STA.
TO WASH. STA. WEST
TO MILK STA.
TO FRIEND STA.
TO SO. STA. UNDER, WEST
NIGHT CAR TRANSFERS
TO CAMB. BRDG. fr ADAMS SQ.
TO WASHINGTON ST. fr UPHAMS COR.
TO GENEVA AVE. fr UPHAMS COR.
OUT STOUGHTON ST. fr UPHAMS COR.
OUT fr UPHAMS COR. or FRANKLIN PK.
OUT WASH'N ST. fr DOVER
IN BROADWAY fr L & 4TH STS.
TO DORCH. ST. fr L & 4TH STS.
OUT TREMONT ST. or COLUMBUS AV. fr BROADWAY
OUT BOYLSTON ST. or HUNT. AVE. fr BERKELEY ST.
OUT SUMMER ST. or DORCH. AVE. fr ATLANTIC AVE.
IN DORCH. ST. fr BROADWAY

OLD TRANSFER


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
NOT GOOD ON CAR GOING TOWARD POINT PUNCHED
★ SULLIVAN SQ.
★ CENTRAL SQ.Camb.
★ CLAR. HILL & H.
★ ARLINGTON STA.
★ LECHMERE STA.
★ BATTERY STA.
★ SCOLLAY SQ.
NIGHT CARS
★ MALDEN
★ MEDFORD
★ HILLSIDE
★ FELLSWAY
★ CLAR. HILL & H.
★ SULLIVAN SQ.
★ ADAMS SQ.
GOOD ONLY UNTIL
Patent applied for.
2 AM
SEE OTHER SIDE FOR CONDITIONS OF USE OF THIS TRANSFER TICKET
4 AM
6 AM
SEE OTHER SIDE FOR CONDITIONS OF USE OF THIS TRANSFER TICKET
7 AM
8 AM
9 AM
10 AM
SEE OTHER SIDE FOR CONDITIONS OF USE OF THIS TRANSFER TICKET
11 AM
12 NOON

PROPOSED TRANSFER

These transfers are punched by the issuing conductor to show the month, day, point and direction and time limit of the transfer. This requires four punches, as the point and direction are indicated by one punch. The day of the month can be punched before the car leaves the carhouse, but at the time of its issue the transfer has to have two punches, namely, point and direction and time.

During recent years, the seating capacity of the two-man cars used in Boston has increased from thirty-six to sixty-eight. This has meant a corresponding increase of transfers issued per car and a greater need of simplification of transfers.

Some time ago the management began to study the situation carefully, and at present a test is being made on certain lines with the form shown herewith at the right. In this transfer the line punched is the starting point of the car, not the point at which the passenger changes cars, and the transfer is good at any regular transfer point in any direction except for return to the point punched.

The time on this new transfer is indicated by coupons, the time limit being hourly. The transfer is stapled at the bottom and the conductor issuing the transfer tears it off at the proper line and leaves on the stub the remainder of the ticket.

The month is printed in large type on the face of the ticket and the day of the month is punched with a "V" punch before the transfer is issued to the conductor. Before starting on his trip, the conductor punches the starting point, so that when he issues the ticket to a passenger he has only to tear off the ticket at the proper point to have it properly time-limited.

Separate transfers are printed for the morning and afternoon. To help make the day of the month more distinct the ticket used during the first part of the month shows the days from the first to the sixteenth and that portion which is used during the last part of the month contains the numbers from seventeen to thirty-one.

The introduction of this ticket has proceeded from carhouse to carhouse and thus far it has proved satisfactory. Its basic idea was suggested by the general auditor of the company, and it had an intensive study by the transportation officials and the conductors before it was put in trial service.

New Track Costs $7 per Foot

L. L. ALLBRITTON, general manager Wichita Falls (Tex.) Traction Company, is enthusiastic regarding a track construction job completed some months ago in which the cost of a 3,700-ft. job, including the excavation through the paving and everything except overhead, was $6.98 per lineal foot. This work was done in building a new line of track for the purpose of making a cut-off in one of the divisions and saving more than a half mile. This was necessary in carrying out a rerouting program.

The new track was put in a street paved with solid concrete. A strip was broken out of the center, 6 ft. 10 in. wide, and excavated to a depth of 14 in. Dayton mechanical ties were used with 75-lb. standard A. S. C. E. T-rail. The special trackwork contained 120-lb. rail. The ties were placed on 3-ft. centers and were imbedded in 1:2:4 concrete, made with screened sand and hard limestone rock. The concrete was covered with about 4 in. of soil and allowed to stand for twenty-eight days before operation began.

All joints were electrically seam welded, using Indianapolis Switch & Frog Company "Apex" joint bars and a resistance type welder. Three pounds of welding steel were used on each joint.

Mr. Allbritton says of this track: "There is no doubt in my mind but that we have a piece of track that will be good for the entire life of the rail. The resiliency we obtain from these ties will more than pay for their cost. Churches and residents along this route have complimented us very highly on the seeming smoothness and quiet running of the cars over this track."

Effect of Peak Loads on Railway Motors

Care Should Be Used in Overloading Ventilated Motors Through Trailer Hauling, as They Are Not Able to Carry as Heavy Loads in Proportion to Their Continuous Rating as Non-Ventilated Motors

BY G. M. WOODS
Railway Engineer, Westinghouse Electric & Manufacturing Company

THE present general adoption of train operation, either multiple unit or motor car and trailer, has resulted in the recognition of certain factors not previously given sufficient consideration. In the choice of a type of train, it is well known that certain conditions of grade or heavy snows may make trailer operation undesirable. It may be impracticable to provide motors sufficiently large for trailer hauling and have satisfactory clearance under the motor and gear case when wheels of 26-in. diameter are used. The smoother operation of multiple-unit trains in starting and stopping may make them preferable to trains composed of motor cars and trailers. In many instances the cost of operation for motor cars and trailers may be higher than for multiple-unit trains because the motors of the cars intended for trailer hauling must be uneconomically large and of too high speed for single car operation. A greater percentage of spare cars must also be provided when trailers are hauled, for trouble with the motor car ties up both cars of the train.

The heating effect of short time overloads on railway motors, especially when ventilated motors are used, has been given considerable study in the past few years. It is generally recognized that ventilated motors are less able to carry as heavy loads in proportion to their continuous ratings as non-ventilated motors, and greater care must be exercised in imposing such loads as trailer hauling. While the average load may be well within the motor's capacity, serious overheating frequently results from overloads of short duration. Recent investigations show also that many non-ventilated motors, which have been used for trailer hauling for several years, are subjected to such severe overloads that very high motor maintenance either now exists or may be expected. In some instances the present overloading is due largely to the fact that changed traffic conditions have necessitated increases in schedule speeds. The high maintenance has been accepted as a necessary evil brought on by new requirements, but in the purchase of new equipments the present overloading would be avoided either by the purchase of larger motors or by buying cars equipped for multiple-unit operation.

Even when the heating of the motor remains within safe limits, heavy peak currents may be drawn which will cause serious motor trouble other than roasting of insulation. The brush-holder contact hammers and shunts become heavily loaded and an appreciable current flows between the brushes and brush box sides, and through the springs. The springs may become overheated with consequent loss of tension. At extremely high currents the motor field iron becomes saturated and the field strength remains the same, while the armature reaction increases almost directly as the current. All of these conditions tend to induce flashing of motors.

The flow of current between brushes and brush boxes causes burning of the brushes and increases side wear. The brush boxes also become rough and the wear of carbons is further accelerated. The carbons become loose in the boxes and poor commutation follows. Heavy currents of such short duration that no overheating of windings results may cause hot spots on the commutator which develop into flat spots. Flat spots constitute one of the most common causes of poor commutation and flashing.

While hot banding of armatures, dipping and baking, and other methods of modern motor manufacture tend to produce a substantial mechanical structure, an electrical winding is inherently semi-flexible, for the fits obtained in the joining of entirely metallic parts cannot be attained when insulated wires enter the construction. A railway motor winding is free to move a certain amount when subjected to vibration or the mechanical stresses set up by heavy currents. The stresses in the windings increase as the current increases, but at a varying rate depending on the degree of magnetic saturation. The stresses in the windings at low magnetic densities are nearly proportional to the square of the current, and after saturation is reached, are approximately directly proportional to the current. Motor field coils are frequently so greatly distorted by the rush of current due to flashing that they have to be removed and are of scrap value only. Tests show that the armature windings of railway motors move in the slots when heavy currents are applied.

REWINDING OFTEN DISCLOSES DEFECTS

There have been numerous examples of railway motors operating fairly successfully for years with temperature rises much higher than ordinarily regarded as permissible. Whenever occasional rewinds were necessary, the insulation was found in a seriously deteriorated condition; but because of the absence of electrical and mechanical shocks, failures were infrequent.

An example of failures being caused by vibration after certain motors had been overloaded in other service is of particular interest because of the absence of overloading during the period immediately preceding the failures. A number of motors were worked rather close to their capacity in frequent-stop city service for a number of years with entirely satisfactory results. The motors were then changed to suburban service of much easier character so far as heating conditions were concerned, but of such a character that shocks and vibration were more severe. There were a number of failures of armatures shortly after the motors went into the new service. Investigation showed the insulation to be in a dry, lifeless state as a result of former overheating, although the motors were operated far under their capacity in the suburban service. After the motors were rewound, however, they again operated with very low maintenance.

The setting of circuit breakers and overload trips should be based on a motor's capacity and commutating limits and so far as motor performance is concerned should be unaffected by service conditions. The manufacturers of electrical equipment are sometimes asked for an overload protection device which can be set at a certain value for single car operation and readily changed to a higher value when trailers are hauled. It is desired to have the proper overload protection of the motors when single cars are operated but the requirements of trailer operation make it necessary to sacrifice some of the protection. In other instances recommendations of a "new" circuit breaker setting are requested so that the frequent tripping of breakers when trailers are hauled can be eliminated. Increased maintenance of motors may surely be expected as a result of increased breaker setting.

A few years ago the performance of some quadruple equipments of 50-hp. motors used for hauling trailers was investigated. The equipments originally were rather liberally applied to cars weighing 46,000 lb., and trailer hauling was not considered at the time the equipments were purchased. Later developments made train operation desirable and the use of the excess capacity of the 50-hp. motors to haul trailers one and one-quarter hours in the morning and an equal period in the afternoon apparently offered the cheapest solution to the problem. Tests showed that the temperature rise of the motors was well within safe limits under the conditions of operation. They also indicated, however, that the motors were subjected to heavy peak currents during the period of trailer hauling. With rush hour loads the tons per motor were increased 70 per cent. In spite of the lower accelerating rate of motor car and trailer the average accelerating current was increased from 71 amp. to 94. Under one severe condition of grade and acceleration, a peak load of 200 amp. per motor was observed. This current is 270 per cent of the one-hour rating of the motor. Under the same conditions of grade and acceleration, the motor current for motor car would have been only 125 amp., which is 170 per cent of the motor's one-hour rating. Motor maintenance increased greatly after trailers were hauled, although failures traceable to overheating were rare.

Experience shows that it is not sound engineering practice to assume that a certain motor equipment will be satisfactory for trailer hauling simply because motor temperatures are observed and found to be within safe limits. A number of the most perplexing troubles encountered in railway motor operation are undoubtedly caused by peak loads of such short duration that their heating effect is negligible. Trailer hauling, especially with equipments not correctly applied for such service, is one of the most fruitful sources of excessive loads.

Blight-Infected Chestnut as Durable as Sound Chestnut

SERVICE records collected by the U. S. Forest Service indicate that chestnut posts, poles and ties cut from blight-infected trees are as durable in service as similar timbers cut from healthy trees. Inspections on posts in one locality during eight years of service showed that decay progresses about as rapidly in one as in the other. The blight fungus in a living tree grows in the bark, but it does not penetrate deeply into the wood itself. Blight-killed chestnut should be cut and utilized as soon as possible. Allowing dead trees to check and become infected with decay in the woods shortens the service life of timbers cut from the tree.

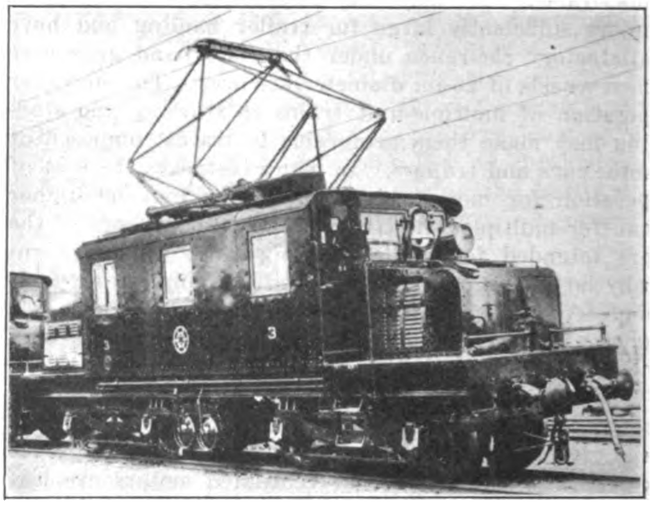
Electrification of Chichibu Railway

Japanese Railway Adopts New Form of Motive Power and Secures Equipment of American Make—The Mileage Affected Is Thirty-five

BY D. E. RENSHAW
Railway Equipment Engineering Department
Westinghouse Electric & Manufacturing Company

ONE of the first roads in Japan to install through electric service over its entire route is the Chichibu Railway, which covers approximately 35 route-miles from Kumagaya through Kagemori Kumagaya, the lower terminal, is a junction point with the Takasaki Line of the Imperial Government Railways which extend to Tokyo.

The chief source of revenue for the Chichibu Railways is Mount Buko, near Kagemori. This mountain is 4,500 ft. in height, and contains great deposits of limestone, some fine decorative stone and valuable timber. Approximately 300 tons of limestone are carried each day from Mount Buko to Kumagaya, whence it is routed over the government lines to the Asano cement mills in the suburbs of Tokyo. In addition lesser amounts of other materials are carried. The up grade traffic is very light.



AMERICAN-BUILT LOCOMOTIVE FOR USE ON JAPANESE RAILWAY NOW BEING ELECTRIFIED

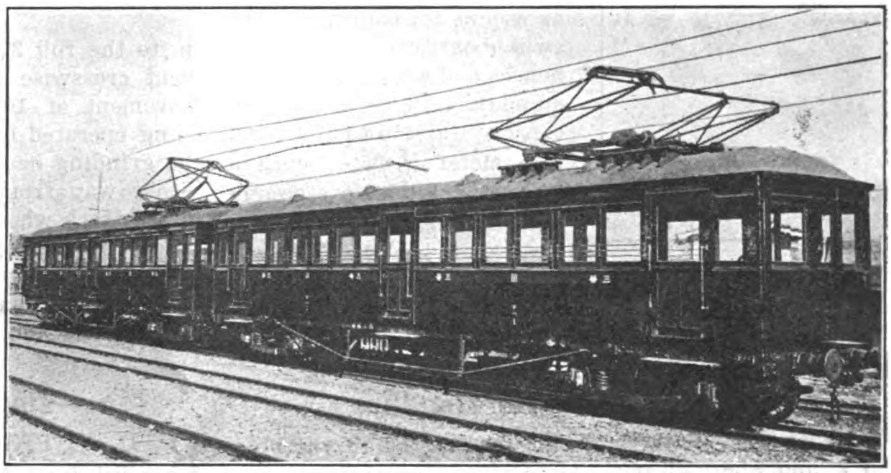
Five trains are run each way per day, each train being made up of fourteen freight cars, weighing 12 metric tons each, and four passenger cars of 9 metric tons each. Passenger traffic is very heavy at certain seasons, notably in the spring when the banks of the Arakawa River are lined with cherry blossoms and in summer when numbers of people make their homes at Hotosan, a short distance below Chichibu.

DATA FOR LOCOMOTIVES FOR CHICHIBU RAILWAYS

Dimensions	
Track gage	42 in.
Length over end frame	30 ft., 8 in.
Rigid wheelbase	7 ft., 4 in.
Total wheelbase	24 ft., 2 in.
Width over all	8 ft., 4 in.
Wheel diameter	38 in.
Height of buffer centers	34½ in.
Height of roof	10 ft., 11 in.
Minimum operating height of trolley	12 ft., 9 in.
Size of journals	5 in. x 9 in.
Weights	
Mechanical parts	50,000 lb.
Air brake	3,600 lb.
Electrical equipment	28,400 lb.
Total locomotive	82,000 lb.
Per axle	20,600 lb.

The grades are rather favorable for present traffic conditions since the heaviest loads travel from Mount

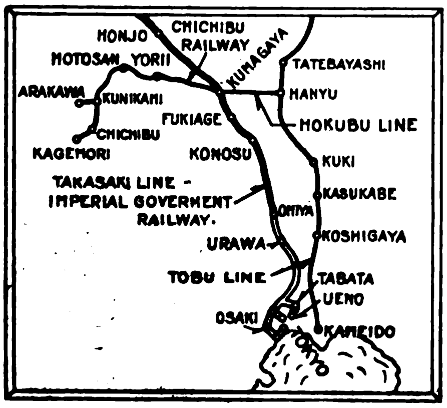
Buko toward Kumagaya, approximately 1,000 ft. lower. The maximum grade is 2.5 per cent but this is only a few hundred feet in length. There also exists something more than a mile of 2 per cent grade, and over the entire route the average is 0.5 per cent. A probable future extension of the Chichibu is across the mountains to connect in again with the government lines on the west side of the slope. The line which now extends from the east coast across the island to the Japan Sea has a single-track section, through the Usii Pass, where the grade is 6.7 per cent and which contains many tunnels. This section is electrified and is operated with 42½-ton rack locomotives of German make which haul light trains at low speed. The proposed extension of the Chichibu line would contain considerable 2.5 per cent grade, but over this profile train weights and speeds could be increased and the tonnage carried would greatly relieve the congestion at Usii Pass. The loads in this case would be heavy in both directions.



A MOTOR-CAR TRAIN ON THE CHICHIBU RAILWAY, JAPAN

The Chichibu Railway purchases its power from the Musashino Water Power Company, and converts to 1,200 volts direct current in substations located at Yorii and Chichibu. Each substation contains three Westinghouse 250-kw. rotary converters, with transforming and switching equipment to correspond. Two units are operated in series and the third unit is a spare.

The overhead is single catenary type. A 400,000-circ.mil feeder is run each way from each substation and is tied into the trolley at numerous points. Three similar additional rotaries, now on order, will be installed at Kumagaya to care for the load part way up the grade toward Yorii, and for an 8-mile extension to Hanyu. This extension is on the Hokubu Railway line, which will be operated by the Chichibu Railways, and connects the Chichibu line with the Tobu line, which parallels the government railway to Tokyo. It is planned that eventually the route from Kagemori to Hanyu to Tokyo will be electrified and operated as one system, giving a more direct route to the Asano cement mills than the present route.



THE CHICHIBU RAILWAY, SHOWN NEAR TOP OF MAP, IS NOW BEING ELECTRIFIED

To initiate the electric operation of the Chichibu Railways, the Westinghouse Company has recently shipped motor and control equipment for three multiple-unit cars and five complete Baldwin-Westinghouse locomotives. The motor cars weigh 28.8 metric tons complete without load, and will normally carry ninety people including those standing. The four motors for each car are type 546-J rated 60 hp. each, and the control is Westinghouse type H.L. arranged for straight 1,200 volts.

The initial motor car schedule calls for five single car trips each way each day, but this will be increased or decreased at various seasons to suit the traffic by omitting one or two trips, or by coupling on regular passenger coaches as trailers. Four additional duplicate equipments are now on order, and when they are received service will be extended to Hanyu and mixed trains will be abandoned. The passenger traffic will then be taken care of by the motor cars exclusively.

The locomotives are of the Baldwin-Westinghouse standard type. They have ratings of 520 hp. at 20 m.p.h. for one hour and 408 hp. at 22.5 m.p.h. continuously, with dimensions and weights as given in the accompanying table.

Although there were no radical departures from standard construction in the locomotive mechanical parts the weight and space restrictions necessitated a very close design. The limitations of track gage, cab width and allowable roof height, together with the railway's requirements for fairly large clearances under motor and gear case, necessitated the adoption of a 38-in. diameter wheel to allow the use of a motor of the specified capacity. As compared with American practice, the locomotive was "compressed" in height, width and weight, while the power requirements were not decreased. To compensate for this the truck bolster, the cab underframing, air duct, and the brake rigging were all specially designed to obtain low headroom.

The trucks are of the swivel, rigid bolster, equalized type with rolled steel bar side frames located outside the wheels. Wheels have cast-steel centers and rolled-steel tires. The draft rigging consists of hook and link-type couplers, with a take-up screw of a standard type.

The brake equipment is standard Westinghouse steam locomotive apparatus modified for electric locomotive application. It includes an independent brake for handling the locomotive alone, together with the standard quick acting automatic brake for both locomotive and train. Although the cars are not yet all provided with air brakes, it is planned so to équip them on this and other Japanese railways.

The arrangement of apparatus in the cab differs from American standard practice in only one important feature. In Japan, the engineman drives from the left-hand side of the cab. Therefore, for these locomotives, the relative positions of the master controller and brake valves are reversed as compared with American locomotives.

What's New from the Manufacturers

Portable Direct-Current Testing Meter

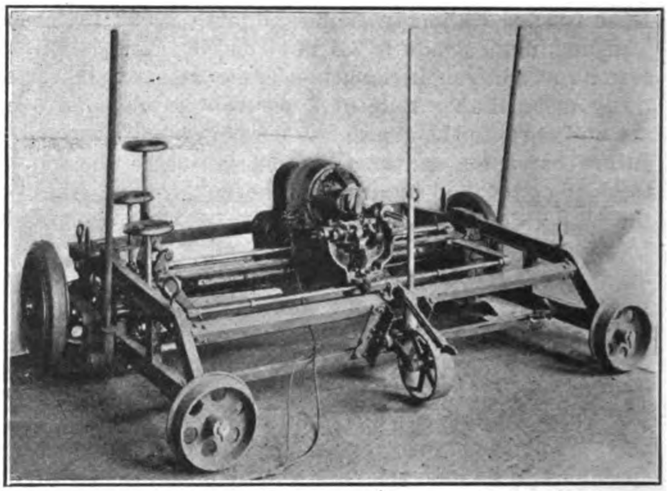
Portable Test Meter

A MERCURY type of portable direct-current test meter is now being produced by the Sangamo Electric Company, Springfield, Ill. With suitable shunts and multipliers it can be readily adapted for testing purposes as well as for calibrating the switchboard meters in power houses and substations. The standard will be of 10-amp. capacity for 110 to 220 volts. The meter is fitted with a magnetic clutch for stopping and starting, and a train reset to bring the indicator back to zero.

Storage Material Crawler Crane for Handling

WHERE railway materials are stored in the open and where all parts of the yard cannot be reached readily with track, a crawler crane has been found of advantage. To meet such conditions and for other construction uses the Link Belt Company, Chicago, Ill., has just brought out such a crane. It weighs complete without bucket approximately 22 tons and has a ground pressure of 10 lb. per square inch with the caterpillar tread as furnished. The crane will lift 10 tons at a 12-ft. radius and 3 tons at a 30-ft. radius. The hoisting speed is 125 ft. per minute with a maximum rope pull of 10,000 lb. on a single line. The crane is provided with two independent band-clutch-operated hoisting drums. The crane will rotate four complete revolutions per minute, travel ¾ m.p.h. and climb a 20 per cent grade. The shoes are 18 in. wide and the over-all width of the crawler tread is 9 ft. 7 in. The total bearing area is 30 sq.ft. Power is furnished by a Climax Engineering Company's four-cylinder, 5¼-in. x 7-in. heavy-duty tractor engine.

Machine for Grinding Rails



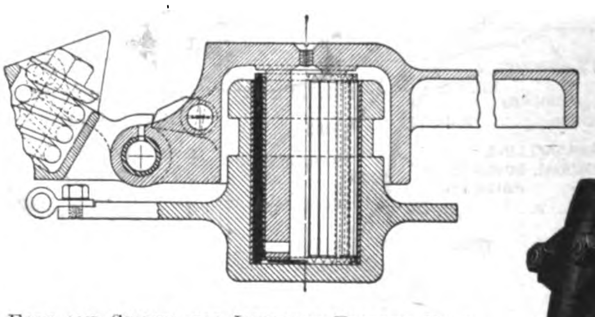
Machine for Grinding Track Rails

THE accompanying illustration shows a form of track grinder being placed on the market by the A. L. Brown Company, Worcester, Mass. The machine rests upon four track wheels, and two additional rubber-tired bearer wheels are provided which may be lowered by means of a lever and toggle joint to raise the machine clear of the track. With the weight supported by the rubber-tired wheels a third bearer wheel of iron in front serves to steer the machine. The grinding head has a transverse movement of 37 in. lengthwise of the track. This movement is power driven and may be set to reverse automatically at distances of from 1 in. to the full 37 in. The grinding head has a movement crosswise of the track of 6 in. and a vertical movement of 10 in., both of these latter movements being operated by hand wheels. The slide upon which the grinding head traverses may be tilted to any angle either way from the level up to 17 deg. Lock pins in the track wheels hold the truck stationary while it is in use or upon grades. The machine is driven by a 500-volt d.c. motor through two leather link belts, provided with a guard and with swinging idlers to maintain belt tension.

Improved Trolley Base

R. D. NUTTALL COMPANY, Pittsburgh, Pa., has just brought out a new trolley base which bears the type No. US-13-E. This is a roller bearing base and one of the distinctive features is the improved swivel arrangement, which is the reverse of other types of roller bearing bases. The swivel pin or inner race is inverted and is a part of the swivel cap, and the cap or outer race into which it is inserted is a part of the base. Some of the advantages claimed for this arrangement are that the lubricant is retained permanently and cannot run out on the car roof, and that this construction is practically dust and waterproof.

All rollers are hardened and secured in a case, which



Foot and Swivel for Improved Trolley Base

New Type Trolley Base

may be readily removed and replaced as a unit. The inner and outer races are hardened and ground. A trigger lock is provided to enable the carhouse maintainer to lock the socket down in a horizontal position. This permits the changing of poles in carhouses with very low headroom.

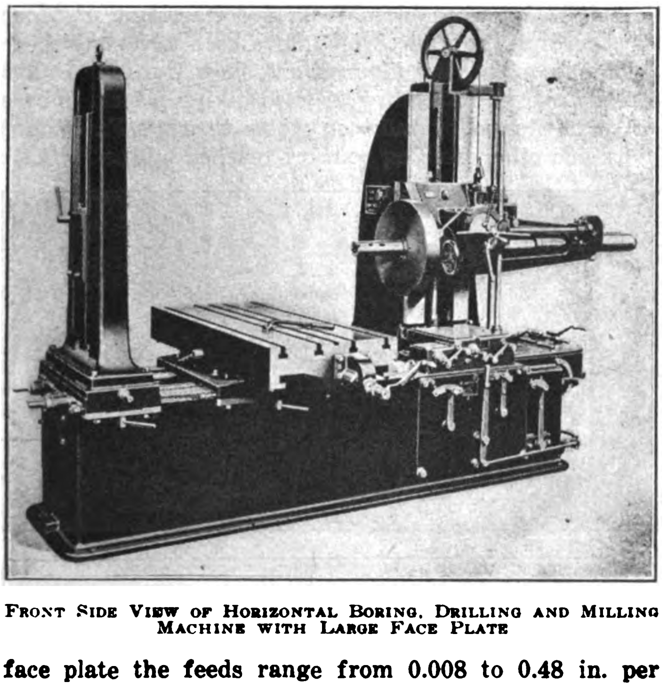
The pole socket axle pin, as well as the bearing, is hardened, and an oil hole is provided for lubrication. Two heavy bronze springs are provided for shunting the current from the pole socket to the base. A two-bolt pole socket clamp is another distinctive feature. It permits the changing of poles more quickly than where four-bolt clamps are used.

Handy Combination Machine

A NEW floor-type horizontal boring, drilling and milling machine has just been brought out by Pawling & Harnischfeger Company, Milwaukee, Wis. This machine is designated as No. 3T and some of the special features include a saddle fully counterbalanced with counterweight located inside the column, centralized control, externally and internally driven face plates, and automatic stops for saddle and platen.

The driving pulley is 14 in. in diameter for a 3-in. belt and makes 350 r.p.m., giving sixteen spindle speeds, ranging from 14½ to 225 r.p.m. with small face plate, and 8.7 to 136 r.p.m. with large face plate. Where motor drive is desired it is recommended that a 5-hp. constant-speed motor with speed about 1,200 to 1,400 r.p.m. be used.

There are eight geared feeds ranging from 0.005 to 0.288 in. per revolution of spindle for boring, and from 0.0084 to 0.44 per revolution of spindle for milling when using the small face plate. By using the large face plate the feeds range from 0.008 to 0.48 in. per revolution of spindle for boring and 0.013 to 0.73 in. per revolution of spindle for milling. The rate of feed is the same for every part to which it is applied, and not more than one feed can be engaged at the same time.

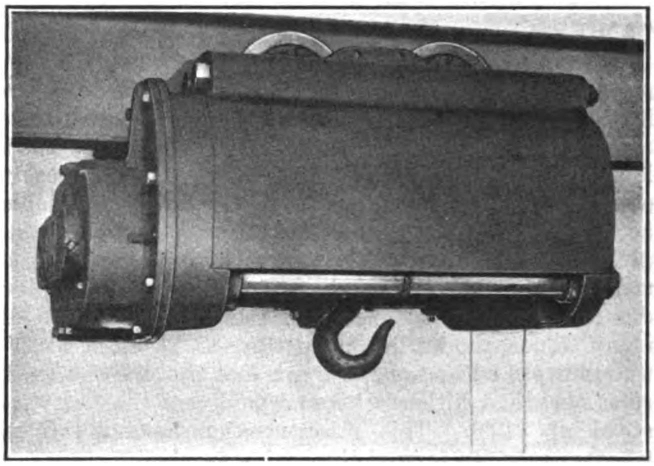


FRONT SIDE VIEW OF HORIZONTAL BORING, DRILLING AND MILLING MACHINE WITH LARGE FACE PLATE

All operating levers and hand wheels are within easy reach of the operator and conveniently arranged for the operations required. The starting, stopping, reversing and changing of feeds or speeds, fast or slow, by hand or power, are controlled by the operator, without moving from his position. The movements of all levers are interlocked so that it is impossible to have any two conflicting speeds or feeds in action at the same time.

Hoist for Short Headroom

THE Standard Electric Crane & Hoist Company of Philadelphia, Pa., has brought out a monorail electric hoist which is particularly useful in shops where headroom is restricted. This hoist requires but 14 in. of headroom, which is much less than the usual type of monorail hoist.



MONORAIL ELECTRIC HOIST FOR SHORT HEADROOM

In the construction of this hoist all shafts are of high carbon steel, heat treated and ground to size with roller bearing races pressed on the ends. The bearings are of the Hyatt high-duty type. Only plain, straight spur gears are used for the hoisting drive. The gears are of forged steel and are contained in the end housing. Pinions are of high carbon steel heat treated. The right and left-hand cable grooves of the hoisting drum coil the rope in a single layer. The cable is connected to the exterior of the drum so that it can be easily removed or replaced. The controller used with this hoist is also of a new type, built especially for hoist service. All parts are fireproof and are protected from dust and moisture. The hoisting motor is fully inclosed and is equipped with high-grade ball bearings.

The automatic mechanical lowering brake runs in an oil bath and is of the screw and disk type geared to the intermediate shaft. The automatic holding brake works on a pulley mounted on the hoisting motor shaft proper. When the load block has reached its upper limit of travel, an automatic device serves to break the electrical circuit and applies the holding brake. The hoists are built in five types, ranging in capacity from 2,000 to 10,000 lb.

New Strain Insulator

A NEW "Duro" strain insulator for insulating the trolley wire from its supports is being marketed by the Westinghouse Electric & Manufacturing Company. The insulator is designed to give the essential mechanical strength and a high flash-over voltage. A malleable-iron socket is filled with insulation in which is inserted a forged steel stud. The entire body is surrounded by molded insulation which is infusable and unaffected by ordinary temperatures. The insulation is also moisture-proof and will not shrink with age.

Electric Railway Publicity

Devoted to How to Tell the Story

Good Advertising Must Iterate and Reiterate Your Story

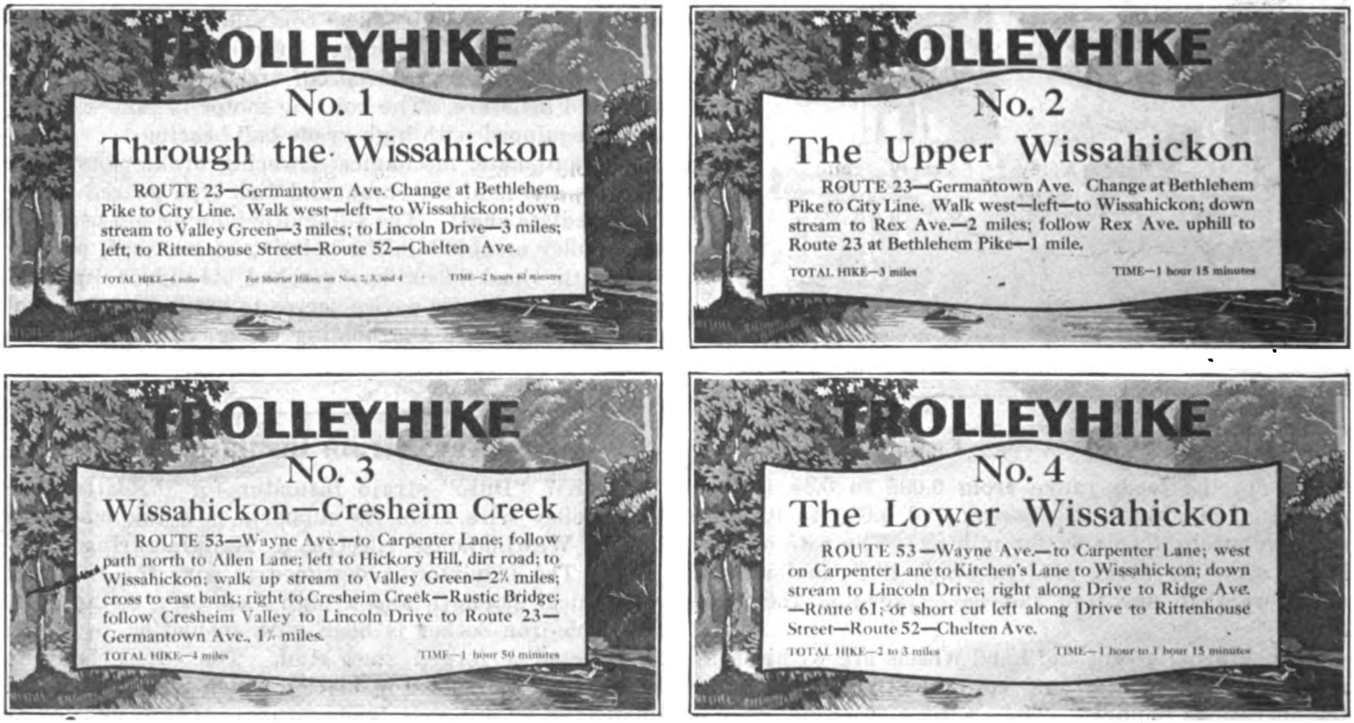
THERE are a great many theories about advertising, but one factor is common to the most diverse viewpoints, namely, that a story cannot be told too often and in too many paraphrasings. An amusing proof of this comes from Youngstown, Ohio. When the Youngstown Municipal Railway announced its unlimited-ride weekly pass, it took the publicity bull by every available horn. Newspapers, car cards, talks to interested individuals and groups—these and other means were used most freely. For all that, the meaning of the innovation did not percolate at once into the understandings of many. Thus, the initial slogan "Ride all week for $1.25" was interpreted by some to mean that the twelve a week rides they had hitherto taken would cost that sum instead of $1.08. This misconception among foreign laborers actually formed the basis of a stupid attack in a foreign weekly.

In a recent talk before the Youngstown Advertising Club, Frank Wert, director of public relations for the company, mentioned several other diverting interpretations of the pass announcements. A number of people thought that they could not buy a pass unless they sat for the company's photographer and had their picture on the ticket. Others were at a loss to understand why the management should make the pass transferable, not realizing at the moment that identification on busy city cars is out of the question and that passholders buy the pass primarily for their own use anyway. Of course the persistent reiteration of what can be done with the pass has educated the Youngstown public to understand it now even better, perhaps, than does many a professional railway man. The obvious lesson is that no matter how simple a new idea may seem to its perpetrators it must be tapped in at frequent intervals rather than hammered into the consciousness of the public at one blow.

"Trolleyhikes" Popular Sport in Philadelphia

A UNIQUE and interesting campaign has been started recently by the Philadelphia (Pa.) Rapid Transit Company. It is designed to encourage people in quest of interesting walks to use the cars of the company to carry them to points from which the hikes may best begin. "Trolleyhikes," as the posters are headed which are being displayed by the company in its cars, tell their own story. In other words, trolley it before you hike it, and you will then have all the advantages of a real hike. Considerable advertising of the routes for the "trolleyhikes" has been done in the Philadelphia papers and in the company's own cars. This is a real service to the public who revel in long walks, and will also be beneficial to the railway because of the resulting increased riding. The company has already noted a considerable increase in riding on those lines feeding the walks which have been advertised.

The accompanying illustrations show the four routes already opened up leading to good hiking places. These will be followed by talks on walks through Fairmount Park and other walking country reached by the P. R. T.



TROLLEYHIKE

No. 1

Through the Wissahickon

ROUTE 23—Germantown Ave. Change at Bethlehem Pike to City Line. Walk west—left—to Wissahickon; down stream to Valley Green—3 miles; to Lincoln Drive—3 miles; left, to Rittenhouse Street—Route 52—Chelten Ave.

TOTAL HIKE—6 miles · For Shorter Hikes, see Nos. 2, 3, and 4 · TIME—2 hours 40 minutes

TROLLEYHIKE

No. 2

The Upper Wissahickon

ROUTE 23—Germantown Ave. Change at Bethlehem Pike to City Line. Walk west—left—to Wissahickon; down stream to Rex Ave.—2 miles; follow Rex Ave. uphill to Route 23 at Bethlehem Pike—1 mile.

TOTAL HIKE—3 miles · TIME—1 hour 15 minutes

TROLLEYHIKE

No. 3

Wissahickon—Cresheim Creek

ROUTE 53—Wayne Ave.—to Carpenter Lane; follow path north to Allen Lane; left to Hickory Hill, dirt road; to Wissahickon; walk up stream to Valley Green—2¼ miles; cross to east bank; right to Cresheim Creek—Rustic Bridge; follow Cresheim Valley to Lincoln Drive to Route 23—Germantown Ave., 1¼ miles.

TOTAL HIKE—4 miles · TIME—1 hour 50 minutes

TROLLEYHIKE

No. 4

The Lower Wissahickon

ROUTE 53—Wayne Ave.—to Carpenter Lane; west on Carpenter Lane to Kitchen's Lane to Wissahickon; down stream to Lincoln Drive; right along Drive to Ridge Ave. —Route 61; or short cut left along Drive to Rittenhouse Street—Route 52—Chelten Ave.

TOTAL HIKE—2 to 3 miles · TIME—1 hour to 1 hour 15 minutes

ADS THAT HAVE MADE HIKERS OF THE INDOLENT

TO OUR PATRONS

The company and all our Trainmen appreciate the manner in which our patrons are assisting us in carrying out the rule, *"Passengers Will Please Deposit Exact Fare In Fare Box"* Your co-operation is also aiding us to give 100 per cent service by having "EXACT FARE READY"

We Thank You WISCONSIN PUBLIC SERVICE CO.

5 **HOP=ON**

We are glad to meet such a large number of our regular customers on the cars each day—

We are just as glad to see new customers on the cars, for they represent old customers in the making, provided, we treat them *right* and give them *Real Service*—

Honestly, we are trying our best to do this WINTER and SUMMER.

Our operators are equally interested in giving you the best possible service during all kinds of weather

WILL TELL YOU MORE LATER WISCONSIN PUBLIC SERVICE COMPANY.

STREET CAR SERVICE IMPROVED

We have added four new safety cars. They are equipped with the latest improved efficient motors, air brakes, storm windows, temperature control on electric heaters, and safety devices, all of which contribute to COMFORTABLE AND RELIABLE SERVICE such as we desire to give at all times.

Success to You—1922 WISCONSIN PUBLIC SERVICE COMPANY.

TO OUR TRAINMEN

The good will and friendship of the community served by this Company is its most valuable asset and the strongest recommendation for promotion that any employe can have is the proof of courteous treatment extended to the Company's patrons by him.

Therefore, in dealing with the public and especially with the Company's patrons, it is sometimes necessary that employes observe patience and self-restraint always endeavoring to follow the dictates of good sense and prudence in order to retain a favorable impression.

Treat the public as any good business man would treat his customers.

WISCONSIN PUBLIC SERVICE COMPANY.

TAKE ADVANTAGE OF REDUCTION IN STREET CAR RATES

Strip Tickets—4 Rides, .25c . . Commutation Books—50 Rides $2.50

Strip Tickets may be purchased from Trainmen on Cars and at the Public Service Company Office

COMMUTATION BOOKS AT

Popp & Rother's Drug Store, 101 No. Broadway, Green Bay | John Arnol's Drug Store, . . West De Pere
Grimmer's Drug Store, . 1226 Main St., Green Bay | Mc Donald's Drug Store, . . East De Pere

FOR FURTHER INFORMATION TELEPHONE [illegible]

WISCONSIN PUBLIC SERVICE COMPANY

TO OUR PATRONS

Street cars are operated primarily for the convenience of the public, our patrons.

Without patrons, there need be no street cars.

In order to get more patrons, it is our aim to render increasingly better service.

We always welcome your suggestions or complaints.

They will have careful consideration and investigation.

Please remember it always takes two—the *Server* and the *Served*—to make first class service. Will you join us?

We Thank You Wisconsin Public Service Company.

GOOD-WILL CAR CARDS THAT ARE PRODUCING RESULTS

Getting the Right Spirit in Publicity

THE Wisconsin Public Service Company, Green Bay, Wis., is making use of a series of car cards placed on the two bulkheads of each car and changed bimonthly. Some of these are reproduced herewith to illustrate the success that has been attained in getting the publicity to reflect the spirit that begets good will and merchandises the service. Most of these cards have been addressed to the company's patrons, but there has been a twofold purpose. In addition to the obvious one of creating a friendly patronage, there has been the indirect purpose of inducing the trainmen and other employees to live up to these expressed policies. The card addressed to the trainmen has a dual purpose similarly, the public in this case being the indirect recipient of the message. If the editors of this paper are competent judges in such cases, they consider that the Green Bay company has succeeded in giving its publicity matter a very happy and effective treatment.

Advice to Railway Operators

AN EDITORIAL, "More About Public Relations Work," in the *Railway Age* for May 20, although addressed to steam railway executives, contains sound advice to electric railway operators. That paper said in part:

> The railways are fully and admirably equipped to present their case to law makers, commissions and courts. But law makers, commissions and courts are not going to settle the future of the railways. They are merely agents—the public is their principal. In this, as in other affairs, the principal will in the long run determine the policies carried out by the agents.
>
> Is it not a curious thing that so many railways—practically every railway in fact—should recognize the need for employing men of great ability to represent them before legislative committees, commissions and courts, and that so few should recognize the need for employing men of equal rank and ability to represent them before the public? Let us be frank about it. Is it not a fact that most railway managements so greatly underestimate the importance of effective public relations work that they would think a man was a little crazy who should suggest that each large road should have in charge of its public relations work a man as highly paid and as able as those at the head of its legal, operating, traffic and accounting departments? But has not the problem of establishing satisfactory relations between the railways and the public been proved by the experience of many years to be quite as difficult as any other problem confronting railroad managements? Is it not at least as far from solution as any other big problem of railroad management? The answers to these questions are obvious. If the problem presented by public relations is so big, so difficult and so far from solution, how can it be expected it will ever be solved unless by men who are able in proportion to the bigness of the problem and who can devote their time to it?

Key Route Campaigns Against Auto

AS A MEANS of increasing travel on the cars in winter time, the San Francisco & Oakland Terminal Railways, Oakland, Cal., is using posters printed in large type which are pasted on the car windows. One or two posters are placed in each car, according to the size of the equipment, on the side nearer the sidewalk. The appeal of the posters is made through the fact, particularly well known to the motorist, that it costs from 5 to 18 cents per mile to operate an automobile and that this is expensive means of travel for riding into the business district to work or to do light shopping. With the large type used, the outside lettering would show inside the car, even on heavy paper, hence it was not desirable to print on both sides of a single sheet, but the company wished to use the space occupied by the poster for both inside and outside reading matter. This end was attained by printing the two notices on the same side of a single double-sized poster and then folding in the middle before pasting on the glass.

SAVE YOUR AUTOMOBILE

Why bark your knuckles tinkering with your stiff and balky auto these cold mornings? Store it for the Winter and ride on the street cars.

6c

Will Take You Anywhere in Oakland, Berkeley or Alameda

LET'S GO!!

SAVE YOUR AUTOMOBILE

for Your Next Vacation—Put Your Auto Away for a Few Months and

USE THE STREET CARS

Then, with the money you save, you can take a long automobile trip next summer

6c *Will Take You Anywhere in* Oakland, Berkeley or Alameda —AND IN COMFORT **LET'S GO!!**

EFFECTIVE ADVERTISING PLACARDS USED BY KEY ROUTE LAST WINTER

One poster took the form of a teaser announcement which was visible to persons on the street. It read, "Ride on the street cars and read the other side of this placard."

The statement on the inside of the car was as follows:

> Save your automobile. Are you grinding the life out of your automobile by riding to work in it every day? Use the street cars and keep your machine for pleasure trips. Put the savings into a replacement fund. Six cents will take you anywhere in Oakland, Berkeley or Alameda, comfortably and safely.

Still another poster had the following admonition:

> Save your automobile. No blow-outs, no punctures, no parking worries, no danger of accidents, no thieves to protect against when you ride on the street cars. Six cents will take you anywhere in Oakland, Berkeley or Alameda. Let's go.

Wisconsin Men Have Highly Profitable Conference

First Convention of Railway Men Separate from Other Utility Sections Sets a Standard for Future Gatherings — Discussion on Papers Covering the Pertinent Topics of Lubrication, Maintenance of Brakes, Schedules and Safety Brings Out Much Valuable Experience

MEETING for the first time in several years as a separate utility unit, the railway men of Wisconsin convened in Green Bay last week for a two-day session. It is hardly enough to say that this initial summer convention of the railway division of the Wisconsin Utilities Association was a marked success from every standpoint. Aside from the fact that Chairman B. W. Arnold said that there are but two seasons in the Badger state, namely, winter and August, and that the hottest day was reserved for the opening day of the session, the ardor for making a whirlwind meeting was dampened only by the perspiration of the participants. The added heat of the discussion caused all coats to be removed and not even the best efforts of a switching locomotive, whose activities seemed to be mysteriously centered around the meeting room, could drown the discussion provoked by Henry Cordell's paper on bearing lubrication nor defeat the unanimous praise for the wonderful work done in educating employees to the full significance of safety work, so modestly outlined by Charles Warwick. At no time did interest lag in the meeting, which was attended by "the men on the firing line of nearly every railway in the State," to use the words of Chairman Arnold. The numbers were further augmented by the full quota of "commercial ambassadors," as the supply men will henceforth be known in Wisconsin.

Charles Warwick, manager Wisconsin Public Service Company in Green Bay, acted as host and arranged for the entertainment features as well as an inspection trip over his property in a special car. The party was shown a mile of single-track extension constructed with Dayton mechanical ties and welded joints, all imbedded in monolithic concrete to the head of the rail. At the shops a special demonstration of short-arc welding on axles, truck side frames, etc., was staged followed by an exhibition of thermit welding as applied to rail joints. The special car was then headed toward the beach, where some insisted on playing ball in spite of the torrid temperature while others sought relief in the dark-brown waters of Green Bay. The afternoon of play was continued into the evening when all sat down to a banquet at the Bay View beach pavilion. Levity was rife both during the banquet and the dance that followed.

Labert St. Clair, publicity director American Electric Railway Association, was the principal speaker of the evening and, in keeping with the spirit of the occasion, related the status of the electric railway industry in 1922 in the form of an analogy between railway management and matrimony. His very interesting address will be published in part next week.

In his opening remarks at the first session Chairman B. W. Arnold, Oshkosh, said:

"We should be proud of our branch of the utility business and should sell our wares with a pride equal to that of the president of the largest banking concern in our community. It is time to stop apologizing for the street railway business.

"A candidate for public office today must cease running on a platform of lower fares and reduced rates for the utilities. The public demands service and is willing to pay for it. This is the age of *service* and the reputation for *good service* is what will give us our place in the sun.

"The past five years have taught us important lessons in the value of public relations, strict economy of operation and the necessity of closer relations between employer and employee.

"It is my earnest desire that every delegate remember and practice the motto of the International Rotary Club, 'He profits most who serves best.'"

A WARNING OF THE COAL CRISIS

J. P. Pulliam, president of the Wisconsin Utilities Association, warned the consumers of coal in that locality against assuming a false sense of security as a result of the settlement of the strike. He declared that the damage wrought by the rail and coal strike had hardly begun to be felt and that the danger of utility shutdowns is still hanging over the public in a menacing manner. He estimated that the public utilities will suffer for the next six months and moreover that their coal bills will be five or six times the amount estimated at the beginning of the year. While the coal strike is settled, Mr. Pulliam maintained that the poor condition of steam railroad equipment will make it practically impossible to move all the coal into Wisconsin in time to prevent a great deal of suffering this winter.

The first formal paper to be read was one on the "Proper Maintenance and Lubrication of Railway Bearings," by Henry Cordell, master mechanic Chicago, North Shore & Milwaukee Railroad, Highwood, Ill. This paper appears in abstract on another page of this issue as does a written discussion prepared by J. H. Kouny, engineer of equipment the Milwaukee Electric Railway & Light Company.

As to the lubrication of ball-bearing motors, Earl F. Harra, master mechanic Eastern Wisconsin Electric Company, remarked that it was their practice to oil GE 258-C motors four times a year or about every 10,000 miles. The cost has been 7 cents per 1,000 car-miles, while there has been but one broken ball in three years time on all their safety car motors.

Frank P. Kittsley, master mechanic Milwaukee Northern Railway, claimed that he is getting good results with babbitt-lined cast-iron bearings. Motor bearings are lubricated on a two weeks basis and journals on a monthly basis. After trying lubrication on a basis of mileage and using a better grade of oil he found that cars had to be taken off the road at inconvenient times for inspection and he also noticed that pull-ins increased. For these reasons he has re-established the calendar inspection, using more oil of a cheaper grade.

Further information on several points was elicited from Mr. Cordell. The armature and journal bearing oiling periods on the North Shore are every 1,000 car-miles. To illustrate the effectiveness of that length of oiling period he said that the train delays on the North Shore Line are but one per 9,514 miles, and 74,219 miles are operated for every train failure.

Perhaps Mr. Cordell exaggerated facts a little when he claimed that the North Shore is a road which never has hot boxes. However, he was not to be outdone by the Scotchman from Iowa, John Sutherland, who claimed that his oiler would commit suicide if a hot box ever occurred on a car in Davenport.

As to the effect of one-direction operation, Mr. Cordell said that much trouble has been experienced on the Ravenswood line of the Chicago Elevated Railroads from hot armature bearings and sharp wheel flanges on the gear side with cars running continuously in one direction. The cause of these troubles has now been removed by turning the cars around once a week.

HOW TO GET EFFECTIVE BRAKING

In the remarks following the presentation of Mr. Hill's paper on "Maintenance of Brakes and Brake Rigging" it came out that good results are being obtained on several properties with a special self-lubricating fabric for brake cylinder pistons. This fabric, made by the Westinghouse Air Brake Company, has superseded leather on the Rockford & Interurban Railway and has been in use for about a year on the Chicago, North Shore & Milwaukee

Railroad. Mr. Cordell says that it is his practice to test cylinder leakage and that the maximum drop in cylinder pressure which is allowed is 3 lb. in five minutes. However, it has been his experience that this pressure drop seldom occurs when fabric packing is used.

Comment on slack adjusters showed that they are quite extensively and successfully used on a number of properties in Wisconsin and Illinois. According to Mr. Kouny, all the interurban equipment of the Milwaukee Electric Railway & Light Company has been provided with Anderson slack adjusters. The result has been that the car-defect reports from the crews have been cut down 75 per cent and the former frequent complaints from the transportation department about defective brakes have almost entirely ceased. Mr. Hill explained that slack adjusters on the cars of the Rockford & Interurban Railway have enabled him to run cars on a weekly inspection basis whereas a closer inspection period would otherwise be necessary. All interurban equipment of the North Shore Line has been equipped, he said, for over a year, with the Smith-Ward slack adjuster and during that time there has never been a failure in its positive action. He declared that they were foolproof and also reliable even after the cars had operated all winter through snow and slush.

STANDARD PISTON TRAVEL IMPORTANT

Mr. Cordell also emphasized the extreme importance of maintaining constant piston travel at all times with slack adjusters on safety cars. Experiments have shown him that the difference in time between an air application and the contact of the brake shoe with the wheel for a 3½ and a 6-in. piston travel is four-fifths of a second. Considering the condition of traffic through which safety cars must operate, he said that this interval may mean the difference between a safe stop and an accident. In other words, a constant piston travel will make the "feel" of one car similar to that of another and then the operator will not have to become accustomed to different braking characteristics for every car that he takes out.

Nels Jensen, master mechanic Wisconsin Valley Electric Company, has found by experience that proper piston travel is essential in order to have a good braking car and it also helps to eliminate unnecessary wear on the brake equipment in general. If the piston travel is unnecessarily long, the brake-cylinder pressure is thereby reduced and the time required in making stops correspondingly increased. In addition, a greater quantity of air is consumed in brake application than would otherwise be necessary. This causes correspondingly greater wear and heating of the air compressor. If the piston travel is too short, it is likely to cause dragging of the brake shoes while the brakes are released, too high a brake-cylinder pressure with an accompanying liability of sliding wheels, and rough and sudden stops. Besides, with a constantly varying piston travel, the motorman is never sure what retarding effect will follow any certain brake-pipe reduction and he will lose confidence in the flexibility of the brakes. He cannot become as expert in their manipulation as if the operation were more uniform, which, if proper installation has been made, becomes largely a question of piston travel.

On the Clinton, Davenport & Muscatine Railway John Sutherland, master mechanic, said that pull-ins had been reduced 93 per cent by the use of Anderson slack adjusters, which were applied to the cars five years ago. The decreased amount of inspection required has also eliminated one night and one day man in the carhouse. Mr. Sutherland has also effected a large decrease in maintenance and inspection costs by using brake shoes for 15 days only, although some serviceable material must be scrapped. With this method he knows that a car will never have to be removed from service to replace a brake shoe in that 15-day period. The brake rigging itself is given a thorough inspection annually when bushings, pins and other wearing parts are all replaced.

ACCOMMODATING SERVICE TO TRAFFIC

In line with the subject of regulation of service to suit traffic, opened with a paper by N. C. Rasmussen, J. A. Phelan, general superintendent Rockford City Traction Company and the Rockford Interurban Railway, told of the method used in Rockford to regulate schedules to meet the traffic, as follows:

"Frequent traffic checks have been of great assistance to us. We take passenger counts on all routes at frequent intervals by placing observers at the point of maximum loading, covering a period of eighteen hours. On routes where traffic is light, counts are made by the conductors and they report on specially prepared printed forms. These counts are graphically charted and compared, and have been responsible for several schedule and service changes. The adoption of variable running time and headway can be traced directly to these passenger counts.

"One of our lines starts out in the morning on a seven and one-half-minute headway with sixty minutes for a round trip, and at 8:30 a.m. the headway changes to ten minutes and the running time to fifty minutes for a round trip; at 3 p.m. it again changes back to a seven and one-half-minute headway with sixty minutes for a round trip, and at 8 p.m. changes to a ten-minute headway with fifty minutes for a round trip. This change of headway and running time is true on nearly all of our lines. One line has ten, seven and one-half and five-minute headways—seven and one-half minutes in the morning rush, ten during the normal hours and five during the evening rush.

"Our greatest problem is the tripper service. Our city is a large manufacturing center, and the factories are not all located in one district, although most of them are in the southeast end on a single-track line that has a loop seventeen blocks long and nine blocks wide. Some factories are on the west side of the loop, but most of them are on the east side. In the morning, we run our cars around the loop striking the east side of the loop first, delivering most of the passengers to their destination in the shortest possible time, and in the afternoon we reverse operation on the loop. We operate some trippers directly to the west side of the loop against traffic.

"A daily record is made of the number of passengers carried on trippers, and a daily record is also made of passengers carried on regular cars during the morning and evening rush period, usually from 6 to 8 a.m. and from 4 to 6 p.m. Our trippers are all numbered and we place a typewritten form at a convenient place in the carhouse, and when a man pulls in on a tripper he makes a record of the number of passengers handled. In this manner we have an accurate record of what our cars are doing. We have two inspectors, one directly in charge of trippers, and it is his duty to see that we are furnishing proper service, not too little and not too much. The second inspector is more of a supervisor and it is his duty to observe operation in general and give particular attention to service.

"One really striking example of the extent to which the automobile is cutting into our business is in this southeast end. We do not handle as many passengers by 25 per cent returning from the factory districts as we do going to it. In trying to find a reason for this, we discovered that these people ride home with friends or with some neighbor who collects a certain amount a week for this service and helps pay for his flivver.

"Our trippers from the factory district arrive in the center of the city at a time when stores and downtown factories are closing and we use them to supplement regular service. I agree with Mr. Rasmussen in the idea of through-routing trippers, but due to the fact that our factories have three closing times, namely, 4:30, 5 and 5:30 p.m., it has not been found advisable to install such a service.

"I believe in frequent headway and fairly rapid transportation. We have increased the headway on all our city lines in the last two years, and have increased the scheduled speed from 7½ to nearly 9 miles per hour. Two of our lines have a scheduled speed of over 10 miles per hour.

GETTING TRAFFIC IN LA CROSSE, WIS.

Why constant checking of traffic was necessary in La Crosse was told by C. L. Hedges, superintendent of transportation Wisconsin Railway, Light & Power Company, in a prepared discussion, which follows in part:

"We have a number of car riders in La Crosse who go home to their noon lunches. Mr. Rasmussen is right in his statement that we should encourage this traffic as much as possible. This traffic can be encouraged by having your cars on time and your cars at the transfer points promptly. During the past ten days I have had some construction work and it has been necessary for me to catch a car from our central point at 12:10 p.m. and ride eleven blocks, get my dinner and get back to the central point of town so as to catch the 12:50 p.m. car for North La Crosse. This gave me about twenty-eight minutes to eat my dinner, and I observed during these days that there were numerous clerks and stenographers employed by the Standard Oil Company and the La Crosse Pearl Button Company who had to make the same time. This clearly demonstrated to me that if we are to get the traffic of people going home for their noon lunch it is necessary that our service be on time during that period.

"Mr. Rasmussen has another good suggestion which I have tried out on numerous occasions, the through-routing of a car from one line to another line from the factories. We worked this to very good advantage last year at night when we sent a carload of passengers from our North Side line straight through on our South Side line with no transfers.

"I believe that one of the best things that an operating superintendent can do is to become acquainted with his passengers. By this I mean not limiting himself in his acquaintances to the more important business men and slighting those who might be considered more common factory hands. I am not a possessor of an automobile and perhaps am in closer touch with my riders on account of this fact. I believe that we can learn of a good many of our troubles through knowing the people who ride with us each day."

On the lines of the Milwaukee Electric Railway & Light Company the best and cheapest way of making a traffic check, according to A. J. Killa, is to have the conductors themselves make checks at certain designated points. The conductors in turn are checked by the supervisors. The schedules are based entirely on these counts, which, made in this way, have eliminated a large force of traffic checkers.

VALUE OF PUBLIC AND EMPLOYEE CO-OPERATION

After presentation of C. E. Warwick's paper on safety first work, which appears on page 301, Walter T. Bie, claim agent of Mr. Warwick's company, showed to what extent the remarkable work with the public and employees carried on by their own superintendent had reached. His own work, he said, as a claim agent, had been considerably lightened and the company had been benefited financially by the kindly feelings of witnesses toward operators, which meant that they had unconsciously shaded their stories of accidents in favor of the car operator and the company. By explaining to claimants that the effect of paying small claims would put a blot on the car man's record and that his bonus would be lost, he has found that many automobile owners can be persuaded to forego their claims.

Mr. Cordell outlined briefly the intensive continuous safety campaign carried on by the North Shore. Mr. Killa sketched briefly the organization of the Milwaukee Safety Committee, which is quite similar to that of the North Shore. Among other beneficial results obtained he spoke of the great decrease in the number of derailments because of the instruction received at the safety meetings.

In the discussion it was suggested that medals for various grades of efficiency in safety work were preferable to any monetary reward. This suggestion found no second among operators having experience in awarding prizes for safety work and they expressed the opinion that money talks with trainmen. The idea of giving a uniform to trainmen for a good safety record was thought worthy of consideration.

RESOLUTION ADOPTED

At the final session on Friday morning resolutions were adopted by the association that it approved Secretary Hoover's proposal that Congress grant the government broad powers to control the distribution and the prices of coal; that motor buses used as common carriers be placed by legislative enactment under the regulation of the railroad commission and be made to assume the same obligations as are now imposed upon such railways. A third resolution was adopted expressing the appreciation of the association for M. C. Ewing, general manager of the Wisconsin Valley Electric Company, Wausau, who died Aug. 11. Mr. Ewing was identified with the electric railway industry for the past fifteen years and was an active and earnest worker in the Wisconsin Utilities Association.

Maintenance and Lubrication of Railway Bearings*

An Outline of the Practice that Makes Hot Boxes an Extremely Rare Occurrence on the North Shore Road—Successful Lubrication Possible Only with Proper Mechanical Condition of Bearings

By HENRY CORDELL

Master Mechanic Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

IF A CAREFUL study were made today of the maintenance cost on electric railroads of this country, we would find that poor practices, cheap material and indifference to causes of bearing trouble figure as a big item in relation to operating cost.

We are all aware of the expensive repairs caused by hot armature bearings, which usually result in cut shaft, ruined bearings, and perhaps loss of armature winding and fields, due to contact with pole pieces. When this occurs the bands usually break and the coils are thrown out, and as the armature is thus not able to turn, the wheels are locked and flat wheels produced.

Hot journal bearings come second in resultant cost. Except in a few instances we find the journal scarred. This means labor to remove and refinish it, and results in a journal of reduced size, loss of service metal and increased chances for hot bearings due to increased load per square inch. As a rule, hot axle or suspension bearings are not so destructive because of the comparatively light load carried, and much labor or time is not required to get the car back on the road. Very seldom is a condition found where the axle must be refinished.

However, the material damage and labor cost on account of hot bearings is probably insignificant when the loss of car-hours, the discomfort to passengers and the difficulty of advertising the road as one of service are considered.

When a car is having trouble I venture to say that the following comments will be heard: The oil is no good; the oiler is lying down on the job; the babbitt is no good; the bearings are not right; the track is in poor condition. Nothing is said about mechanical conditions or supervision. Why? Because it hurts to admit one's own shortcomings, and it is much easier to find fault than to get down and root out the cause of the trouble. It is almost certain we shall find mechanical defects and indifference or ignorance on the part of the men. Don't blame the men if you have failed to instruct them properly.

No matter what oil is purchased it will not keep the cars on the road unless properly used. Too much oil kills the elastic properties of the waste, which then falls away from the bearing. Loose bearings will permit oil to escape, depleting the supply in the wells. Bearings fitting too tightly on shafts, allowing no oil to flow, are often the cause of hot armature bearings. This condition is quite often encountered when bearings are bored with too small a clearance and driven tightly into the shell heads. It is also likely to occur on motors which have seen a good deal of service and the loose heads of which have been repaired by shrinking a band on the outside and by refinishing to the proper fit.

Unless the original alignment of

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*Paper presented before railway section of Wisconsin Utilities Association, Green Bay, Wis., Aug. 17-18.

bearings is considered, they will not line up. I refer to the eccentricity of the bearing in relation to the outside fit of the shell head, which condition carries the armature about 1/32 in. nearer to the top field. If only one head were repaired and finished concentric, the armature shaft bearings would bind in both bearings. I have known this condition to exist and cause a lot of trouble.

SOME END PLAY IS NECESSARY

In assembling motors care should be taken to insure that end play exists, so as to allow for expansion of the armature shaft and to permit a slight oscillation of the armature, which tends to distribute the oil. An allowance for end play of 1/16 in. is sufficient. Armature bearings should be bored 0.0025 in. large for each inch of armature shaft diameter. A small oil groove cut into the face of the bearings from the center of the waste window and slightly inclined downward will help lubricate the bearing face and thrust collar.

Many operators have trouble with excessive end play of armatures. You will find this is perhaps due to excessive wear or play in the axle bearing collars. This wear is not very harmful as long as there is clearance for the gear and pinion in the gear pan, but I have found that play of 1/4 in. to 3/8 in. will throw the shell from one side to the other, driving the armature violently against the heads and causing the armature bearing collars to bend over or break. This is particularly true in high-speed service and with nose-suspended motors.

Babbitting of armature bearings requires careful work, and should be done by a man who understands and realizes the importance of perfect tinning. We can hardly expect a 100 per cent job of tinning old bearings, due to oil that remains in the bearing regardless of the method of cleaning used. However, we can get a 75 per cent job with anchor slots or holes, which will be found satisfactory. Bearing should be struck with a hammer after the babbitt has cooled to test the solidity of the lining. If a hollow or cracked sound issues, the bearings should be done over.

The best pouring temperature for babbitt metal is about 925 to 975 deg. F. In the absence of a pyrometer, the proper temperature of pouring can be determined when the dipping of a white pine stick into the molten metal will char or brown it. As soon as the metal begins to melt, the surface should be covered with powdered charcoal or graphite. This will retard the formation of scum or dross. The tinning bath should consist preferably of pure Straits tin, although other high quality tin will serve almost as well. Solder should never be used for this purpose, because it contains lead, introducing that element into the babbitt during the process of pouring. It is important to keep the pot of tin clean and free from impurities, and a heat should be held where it completely liquefies the tin, care being taken not to overheat it. About 500 deg. F. is an average temperature.

In older type motors using grease lubrication, excellent results will be obtained if the shaft size is increased by shrinking on a cast-iron sleeve. The outside may vary on different types of motors, but I have found that a 3/4-in. increase or 3/8-in. wall thickness of the sleeve worked satisfactorily on GE-57 motors. As a matter of fact, we now have no trouble at all from hot bearings after the completion of this work on all motors. At the same time we discarded the cast-shell bearings and put in service bronze bearings with only 1/16-in. babbitt. This insures us against loss of windings should a hot box occur. The old cast-shell bearings carried 3/4-in. babbitt lining, which would allow the armature to drop on the poles.

RESULTS OF OVERHEATING

We find that armature bearings which, when first put in service, had the required press fit in the shell heads, after a few relinings were fitting too loosely. This is generally caused by overheating when old babbitt is melted out prior to relining. Any bearing which presents a pock-marked appearance has been overheated and it is economy to retire it from service, rather than permit a loose-fitting bearing to destroy the fit in shell head. The bore in frame heads, which through the above mentioned condition has become too large for standard bearings, can be rebored and a larger size bearing used. However, special jigs should be used to assure perfect alignment.

The formula under which bronze armature bearings are made differs with manufacturers and operators. We have found that bearings made of the following parts meet with our requirements:

Copper	78	per cent
Tin	12.5	per cent
Lead	8.6	per cent
Phosphorus	0.9	per cent
Manganese	0.013	per cent

Babbitt metal from the following formula gives excellent service for lining armature bearings:

Tin	90	per cent
Copper	6	per cent
Antimony	4	per cent

Hot journal bearings can be eliminated providing proper care is exercised. The causes of hot journals are too numerous for me to mention in this paper. However, I will mention a few which stand out above all others and take them up under two classifications—lubrication defects and mechanical defects. The former includes: Waste not properly saturated; dirty, dead waste; improper packing; oiling by calender instead of by mileage; too much oil and poor waste.

You will find that the majority of railroads have found it advantageous to install proper facilites for soaking of packing waste. Still there are some operators who feel that no particular necessity exists for cleaning or reclaiming old and to all appearances dead waste. It is surprising the saving in waste and oil which can be made by even a "home-made" washing outfit.

The oil in the washing tank should be kept at a temperature of 125 to 150 deg. F. After waste is washed, allow it to drain, and soak before using, as if new waste were handled. Unless resoaked for forty-eight hours and permitted to drain the required time, say twenty-four hours, the waste is too dry, due to the light consistency of the oil in the washing tank on account of the high temperature. The soaking tank should be kept at a temperature of 70 to 80 deg. F.

Packing journal boxes looks like a job which does not require anything but a weak mind and a strong back. Perhaps that is why we have hot boxes. If we feel that the job is too simple to bother with, let's get a good reliable oil company on the job, which can furnish experts to teach our men. The service would be free at that.

MILEAGE BASIS BEST FOR OILING

Oiling should be done on a mileage basis by all means. We oil and grease our automobile (yes, even a Ford) on so many hundred miles—why not our cars? In interurban service the miles operated per car per day vary considerably. We find cars running anywhere from 100 to 600 miles per day. As the mechanical department has no control over this condition it is apparent that mileage inspection, at which time oiling should be done, is the proper and only correct method. If oiling is done between inspections at different locations on the system the chances are too great that oil will be applied and waste become too soggy, to say nothing about the extra large amount of oil used.

In high-speed service we find that waste will work out toward the front of the journal and we inspect the journals after a 200-mile run and pack the waste back. Very seldom do we find occasion to apply additional oil. On the regular inspection day, that is, after 1,000 miles operation, the front part of the packing is removed, the condition of waste inspected and if found drying out, a small amount of oil is added and the waste properly packed back.

A good grade of wool waste should be used. Substitutes consisting of cotton waste, horse hair, cocoanut fiber, steel shavings, asbestos and what not, are used, but I question if any real economies are gained. We rely on capillary attraction to bring the oil to the journal, and we should use material having this property.

Mechanical defects include: Rough machining of axles, trucks out of square, improper fitted bearing, taper journals, excessive bearing pressure, poor dust guards, inferior bearing metal, improper metal used for lining bearings and rough track.

In machining an axle it is good practice to rough turn the axle all over to 1/32 in. above size. This will eliminate any springing of axle when the final finish cut is taken. The bearing portions of the axle should be rolled to assure a smooth surface. The rolling process leaves a journal in far better condition than a polishing by abrasives or grinding.

In assembling wheels and axle, see that the pressure is concentrated through the center of the axle. This can be done by using a cap with a small projection fitting loosely in the lathe center and of an outside diameter the size of the journal (not the size of the collar) placed between the ram and the axle. This cap should be slightly crowned on the back. You will find the axle straight after mounting the collars and the check plate grooves true, if this practice is followed. Wheels mounted off-center, that is, not properly located on the axle, will cause binding just the same as if the truck were out of square and will not only produce hot bearings but this condition will increase the flange wear and power consumption.

As a rule very little care is used in fitting car journal brasses. We should see that there is a clearance at the side of the bearings, that fillets are not crowding and that we have more than a line contact. Bearings carrying more than 400 lb. per square inch of projected area of brass very likely will run hot.

One of the worst conditions existing is the taper journal. Not only is the pressure per square inch increased, but the bearing surface is always shifting, causing the lining to squeeze or roll out. Poor dustguards or the absence of them are responsible for this wear. We have been using a metal dustguard on standard 4¼-in. x 8-in., 5-in. x 9-in. and 5½-in. x 10-in. journals and we are having very little trouble. If you measure the journals carefully after say 250,000 miles, you will find most of them worn egg-shaped by several thousandths. Before new wheels are mounted we refinish the journal. Very little stock is removed, and we find it is well worth while.

Journal bearings should be of such a composition that after the lining is worn out the bearings can remain in service until worn out. We find bearings from the formula below give such service:

Copper	65 per cent
Tin	5 per cent
Lead	30 per cent
Nickel	1 per cent

Bearing should be machined and well tinned before they are lined. Babbitt metal consisting of 87 per cent lead and 13 per cent antimony gives very excellent results, and the lining should not exceed ⅛ in. in thickness.

KEEP BEARING WITH THE SAME AXLE

In changing wheels from one truck to another keep each bearing with its own axle and permit them to wear out on the same axle. Changing brasses from one axle to another generally means trouble due to different diameters of journal. Scraping bearings to a fit is a waste of time.

We may trace some of the bearing trouble to rough track, but it is high speed over special work that breaks down the oil film; it pushes the waste away from the journals and cracks the brass. A little friendly talk to the superintendent of transportation generally takes care of this condition if proper co-operation between departments exists.

There is no reasonable excuse for hot axle bearings. A clamping fit over the axle is about the only reason, and this can be avoided if the bearings are of proper bore. An allowance of 0.002 in. for each diametrical inch of axle should be provided. If bearings are too tight, shimming between the two halves provides clearance. Shims should never be put between the axle cap box and the shell. This would allow the bearing to work loose and distort the housing fit, spoiling the dowel pins and brass itself.

Axle bearings should not be permitted to wear to such an extent that gears and pinions are thrown out of proper mesh. A wear of ⅛ in. should not be exceeded. Bearings composed of approximately the following metals give very good results:

Copper	77 per cent
Tin	8 per cent
Lead	15 per cent

or

Copper	88 per cent
Tin	10 per cent
Lead	2 per cent

I am of the opinion that babbitted axle bearings are inferior to bearings of bronze even though babbitt has a lower coefficient of friction than bronze. The location of axle bearings on electric railway motors is such that they are subjected to much dirt, dust, sand and gritty material, and due to the soft nature of babbitt metal this grit becomes imbedded in the metal, forming a grinding substance which produces excessive wear on the axle. The grit does not imbed itself in the harder bronze and it is flushed out by the lubricants. However, the composition of any bearing metal is only one of the factors in efficiency. The treatment of the metal, the method of casting, the machining, and the design, are certainly as important as the composition used.

No matter what metal or lubricants are used in armature, journal or axle bearings, keep in mind that the mechanical condition must be correct.

Lubrication Costs Reduced 60 per Cent in Milwaukee[*]

Reduction in Lubrication Expense Effected by Lengthening the Oiling Period from 800 Miles to 2,400 and 3,600 Miles—Used Oil and Waste Are Reclaimed

BY J. H. KOUNY,
Engineer of Equipment Milwaukee Electric Railway & Light Company,
Milwaukee, Wis.

WHEN I compare the practice of the Milwaukee Electric Railway & Light Company with that of Mr. Cordell, I find that to a very large extent our practices are identical. We are at variance somewhat on the types of bearing metals used, the frequency of inspection and lubrication, and in all probability on the quantities of lubricant used, but these must be worked out to suit the operating conditions and equipment on the various properties.

During the war our lubrication costs kept pace with everything else and continued to go higher and higher, and about two years ago, we came to the realization that it was costing us a lot of money. The curtailing of expenses was imperative and here seemed to be an opportunity. Our first thought, of course, as Mr. Cordell pointed out, was that it perhaps was the grade of oil which we were using, but since we knew we were using a good grade, this evidently was not the answer. Looking further, we found that there were a lot of things that were not right, due largely to the lack of proper attention in the machine shop, repair floor, and at the carhouses. Careful supervision, of course, was also lacking. The larger properties, no doubt, all suffered similarly, due to the rapid turnover in help during the war, when we were glad to accept any one who appeared willing to work whether he was qualified for the job or not.

The result of our investigation proved that we were suffering more from overdoses of oil than from a lack of it, consequently our waste was soggy and was falling away from the bearings. We were having many grounded armatures, due to the oil throwing over on our commutators.

Our practice at that time was to add a gill of oil to all bearings on an 800 car-mile basis (and in many instances this quantity was exceeded) but since this gave excessive lubrication, we conducted tests on twenty-five cars equipped with various types of motors and finally decided that by extending our lubrication period to 3,600 car-miles and adding 1 gill of oil to each axle, journal, and commutator and armature bearing with 1½ gills to the pinion end bearing, no danger from hot bearings would be encountered. On our interurban cars operating in higher speed service, it was decided to lubricate on a 2,400-mile basis with the addition of but 1 gill of oil, except on armature bearings when 1½ gills are added to the commutator ends and 2 gills to the pinion ends. We also adopted the wickfeed system, using 18-in. skeins of long fiber wool yarn waste extending from the bottoms of the oil wells over the bearing windows to the tops of the oil box and then pack between the wicks and the backs of the boxes.

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[*] Discussion presented at meeting of Wisconsin railway men, Green Bay, Wis., Aug. 18, 1922, on Henry Cordell's paper "Maintenance and Lubrication of Railway Bearings."

Of course, this practice was entirely revolutionary, as compared to what we had been doing, and the general opinion was that it could not be done. All foremen, sub-foremen, and oilers were carefully instructed as to the practice to be followed, and one of our men, assisted by an oil company expert, was placed in charge of the work. Some of our oilers assumed an indifferent attitude and had to be replaced, but as a whole the system worked out very satisfactorily from the start and is in practice today.

We find it necessary to employ but one man for babbitting bearings, and since this job has changed hands several times during the last three or four years, we found that the best practice was not being adhered to. We, as well as the foreman in charge of this work, assumed that certain things were being done whereas in reality they were not. In machining, we found that the edges of the bearing windows were not being properly chamfered, nor were the oil grooves being cut properly, and in some instances bearings were bored eccentric.

When we started out on our investigation, we had in mind the matter of lubrication, but we soon learned that it was merely a stepping stone toward improving car maintenance as a whole. We not only have been able to reduce our lubrication costs approximately 60 per cent, but have reduced other maintenance costs as well.

While it might seem that I am deviating from the subject assigned me of commenting on Mr. Cordell's papers, by outlining what we have been doing along this line, in reality I am not, for our findings bear out almost to the letter what Mr. Cordell has outlined at the beginning of his paper. He has evidently been through the mill and knows whereof he speaks.

We are fully in accord with Mr. Cordell's practice as to machining tolerances for bearings, and agree that too much care cannot be taken in being assured that they are bored concentric with the outside diameters, but we do not feel that it is necessary to use pure Straits tin for tinning prior to babbitting. We find that half and half solder works out very satisfactorily, and if the bearings are properly heated before tinning and then thoroughly swabbed with a zinc chloride solution, very little solder will adhere to the shells and will cause no trouble due to the introduction of an exceedingly small amount of lead. A pouring temperature of from 925 to 975 deg. F. is too high for genuine babbitt, for the critical point is approximately 925 deg. F., and a pouring temperature ranging from 25 to 75 deg. F. below this figure is correct. In the absence of the use of a pyrometer, these temperatures, of course, can only be approximated. At various times, we have done considerable experimenting with bronze bearings made in accordance with different formulas, and we have found that there is but little to be gained on our property through the use of different alloys for armature, axle and journal brasses, so have adopted but one formula for all, viz:

Copper	85 per cent
Tin	5 per cent
Lead	5 per cent
Zinc	5 per cent

The matter of proper care of waste is one of vital importance, and adequate facilities for saturation and drainage, as well as for reclaiming used oil and waste, not only afford considerable economy, but also assure proper conditions in so far as waste and oil are concerned when a bearing is properly repacked. We have gone to considerable expense in properly equipping our department for handling this work and the expense is well warranted. A brief outline of our practice might be of interest.

RECLAIMING METHODS USED

When bearings are repacked at the various carhouses, the used waste is accumulated in containers and then sent to the shop for reclaiming. It is then sorted (the very dirty portions being scrapped) and placed in a centrifugal oil extractor, which in reality is nothing more than a centrifugal wringer, such as is used in laundries. It is driven by a steam turbine, and the live steam is allowed to escape into the waste compartment to bring it up to the proper temperature. The centrifugal action of the drum extracts the heated oil from the waste and this is drawn off and run through an oil purifier that extracts the moisture, emulsification or sludge, and all solid matter, leaving the oil in as good condition as when originally used, although of a slightly darker color.

The purified oil is then pumped into the waste saturation tanks, which are of the three-section upper and lower compartment type, where it is heated to 100 deg. F. or the temperature maintained in the saturation tanks. Steam coils placed beneath the tanks are employed in maintaining the proper temperatures.

The waste removed from the oil extractor is carefully sorted and then dried over a steam heated rack. When dry, it is placed in the saturation tanks and immersed for twelve hours in the heated oil and then drained for twelve hours at the same temperature. We find that this is ample time for the proper treatment of the waste and that it will absorb about 2 lb. of oil per pound of dry waste. New waste is treated in the same manner. Since it is impossible to extract the foreign matter from the used waste entirely, this is used in repacking axle and journal bearings only, while new waste is used in armature boxes.

There is one matter that Mr. Cordell has not touched upon to an appreciable extent and that is flange wear on axle bearings, particularly on the larger sizes of interurban motors which do not permit of the use of axle collars. We find that on the commutator sides where the axle bearings are flush with the wheel hubs, the wheel wash runs down the back of the wheels and over the faces of the flanges. The oil film is thus broken and cutting is started. When once started it is difficult to overcome. We have experimented with various types of oil grooves, some merely extending from the bearing windows to the flange faces and others completely across the flange faces, but to date are not entirely satisfied with the results. On motors that permit of the use of flanged axle collars, rather encouraging results are being experienced.

On some of the smaller motors with very narrow oil boxes, it is absolutely essential that care is taken in packing across the entire width of the bearing windows, especially on the armature bearings. This is not the easiest thing to do on account of the offsets toward the flanged ends of the bearings, but hot bearings will eventually develop if proper attention is not given this feature. Of course, it is necessary to have the waste well up against the shafts on all bearings, but on the so-called "baby motors" I feel that the manufacturers have overlooked an excellent opportunity of making these motors practically foolproof as far as lubrication is concerned, for the very narrow widths of the motors would readily permit of more generously designed oil boxes.

Putting Safety First Over the Top in Green Bay*

How a Harmonious Triple Alliance of Public, Employees and Management Was Effected Is Modestly Told by the Man Who Did It

By C. E. WARWICK

Superintendent of Railways Wisconsin Public Service Company,
Green Bay, Wis.

CAN the safety movement be made an effective auxiliary to function with the present day movement of "merchandising transportation"? Certainly it should add another very important "string to the bow," since every approved safety device and practice will not only aid the sale of transportation, but will greatly reduce the damage suits that are a burden on the net income of the company.

The man in whose hands the prevention of accidents largely lies is the car operator. Some operators drive their car from year to year without an accident. Others do not. To prevent accidents, therefore, we must engage the right kind of operator, then educate him in the rules of safe operation, then keep him keyed up to the pitch where he is trying at all times to prevent accidents. The solution of this last named problem lies, to a great extent, in co-operation. The question is, how can co-operation best be maintained. There are two ways:

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*Abstract of paper presented before the railway section of the Wisconsin Utilities Association, Green Bay, Wis., Aug. 17-18.

1. By engaging and retaining only the proper operators. Street car service is no place for a careless, surly or discontented employee.
2. By a happy family of employees.

The social side of life must not be overlooked. A man whose family is discontented will bring their discontentment on the job with him. Company social affairs should be encouraged. Dancing parties and picnics given quarterly, semi-annually or annually, bowling tournaments or other forms of amusement should be provided. Company employees should not only become acquainted with each other but it is important that the families be given an opportunity to learn that the official forces are human also, that it is men that their husbands and fathers are working for, not heartless corporations. It might be well to consider the issue of free transportation to the wives of operators, for if they are not given this privilege they will make an effort to ride only their husband's cars, and as the operator is only human he will be tempted to let them ride free.

There should be also semi-monthly meetings to discuss means for greater efficiency on safety and service, and quarterly and annual meetings, when the degree of success attained in the work should be emphasized.

It is important to impress upon the minds of all employees that they represent the company to the public and they must act accordingly. For the same reason, the car men who come in daily contact with the public can tell us what the public think of our service. An operator cannot retain an even, contented state of mind when patrons are continuously finding fault. After the safety meetings, there should be a free discussion, at which each man will have an opportunity to voice his likes and dislikes and give suggestions for improvement. Co-operation is what we are after and we cannot have it with hidden or suppressed feelings.

One thing remains. Operators or trainmen should be enthused to the highest degree of alertness to avoid accidents by some incentive. The outstanding characteristic of the American is the desire to win in whatever game he plays. Let us make our desire for perfect safety a game to win and we shall have the additional incentive necessary to avoid accidents.

The goal in this game is the end of a certain period. To reach that goal the player, a car operator, must travel his full quota of scheduled mileage without an accident. His prize for winning is a quarterly or annual bonus or both, not necessarily large, but still a prize, worthy, honorable and worth winning, both as to value and as a matter of record. As soon as one prize is won, another period begins, which may be added to the first period, and an additional bonus offered for successive winning periods. A practical scheme of bonus awards for safety operation follows:

Classification of Accidents:

Classification of accidents to determine the qualification of each trainman, entitling him to the quarterly bonus on the plan herein outlined.

Class "A"—Accident reports on occurrences not likely to result in any claim, both from absence of liability and absence of serious injury or unkind feeling, and where operator is not at fault.

Class "B"—Accidents resulting in injury or property damage, not of a serious nature, involving probable claim, and where the accident might have been avoided by extra precaution, foresight or efficient manipulation of car control.

Class "C"—Accidents resulting in serious personal injury or property damage, caused by careless, indifferent or incompetent operation, or by neglect to observe and practice "Safety" rules.

Class "D"—Near accidents, where serious accident is avoided by foresight and extraordinary skill of operator, and where witnesses will testify to the occurrence.

Class "E"—Accidents to employees.

Safety Efficiency Qualifications:

"A-plus" Records:—Operator has passed three consecutive months without having any class "C" or class "B" accidents and with one or more "D" occurrence to his credit during the time.

"A" Record:—Operator has passed three consecutive months without having any class "C" or class "B" accidents charged against him.

"A-minus" Record:—Operator has passed three consecutive months without having any class "C" and only one class "B" accident charged against him during the time.

"B-plus" Record:—Operator has passed three consecutive months without having any class "C" and two class "B" accidents charged against him during the time.

"B" Record:—Operator has passed three consecutive months without having any class "C" and three class "B" accidents charged against his record during the time.

In compiling Safety Qualifications Record, every class "D" accident credited to the operator for each quarterly period will serve to offset debit of one class "B" accident.

Safety Efficiency Bonus:

For "A-plus" record and "A" record, a quarterly bonus of a $4 refund on his uniform will be given.

For "A-minus" record, a quarterly bonus of a $3 refund on his uniform will be given.

For "B-plus" record, a quarterly bonus of a $2 refund on his uniform will be given.

Accident Reports:

A full and complete written report of every accident, no matter how trivial and whether occurring on or near the car, must be made by the motorman and conductor. Accidents sometimes considered as not worth reporting are often the most serious, troublesome and expensive.

Neglect to report accidents in accordance with the above rule will result in the operator losing his bonus for that quarterly period.

The above is a tentative plan, inaugurated for the purpose of encouraging safety and efficient operation and co-operation. If after a trial of this plan for a period of six or nine months, it is found to be satisfactory to the men and the company, consideration will then be given to offering an annual safety efficiency bonus in addition to the quarterly bonus.

It is hoped that all will join hands in this movement and offer any suggestions that may be an improvement.

The bonus plan, therefore, is our incentive to win in the game of safety or accident prevention. We must never let the idea of winning this game become stale. We must constantly watch the progress of the game just like a football coach who watches to supply new ideas in attack or defense, or to put new vigor or "pep" into tired or slacking players. The effect of this is to keep the machine going the way it was trained to go.

Many ways are open to us to do this as by attractive advertising, both in the press and on car cards and by giving publicity and credit for extraordinary accomplishment in avoiding certain accidents. The rewards will be abundant if we keep everlastingly at it.

In starting a safety movement the officials in charge should bear in mind that it may be necessary to change the habits of their employees and that this is necessarily a slow process in some cases. Attempts to rush the program may lengthen rather than shorten the period of transition. Patience, therefore, should be exercised, but start the game and you will be surprised how interesting it is to put it over the top.

Internationaler Strassenbahn und Kleinbahnverein

THE second biennial convention of the Internationaler Strassenbahn und Kleinbahnverein will be held in Budapest during the first part of September, 1923. The following subjects have already been announced:

(1) Status of electric railway undertakings in Hungary; (2) an international standard classification of accounts; (3) one-man cars; (4) track construction and maintenance; (5) ball and roller bearings, bearing lubrication and gears; (6) new designs in car motors; (7) average yearly performance in car-miles of trainmen and the eight-hour day; (8) magnetic track brakes; (9) fares on electric railways.

Further particulars will be sent out later from the headquarters of the secretary at Favoritenstrasse 9, Vienna.

American Association News

Fine Outing for Section No. 7

THE Connecticut Company held its ninth annual outing at Lighthouse Point, New Haven, Aug. 10, under the auspices of Company Section No. 7.

A delegation of 475 assembled in the Ball Park. Here a parade was formed, headed by the Section Band of thirty-five pieces, when the ball teams from Hartford, Waterbury, Bridgeport and New Haven were escorted around the field. This was followed by ball games and field sports.

Special Trains to Convention

ARRANGEMENTS for transportation to the convention this year will be in charge of the Boosters' Committee. Plans are now being formulated for special trains to be run from various points to Chicago. Railway men and manufacturers will shortly hear from members of these committees with respect to the most desirable schedules. Many pleasant associations and diversions on the trip to the great convention city will be enjoyed as the result of this planning.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Intimidation Must Stop

Court Restrains Union Men from Interfering With Employees of International Railway

Upon application of Henry W. Killeen, of counsel for the International Railway, Buffalo, N. Y., Justice Charles A. Pooley in the Supreme Court has issued an injunction restraining officers and members of the local union of the Amalgamated and all other persons associated with them from interfering with loyal employees of the International, property of the company or persons patronizing the company's cars. The application for an injunction was supported by a long list of affidavits showing assaults on the company's cars, employees and passengers.

Under the injunction strikers are forbidden from parading or marching in masses, companies or bands or collective numbers back and forth in front of and adjacent to the carhouses, stations, power houses and offices of the company. They must not interfere with the free passage of the company's loyal employees and are restrained from obstructing the employees upon any street or public place or threatening them in their homes.

The injunction is directed against intimidation of the company's employees and persons patronizing the cars. Abusive language, including the use of the word "scab," and tormenting signs are forbidden. It is forbidden to compel the International by threats, intimidation or coercion to carry on its business exclusively by union labor or not upon the open shop principle.

Hundreds of jitney and bus drivers have been served with copies of an injunction granted upon application of International to prevent operating of jitneys within the city. Jitney owners must appear in the Supreme Court within twenty days and answer the complaint. Although some jitneys are being operated in defiance of the law and the decisions of Justice Pooley in the Supreme Court and Justice Krause of the Appellate Division, the injunction proceedings instituted by the International have had a tendency to squelch the operation of the autos.

More passengers are being carried on the cars, especially the Main, Kenmore, Hoyt and Elmwood lines, but practically no passengers are riding on the East Side lines, which pass through the foreign settlements of the city. Normal service is being given throughout the day and evening on all local and interurban lines and owl service is being maintained on several local lines.

Since the dynamiting of the Buffalo-Niagara Falls high-speed line and the wrecking of three cars carrying Eastern tourists members of the New York State constabulary have been reassigned to patrol this line.

Under the caption of "Ride on the Street Cars," the Buffalo *Commercial* said in part:

> The strike would be a thing of the past in a few hours if the public made up its mind to ride on the cars and did it. The strikers are laboring under the delusion that the cars are going empty because they have public sympathy with them. Many more are riding on the cars now than did during the early days of the strike, but the way to let the strikers know that they are in the wrong and that their fight to shackle the company with union domination is lost is to fill the cars with passengers.

Responsibility for the strike and the way it has dragged along since July 1 is due entirely to Mayor Frank X. Schwab, according to Henry W. Killeen, counsel for the International, and editorials appearing in local newspapers.

In commenting editorially upon Mayor Schwab's attitude, the *Commercial* said:

> Schwabbery has made the name of Buffalo a byword and a stench in the nostrils of the whole country. The news that it is unsafe for people to come here is traveling far and wide. Schwabbery will protect the cut-throat and the dynamitard. How long are the people of Buffalo going to put up with Schwab?
>
> Have the law-abiding citizens the courage of their convictions or are they afraid of the consequences of standing four square against the forces that are now ruling with dynamite and gun?

Louisville Case May Go to Courts

H. R. Petty and Don Warren, Councilmen of Louisville, Ky., who led the fight which defeated the Mayor's fare ordinance in the lower board last week, are imbued with the bus idea. Mr. Petty is said to plan to submit to the Louisville Taxicab Company for consideration a scheme for operating buses at 5 cents and to bring a similar proposal to the attention of the Associated Motor Industries Corporation, which recently took over the plant of the Kentucky Wagon Works.

Mr. Petty said that a franchise for a bus line would be offered to the Council at the next meeting. The Quin fare bill is generally regarded as dead, although the Board of Aldermen will pass it without a dissenting vote, it is predicted. The lower board will then have another opportunity to pass it.

The Louisville *Herald* and the Louisville *Times* have charged that subsurface influences defeated the bill, which seemed to have the support of citizens. The opinion of the *Times* is that the people have the right to good railway service and that it is to their interest that injurious experiments of a competitive nature be discouraged.

The proposal of bus lines is not taken seriously, and unless by a miracle the Quin fare bill is passed, the case will return to the courts, where, it is estimated, it will require at least three years for settlement.

House Passes Bill Reducing Commission Members

A bill recently introduced before the Georgia State Legislature reducing the size of the State Railroad Commission from five to three members, and appropriating $70,000 for the operation of the commission, has been passed by the House and is now virtually certain to become a law before the present Legislature adjourns. Mention of this bill was made in the *Electric Railway Journal*, issue of Aug. 5. The original appropriation intended to be carried was $40,000. The expenses of the commission are raised by a special tax on the utility companies of the State subject to the commission's jurisdiction.

Prospects Bright for Electrifying the Katy

Engineers have submitted their report on the proposed electrification of the Missouri, Kansas & Texas Railway from Dallas to Denton, a distance of 48 miles. According to C. E. Calder, president of the Texas Power & Light Company and of the Dallas Power & Light Company, the cost is placed at between $800,000 and $1,000,000 by these engineers. Mr. Calder said:

> Electrification of the Missouri, Kansas & Texas from Dallas to Denton will be an economic proposition from the standpoint of the railroad, as well as the electrical interests. An electric line to Denton would take practically all passenger traffic from a steam line. The electric company would pay the railroad rental for the use of its track, and both would profit from such an arrangement.
>
> From the standpoint of the territory served, electrification would be even more pleasing. The Katy operates only six trains, two of them night trains. Interurban service on such a line would be hourly.

Negotiations between the electrical interests and officials of the Katy are under way, although it is said no definite agreement has been reached. It is proposed that the electrical interests shall lease the trackage rights, and that electrification of the line will in no way interfere with operation of freight trains on the line, nor in the operation of through passenger trains.

Officials of the electric companies interested in the proposition are hopeful that an agreement can be reached and construction work on the electrification of the line started by the beginning of 1923.

Mr. Calder pointed out that a contract with the railroad for electrification would comply with an agreement made with the city of Dallas for the construction of an interurban line at least 30 miles in length which the Dallas Railway is under bond to build in order to fulfill the terms of an agreement entered into in connection with the granting of the franchises to the Strickland-Hobson interests in 1917.

Dynamite Outrage

Buffalo-Niagara Falls High-Speed Train Believed to Have Been Wrecked by Strike Sympathizers

About fifty tourists in a three-car train being operated over the high-speed line of the International Railway between Buffalo and Niagara Falls were injured at midnight on Aug. 17 when the train ran into a section of track which had been destroyed by dynamite. Company officials believe that strikers or their sympathizers are responsible for the outrage and Herbert G. Tulley, president of the International, has offered a reward of $10,000 for information leading to the arrest and conviction of the dynamiters.

SECOND ATTEMPT SUCCEEDS

This is the second time sections of the Buffalo-Niagara Falls high-speed line have been blown up by dynamite since the strike was called on the local and interurban lines of the International on July 1. The first damage was done to a steel bridge over Gill Creek on the outskirts of Niagara Falls. Cars in all parts of Buffalo have been badly damaged by dynamite and many employees have been injured.

Mitten Management, Inc., has enlisted the aid of four nationally famous detective agencies in an effort to bring about the arrest and conviction of the dynamiters. Several clues have been found, but it is reported that no direct evidence has been obtained by the detectives.

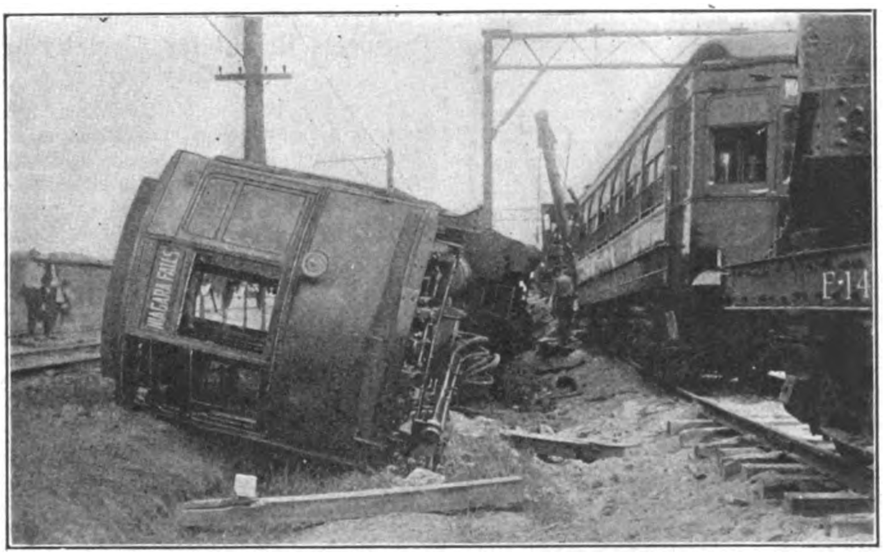
EXCURSIONISTS MADE TO SUFFER

The three-car train which was wrecked was running as a special carrying Philadelphia, New York and Baltimore tourists who had just arrived in Buffalo on an excursion over the Pennsylvania Railroad. The motorman did not see the damaged piece of track until he was only a few yards away. It was then too late for him to avoid running into it. The first two cars left the rails, but remained upright, while the third car turned over in the ditch. Most of the injured were in the rear coach.

Immediately after the accident detectives found a charge of 50 lb. of dynamite on the Buffalo-bound track of the International's high-speed line. The battery was connected for the charge and detonator caps were adjusted, but apparently the plot to destroy this track was frustrated by the arrival of the excursion special and the wrecking of this train. The vestibules of the steel cars were wrecked.

Robert C. Lacey, chairman of the board of arbitration of the Central Labor Council of Western New York, and five striking employees of the railway, members of the Amalgamated, are under arrest charged with illegal possession of dynamite. Additional arrests will probably be made.

While all the prisoners are charged with illegal possession of high explosives, several are charged with illegal transportation of dynamite. The District Attorney says these are only technical charges to hold the men pending the final outcome of the investigation into the dynamiting of local cars and the wrecking of the Buffalo-Niagara Falls train.



DYNAMITE DERAILED AND DITCHED THIS CAR

NEWSPAPERS DEMAND AMALGAMATED ACT

In commenting upon the arrests Buffalo newspapers demand that the Amalgamated Association repudiate its members alleged to be implicated in the dynamiting outrages and assist in the investigation.

Burns' detectives claim to have discovered a plot on the part of strikers and their sympathizers to wreck the steel arch bridge of the railway across the lower Niagara gorge. As a result members of the New York state constabulary have been detailed to guard the foundations of the structure in the lower gorge of the Niagara River and also the American approach to the structure. Dominion police are guarding the Canadian end of the bridge.

Utilities Meet Test of "Truth in Advertising"—Now, "Tell it to the World"

In a recent letter to Mr. Lytle of the Illinois Committee on Public Utility Information regarding the proposed Public Utility Advertising Association, Alfred Fischer, director of the Michigan Committee on Public Utility Information, raised two interesting points. First, he asked how the new plan would fit in with the advertising service now being established by the American Gas Association and other national bodies. Second, he wondered if it was necessary to stress the needs of ethical advertising practices in the utility field.

Both of these points have been answered in a letter written to Mr. Fischer by W. P. Strandborg, of the Portland Railway, Light & Power Company, Portland, Ore., who is chairman of the organization committee of the Public Utility Advertising Association. On the first point Mr. Strandborg says that, in his judgment, there can be no conflict or confusion with anything the one public utility may be doing in the way of getting its story over with the people. He points out that the main point involved in the proposed plan is that up to the present time the public utilities of the country, as an industry, have no official standing or recognition in the great organized advertising movement, and it is this formal and valuable recognition that is now being sought, not for one utility or group of utilities, but for the whole family of major utilities working together in the common cause.

Again the plan now being developed, explains Mr. Strandborg, will provide a tremendously valuable clearing house for all the utilities that use advertising or publicity and enable the new association to take advantage, for the good of all, of the successful things that may have been achieved in one or more of the utilities through their individual experience and observation. For instance, if some great national movement vital to all the utilities should arise that required the joint and united attention of gas, light and power and electric railway interests, the new association would have the machinery and equipment for meeting the situation at once and efficiently.

On the second point raised by Mr. Fischer Mr. Strandborg says that it is well known that the utilities are adhering to the rigid requirements of "Truth in Advertising," but that the need exists for telling the world about it; in other words, to let the public know that the utilities are on record absolutely in this matter, and that what the railway, the gas and the electric companies say in the printed word may be accepted at par.

It is Mr. Strandborg's opinion that there is no better way of accomplishing this than to have the message carry the stamp of approval of the Associated Advertising Clubs of the World.

Strike Appears Settled

The Toledo & Western Railroad, Toledo, Ohio, operated by receivers, has apparently settled its strike as far as operation of the road is concerned. A strike was called by platform employees about April 20 and within six weeks from that date all service was restored. The men had asked for an increase in wages amounting to about 4 cents an hour. The receivers were willing to negotiate several questions on working conditions, but the men walked out without replying to offers made by the receivers. New men were hired and as soon as they were broken in the trains were put back into service. Freight service was first restored.

A restraining order was granted by the Federal court at Toledo and two deputy marshals were put on duty at Sylvania to protect the property. Several arrests have been made under the order, but no defendants have been tried. Little damage has been done to property or trains. Linemen who wanted to go out in sympathy with the trainmen went back to work without any negotiations when the Federal court advised the receivers to have nothing to do with them.

Former platform men of the railway are operating three passenger buses and two trucks in competition with the railway, but so far have not made serious inroads upon the revenues of the railway.

Wage Issue Up in Pittsfield

A three-day hearing on the wage issue between the Berkshire (Mass.) Street Railway and its employees began at Pittsfield on Aug. 22, with former Gov. Samuel W. McCall sitting as neutral arbitrator. Joseph Berry represented the company and James H. Vahey the employees, the neutral arbitrator having been chosen by them. The pay of blue uniform men under the agreement that recently expired was a fraction less than 47 cents an hour for first-year men, about 50 cents for second-year men and a fraction more than 53 cents for third-year men. One-man car operators got 6⅔ cents an hour more. The company seeks to reduce wages by about 10 per cent. Employees seek an increase and have proposed a plan by which compensation would be placed in part on a commission basis.

Interurban Proposal Revived

Talk of an interurban line connecting Tampa, Fla., with various points to the east and north—probably running as far as Orlando and Sanford—has been revived with the announcement of plans of the Tampa Electric Company, a Stone & Webster subsidiary, for bidding on the contract to furnish current to the city of Lakeland and plans to run a power line to that city if the contract is secured. T. J. Hanlon, manager of the Tampa Electric Company, will not discuss the interurban line talk, feeling that such a possibility is too far in the future. He has gone to Boston to discuss the power proposition with Stone & Webster officials and make up a definite bid to deliver the current.

"To Open Up as Many Channels as Possible"

With the idea of developing a relationship so that the public will have a closer idea of railroad problems and the railroad management a closer idea of their patron's problems a "Committee on Public Relations" has been announced by Ralph Peters, president of the Long Island Railroad System. Mr. Peters in addressing the committee at its first official meeting said that periodical publications in developing good will had been very satisfactory but that now the railroads must do more to keep its patrons informed of railroad problems. He emphasized the need of more liberal education for the employees. The committee is now engaged in formulating plans for carrying out the ideas outlined by the chief executive of the road and when completed the program will be made public.

Commissioners Plan Electrification

The harbor commissioners of the Port of Montreal, Can., have started to electrify the surface lines at the terminals. Forty-two miles will be electrified this year, and the balance of the trackage, 16 miles, will be electrified next spring. M. P. Fennell, the present general manager of the port, is in charge of the electrification. When the electrification of the 42 miles is completed, two electric locomotives will be leased from the Canadian National Railways for the balance of the shipping season. It was necessary owing to the freight congestion on the lines and at the piers either to purchase at least five more new steam locomotives or electrify the system.

Keeping a Pledge

The efforts of the Binghamton (N.Y.) Railway to improve its property are receiving public recognition. The *Morning Sun* of that city in its issue of Aug. 18 said:

> The Binghamton Railway, after many difficulties not of its own making, has kept its word to the city. The promise made at the time the municipality permitted the 6-cent fare, has been fulfilled. Seven more of the latest type of trolley cars are in operation and the service has been improved proportionately. These seven cars represent an investment of more than $80,000 and they are in every way in keeping with the best standards of service.
>
> No trolley company in the land is free from criticism. There are times when the best equipped lines fail in an emergency. Schedules are upset, cars are crowded and patrons are forced to wait on street corners. But in Binghamton there has been a constant improvement and the service here at the present time compares pretty favorably with that in any other city. Whether or not trolley patrons generally are willing to admit this, they will at least give the present management credit for an honest effort to make good. And where honest effort exists the public is not slow to recognize it. Fewer people are "knocking" the company and perhaps that is all any public service corporation can expect.

News Notes

Electrification Proposed.— Representative Richards of Malden, Mass., recently propose delectrification of the Sangus branch of the Boston & Maine Railroad while Judge Walcott of the Chamber of Commerce asked for the consideration of a plan to run trolley cars over the Fitchburg tracks from Arlington through Cambridge to Lechmere Square.

Junior Police Have Day's Sport.— Miss Safety First of the Philadelphia (Pa.) Rapid Transit Company entertained 600 boy traffic policemen on June 28 at Willow Grove. These boys during the school semester act as auxiliary policemen at the crossings near their schoolyards. The company organized this patrol. T. E. Mitten, president of the company, took personal charge of the children and Charles Bainbridge supervised the afternoon contests.

Railway Employees Delight in Gardens.— Carhouse employees of the Pittsburgh (Pa.) Railways are responsible for creating a real beauty spot in Oakland. More than 200 men who report at the Craft Avenue carhouse have had a hobby this year, namely, planting and caring for flowers, so that now wonderful flower beds adorn the spot to the amazement of pedestrians, antomobilists and electric riders who pass this section. The men promise that next year the display will be greater than ever.

New Wage Contract Entered Into.— C. S. Banghart, general manager of the Augusta-Aiken Railway & Electric Comporation, Augusta, Ga., has just entered into a new wage contract with the trainmen of his company for a wage scale of 41 cents an hour for the first six months' service, 43 cents an hour for the second six months service and 45 cents an hour thereafter. The old wage contract, which recently expired, provided a wage scale of 46 cents an hour for the first six months service, 48 cents an hour for the second six months service and 52 cents an hour thereafter.

No Strike in Memphis.—There have been no further developments in the threatened strike last week of the employees of the Memphis (Tenn.) Street Railway, the men voting down the strike themselves even though the hourly wage was slightly reduced. The board still has under consideration the various problems. The company is still in the hands of receivers, but it is thought not for long. The State Utility Commission is dealing with other questions affecting the several Memphis public utility companies and their affairs are in better shape, indicated by the service and steady improvements going on. The 7-cent fare still obtains.

Financial and Corporate

Reorganization Committee Purchases New Orleans Property

The properties of the New Orleans Railway & Light Company, New Orleans, La., was sold on Aug. 17, by Master in Chancery Chaffe, under instructions from Judge Rufus Foster of the United States District Court. The sale was made in two parts. The first property offered comprised all the holdings of the railway, consisting of real property, rolling stock and securities. The second property consisted of 958 4½ per cent gold bonds of $1,000 denomination. There were only two bidders. G. H. Dahl, vice-president Chase National Bank, New York, acting in behalf of the reorganization committee, bid $14,500,000 for the property as a whole, and Charles K. Beekman, also of New York, bid $620,000 for the gold bonds. Confirmation of the sale is now up to the court for action.

At the meeting of the Commission Council on the evening of Aug. 17, Commissioner of Public Utilities Maloney withdrew the ordinances that were previously introduced and substituted three new ordinances in accordance with the agreement reached with the securities committee. These ordinances give the city an option to purchase the gas property at $8,652,000 plus any additional amount invested in the property subsequent to Dec. 31, 1920; the electric light property at $11,040,000, and the street railway property at $25,000,000.

Indeterminate permits are granted to the company in lieu of a franchise for a fixed period. The city is to have supervision and control of the operation of the utilities and will have the right to levy a tax on gross receipts of the utility after the allowable rate of return is earned. It is estimated that the tax will net the city about $320,000 a year. A paving program is provided which obligates the company to pave between the tracks and 18 in. on each side. This will add about 50 miles of paving to the company's obligation. After reorganization of the company has been effected, the two ordinances will be advertised for two weeks.

Cost of Service Exceeds Receipts by $104,149

The total revenue of the Boston (Mass.) Elevated Railway in July of last year was $2,534,775. Last month it was $2,472,137. However, 1,770,130 more revenue passengers were carried than during the same month last year. The cost of service exceeded receipts by $104,149. This was slightly better than was anticipated because heavy expenditures were incurred during the month for the construction of tracks and other maintenance work in accordance with the usual practice.

The average fare paid by each passenger during July was 8.896 cents, and the number of 5-cent passengers carried was 22.05 per cent of the total revenue passengers.

BOSTON ELEVATED RAILWAY RECEIPTS AND COST OF SERVICE—JULY

Receipts	1922	1921
From fares	2,404,325	2,444,596
From other sources	53,102	51,555
Total receipts from direct operation of road	2,457,427	2,496,151
Interest on deposits, income from securities, etc	14,708	38,623
Total receipts	2,472,136	2,534,774
Cost of service		
Transportation expenses (including wages of car-service men)	836,576	871,440
All other expenses	1,739,710	1,798,064
Total cost of service	2,576,286	2,669,504
Excess cost of service over receipts	$104,149	$134,729
Revenue passengers carried		
10 cent passengers	21,082,822	23,644,661
5 cent passengers	5,966,895	1,634,926
Total revenue passengers carried	27,049,717	25,279,587
Total receipts per revenue passenger	9.139c.	10.025c.
Receipts from fares per revenue passenger	8.896c.	9.676c.
Cost of service per revenue passenger	9.523c.	10.560c.

Year	Fare (Cents)	Total	Average Weekday	Average Saturday	Average Sunday	Average Holiday
1915	5	28,948,241	934,719	1,076,296	804,095	721,292
1916	5	30,107,539	1,000,582	1,146,208	743,680	645,999
1917	5	31,517,011	1,041,405	1,166,407	827,284	845,458
1918	5	30,572,041	1,018,179	1,145,967	697,513	798,177
1919	8–10	21,214,338	816,222	835,906	580,684	640,117
1920	10	26,640,614	887,374	950,939	644,308	673,825
1921	10–5	25,279,587	871,216	888,039	556,838	630,881
1922	10–5	27,049,712	924,227	978,326	626,220	542,431

Power Merger Attacked

The Attorney General of Tennessee has filed suit in the Chancery Court, alleging the recent merger into the Tennessee Electric Power Company of the Chattanooga & Tennessee River Power Company, Nashville Railway & Light Company, Tennessee Power Company and the Chattanooga Railway & Light Company was in violation of the State's anti-trust law and "a scheme to gain monopoly of the electric power development of the State."

The allegations are similar to those brought against the Tennessee company in the United States Court by the Ducktown Sulphur, Copper & Iron Company. The contention of the attorneys of the company is that the anti-trust law of the State has been superseded by the public utilities commission law and that the public is now safeguarded against excessive rates.

Conspectus of Indexes for Aug., 1922

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	Aug. 1922 **7.01**	July 1922 **7.04**	Aug. 1921 **7.20**	May 1921 **7.24**	**4.84**
Street Railway Materials*	July 1922 **181**	June 1922 **172**	July 1921 **164**	Sept. 1920 **247**	**100**
Street Railway Wages*	Aug. 1922 **210**	July 1922 **211**	Aug. 1921 **218**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	July 31 1922 **5.78**	June 30 1922 **5.64**	July 31 1921 **4.83**	Apr. 30 1917 **12.18**	**5.91**
U.S. Bank Clearings Outside N. Y. City (Billions)	July 1922 **12.30**	June 1922 **12.88**	July 1921 **11.03**	March 1920 **18.54**	Av. Mo. 1913 **6.12**
Business Failures	July 1922	June 1922	July 1921	Jan. 1922	Av. Mo. 1913
Number	**1,568**	**1,656**	**1,491**	**2,722**	**1,213**
Liabilities (millions)	**42.15**	**38.41**	**70.15**	**105.7**	**24.64**

	Latest	Month Ago	Year Ago	Peak	1913
Eng. News-Record Construction costs	Aug. 1922 **173.4**	July 1922 **169.7**	Aug. 1921 **193.1**	June 1920 **273.8**	**100**
U.S. Bur. Lab. Stat. Wholesale Commodities	July 1922 **155**	June 1922 **150**	July 1921 **141**	May 1920 **247**	**100**
Bradstreet's Wholesale Commodities	Aug. 1 1922 **12.07**	July 1 1922 **12.11**	Aug. 1 1921 **11.06**	Feb. 1 1920 **20.87**	**9.21**
Dun's Wholesale Commodities	Aug. 1 1922 **173.6**	July 1 1922 **173.7**	Aug. 1 1921 **163.7**	May 1 1920 **263.3**	**120.9**
U.S. Bur. Lab. Stat. Retail food	July 1922 **142**	June 1922 **141**	July 1921 **148**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	July 1922 **155.6**	June 1922 **155.4**	July 1921 **163.1**	July 1920 **204.5**	(1914) **100**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over, except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on street and interurban railways in the United States. †Revised weighting.

Railway Responsible for Tax

In the opinion of Malcolm Douglas, prosecuting attorney for King County, the Puget Sound Power & Light Company and not the city of Seattle is held responsible by King County for more than $540,000 in taxes and interest on the street railway system for 1919. If the city has agreed to pay three-fourths of the tax, the opinion states, it is the duty of the company to collect that amount from the city, for the county proposes to collect the entire amount from the company. The opinion also held that the County Commissioners have no power to waive payment of the city's three-fourths share of the interest due on the tax. The tax is $401,018 and 15 per cent interest. The Commissioners requested the opinion after receiving the request of the City Council that the city's share of the interest be waived and that the company be allowed to pay its share, one-fourth, of the entire amount forthwith, with the city being allowed the privilege of paying the remaining three-fourths in installments. The street railway system was transferred to the city of Seattle by the Puget Sound Power & Light Company March 31, 1919, and the suit followed when the company and city held that the lines were public property when the taxes fell due and were therefore non-taxable. The county's position, upheld by the courts, was that the system was private property when the tax was levied and therefore taxes were due for the entire year.

Detroit Municipal Increases Net Income

The City of Detroit Department of Street Railways for thirty-one days ended July, 1922, reports a net income of $100,892 against $98,743 for the thirty days ended June of this year. The total number of passengers carried increased from 36,715,466 for the June period to 36,904,425 for July. The details of operation are contained in the accompanying table.

CITY OF DETROIT

Department of Street Railways

INCOME STATEMENT AND OPERATING STATISTICS, JULY, 1922
COMPARED WITH JUNE, 1922

Operating Revenue	July, 1922, 31 Days	Cents per Car-Mile	June, 1922, 30 Days	Cents per Car-Mile
Revenue from transportation				
Passenger revenue	$1,489,136		$1,480,978	
Parlor, chair and special car revenue	109		246	
Total	$1,489,245	37.5	$1,481,224	38.3
Revenue from other railway operations				
Station and car privileges (adv.)	$7,391		$6,754	
Rent of track and facilities	85,678		89,793	
Miscellaneous	2,482		758	
Total	$95,551	2.4	$97,305	2.5
Total operating revenue	$1,584,796	39.9	$1,578,529	40.8
Operating expenses				
Ways and structures	$181,977		$159,952	
Equipment	98,930		117,078	
Power	140,091		148,433	
Conducting transportation	564,211		559,588	
Traffic	119		Cr. 1	
General and miscellaneous	118,114		105,681	
Total operating expenses	$1,103,442	27.8	$1,080,731	28.0
Net revenue railway operations	$481,354	12.1	$497,798	12.8
Deduct taxes assignable to railway operation and miscellaneous rents	54,574	1.4	61,281	1.5
Net operating income	$426,780	10.7	$436,517	11.3
Non-operating income				
Net income from miscellaneous property	569		1,082	
Income from unfounded sec. and accounts	....		3,709	
Total non-operating income	$569		$4,791	0.1
Gross income	$427,349	10.7	$441,308	11.4
Deductions				
Interest notes payable	$10,245		$11,507	
Sinking fund construction bonds	37,748		37,747	
Sinking fund purchase contract	142,016		142,016	
Interest fund construction bonds	51,260		65,895	
Interest fund purchase contract	85,189		85,400	
Total deductions from gross income	$326,458	8.2	$342,565	8.9
Net income	$100,892	2.5	$98,743	2.5
Ratio operating expenses to revenue from transfers		74 per cent		73 per cent
Ratio operating expenses to operating revenue		70 per cent		68 per cent
Ratio net income to operating revenue		6 per cent		6 per cent
Revenue car-miles operated	3,975,552		3,859,405	
Non revenue car-miles operated	7,569		4,751	
Total car-miles operated	3,983,121		3,864,157	
Earnings per car-mile		.375		.38
Earnings per car-hour		1.946		1.99
Expenses per car-mile		.278		.28
Expenses per car-hour		1.440		1.45
Revenue passengers carried	27,838,688		27,692,462	
Transfer passengers carried	9,065,737		9,023,004	
Total passengers carried	36,904,425		36,715,466	
Ratio of transfer passengers to revenue passengers		32 per cent		32½ per cent
Revenue passengers per car-mile operated		7		7
Transfer passengers per car-mile operated		2		2
Total passengers per car-mile operated		9		9

Valuation Figures Revised

A revised appraisal of the Manhattan & Queens Traction Corporation property submitted to the New York Transit Commission by the bureau of valuations increases the estimate recommended for acquiring operating property for inclusion in city-owned traction system from $885,993, the original estimate, to $995,860. The estimate is based on original costs less the expenditures necessary to place the road in first-class operating condition.

On 1910-1914 price basis, less depreciation, the net correction is $3,382, increasing the original estimate of $1,113,263 to $1,116,645; on the basis of 1921 prices, the former estimate of $2,158,871 is changed to $2,164,498.

The Transit Commission was informed by the valuation bureau that the recommended valuation for the Richmond Light & Railroad Company property, through an arithmetical error incorrectly placed at $3,122,943 in the original estimate, is revised to $2,729,659.

Following the announcement of the revised appraisal, counsel for the security holders of the Richmond company protested that the estimate is incomplete, inaccurate and insufficient, and does not represent the real value of the property. Counsel disclaimed any obligation to be bound by the valuation, declaring it to have been made without due process of law and in violation of the Constitution of the United States and the Constitution of the state of New York.

Court Orders Property Sale

Sale of the property of the Asheville & East Tennessee Railway, Asheville, N. C., has been ordered by Judge Henry P. Lane of the Superior Court. The petition in receivership was filed a few weeks ago. Debts of the company, including bonds, amount to about $70,000. The length of the road is 9 miles. The sale will probably be held in October.

Second Sale Brings $42,000

The property of the Monmouth County Electric Company, Red Bank, N. J., was sold at public auction for the second time on Aug. 8 by order of the United States District Court. At the first sale last May the road brought $33,000 and when it lacked confirmation R. L. Marshall, New York, offered $36,000. The court ordered a resale and the second time it brought $42,000. The tracks, wires, copper and poles were bought by Samuel Altman of Long Branch and E. Gelb & Son of Newark.

The sale will have to be confirmed by the United States District Court at Trenton. The sale means the end of this 17-mile railway built twenty-five years ago. The stockholders will lose all. The holders of receivers' certificates will share first in the receipts. All the municipalities will lose their tax charges, which total more than the receipts of the sale.

Moore Interests Reported Sold

Machold & Riddell, Philadelphia engineers, have notified the City Commissioners of Wildwood, N. J., that the Henry D. Moore interests, which owned the West Jersey Electric Company and the Five-Mile Beach Electric Railway, have sold their holdings. It is said that the railway company and the electric company have been purchased by Atlantic City interests. A committee appointed by the Wildwood City Commissioners to investigate the possibility of purchasing the Wildwood plant at the request of the petitioners had not completed investigation before the deal was consummated. It is understood that should the long distance service of power prove unsatisfactory to the city it will install a municipal plant for lighting the streets and the public buildings and insist that the stipulations in the original ordinance grant to the electric light and trolley companies be carried out by the new purchasers.

Public Utilities Lead in September Maturity Obligations

Public utility obligations falling due in September total $66,176,200. In this list the main item is the Interborough (N. Y.) Rapid Transit Company's 8 per cent notes, of which $39,199,000 are outstanding. It is proposed to pay the noteholders 10 per cent in cash and extend the balance ten years to Sept. 1, 1932. The combined total of railroad, public utility and industrial bonds falling due in September amounts to $84,391,540.

Balance of $8,434 in Toledo in July

Operations of the Community Traction Company, Toledo, Ohio, for July show that the Toledo properties earned a balance of $8,434 to go into the fare stabilizing fund, bringing that reservoir up to $145,643. Through added maintenance cost in summer months the ratio of operating expense to gross income rose from 68.68 per cent in June to 71.24 per cent in July. Additional service, amounting to 300 car-miles per day, was put in operation during July.

A block of bonds of the Community Traction Company was purchased by the sinking fund for municipal ownership, bringing the total holdings up to $255,000 of the 6 per cent bonds and $60,000 in cash. The monthly income from these bonds, which amounts to $1,275, will be added to the $17,708 contribution made from earnings each month which goes into the sinking fund.

Operation of one-man cars on the Bancroft line has proved very successful, Commissioner W. E. Cann reported. About sixty more of the one-man cars will be placed in operation as soon as delivered from the shops.

Daily passenger travel decreased from 163,722 revenue passengers a day in June to 159,167 revenue passengers in July.

Checks of both street railway and bus operation since Aug. 1, when about thirty buses were forced to suspend operation in direct competition with street railway lines, have shown that street car revenues have increased an average of $320 a day. The remainder of the forty or more buses will be forced to find new routes not paralleling the traction lines as soon as licenses expire.

Improvement Noted in Second Quarterly Report

According to the quarterly report of the United Traction Company, Albany, N. Y., operating revenues and operating expenses decreased for the quarter ended June 30, 1922. The operating revenues were $775,160 against $785,316 for the preceding quarter and an increase of $711,174 over the same quarter a year ago. The operating expenses for the 1922 June quarter were $604,533 against $637,453 for the preceding quarter and against the corresponding period of a year ago the operating expenses show a decrease of $116,172. The net corporate income for the quarter ended June 30, 1922, is $7,968, while the net corporate deficit for the preceding quarter was $17,598.

The number of passenger fares collected in the quarter just ended is 11,022,749. During the preceding quarter the number was 11,202,763. The report shows an increase of 10,157,599 passenger fares collected for the quarter just completed over the number collected during the same period in 1921.

Passenger car miles for the quarter ended June 30 were 1,692,188 with the number for the preceding quarter 1,680,397.

Financial News Notes

$1,500,000 Note Issue Called.—The United Light & Railways Company, Grand Rapids, Mich., has called for redemption as of Oct. 1, 1922, all of the $1,500,000 issue of 7 per cent bond-secured gold notes, Series B, issued as of Nov. 1, 1917, and due April 1, 1923.

Gain in Net Income.—The Hudson & Manhattan Railway, New York, N. Y., reports a balance of $432,796 for the seven-months period ended July 31, 1922. This compares with $91,447 for the corresponding period of 1921. Expenses from January-July, 1922, were reduced to $3,555,615 from $3,559,009 obtained in the corresponding months a year ago.

May Build New Plant.—The Sedalia City Light & Traction Company, Sedalia, Mo., plans to abandon its present plant if the plans for financing a new plant are approved by the Missouri Public Service Commission. The present power and railway plant has been in operation for twenty-five years. The new plant would cost $362,000.

Notes to Be Redeemed.—The five-year 7 per cent collateral trust gold notes of the Detroit (Mich.) United Railway amounting to $500,000 have been called for payment Sept. 1 at the office of the Central Union Trust Company, New York, N. Y. They will be redeemed at 100½ and interest. The notes are dated April 1, 1918.

Deficit for Six Months' Period.—A deficit in the revenues of the Shore Line Electric Railway, Norwich, Conn., for the six months ending June 30 of $5,746 is shown by the report filed in court by Receiver R. W. Perkins. Although there were gains over outgo in April and May, there was a deficit in the June operations. The total receipts from all sources for the six months period were $110,631.

Sale Recorded.—A copy of the transfer deed turning over the properties of the Tennessee Power Company to the Tennessee Electric Power Company for $50,000,000 has been recorded in the county register's office at Nashville. The law requires that a copy of the deed be recorded in every county where any part of the property is located. The document lists all the properties and plants included.

Another Sale of Long Island Property.—The property of the New York & North Shore Traction Company, which extends from Flushing to Whitestone and from Flushing to Mineola on Long Island, and has not been operated recently, will again be offered for sale at public auction on Sept. 24. At the sale held on July 24 a scrap dealer bid $15,000 for the equipment of the defunct road. This figure was so low that the sale was set aside.

Authorization of Sale Sought.—Corporation Counsel Walter F. Maier of Seattle, Wash., has been requested by the utilities committee of the City Council to draw up an ordinance authorizing acceptance by the city of the deeds and bills of sale of the Greenwood lines, purchased from the Pacific Northwest Traction Company and the Western Washington Power Company. The purchase price was $55,000, to be paid in 5 per cent utility bonds. The city has been operating the lines for two years under a gentlemen's agreement.

Preferred Stock Dividend Resumed.—The Cities Service Company, New York, N. Y., on Aug. 18, placed the preference "B" stock back on a cash dividend basis, in compliance with the plan announced in June. The board of directors declared the regular one-half of one per cent monthly dividend payable in cash Oct. 1 to stockholders of record Sept. 15. At the same time one-half of 1 per cent in cash was declared on the preferred stock, and the regular dividend of one-half of 1 per cent on the common stock payable in scrip and 1¼ per cent payable in stock scrip were declared as of the same date.

Traffic and Transportation

Patrons Request Higher Fare

The Waverly, Sayre & Athens Traction Company, Waverly N. Y., is charging 20 cents per zone between the hours of 12:30 a.m. and 5:30 a.m. on its lines in the State of Pennsylvania. The petition for a 20-cent rate was in effect a request of numerous patrons of the railway that the company be granted the requisite authority to charge and collect on its lines in Pennsylvania during the specified hours an additional 10 cents per zone. The application, unique in the annals of the commission, was approved of with the requirement on the part of the company of filing statements every three months showing the revenue received from this service and the operating expenses.

The company, which has its New York terminus in Waverly and a Pennsylvania terminus in Athens, was collecting a 10-cent cash fare per zone on its line in Pennsylvania with a ticket fare of thirty tickets for $2.40. It was the contention of the company that the installation of the all night service, which was for the accommodation of employees of the Lehigh Valley Railroad who worked at Sayre, could not be furnished at the existing rates and meet operating expenses.

Wants to Co-operate in Motor Safety Campaign

The Connecticut Company, New Haven, Conn., recently issued Accident Bulletin No. 4½ announcing its intention of giving the heartiest co-operation to the Commissioner of Motor Vehicles in his continuing safety campaign "in an effort to bring the automobile hazard to the lowest of any State." The bulletin states that more than half of the company's accidents involve automobiles and that extra precaution upon the part of the railway operators might prevent accidents to the exceptionally careless auto drivers. The bulletin says that the only safe course is "Look out for hand signals from auto driver; look out for carelessly driven automobile. In other words, Look Out! Look Out!! Look Out!!!"

Fight Looms Over Extending Six-Cent Fare

A legal fight appears to be imminent in the city of Dallas, Tex., over the extension to the Dallas Railway by the city of the 6-cent fare for a period of one year. A petition bearing the signatures of 2,503 individuals, was recently filed before the Board of City Commissioners asking that the ordinance granting the fare extension be submitted to the people for their approval at a referendum election, as provided in the city charter.

City Attorney Allen Charlton held that the ordinance granting the fare extension was not subject to the referendum provision of the charter, the referendum provision stating that an ordinance was subject to the referendum only when a petition signed by the required number of qualified voters was presented to the City Commission within thirty days after the passage of the ordinance and before it became effective, or where such ordinance dealt with the granting of a franchise. The city attorney held that the ordinance granting the fare increase was not subject to the referendum provision, since the measure did not deal with the granting of a franchise, and since it was passed with the emergency clause and there was no period of thirty days between its passage and the date on which it became effective during which a referendum petition might be filed.

W. S. Bramlett and Leo S. Tresp, attorneys for the petitioners, then threatened mandamus suit to compel the submission of the ordinance for referendum, and it is believed that such suit will be filed in a few days.

Weekly Pass on Chicago "L"

Unlimited-Ride $1.25 Ticket Forms Part of Fare Reduction Plan—Bus Feeders Proposed—President Budd Convinced the Principle of the Pass Is Correct, but Realizes Its Application Is an Experiment

A VOLUNTARY experiment in furnishing the people of Chicago with unlimited elevated transportation on a weekly pass was announced on Aug. 18 after the Chicago Elevated Railroads had filed a voluntary petition with the Illinois Commerce Commission for a downward revision of rates. The plan provides for the sale of a weekly unlimited ride transferable pass for $1.25 good between all points south of Howard Street. Another, the price of which is $2 will be good for any points between Chicago and Evanston. Unless stopped by the Commerce Commission, the fare plan automatically becomes effective thirty days from the date of filing—that is, Sept. 18.

On the day following the announcement of a revision in rates, the Elevated disclosed its intention to install some supplementary bus lines. Three lines were announced connecting with the elevated trains at Fullerton Avenue, Logan Square, and Fifty-first Street stations. Certificates of convenience and necessity will be filed with the Commission and permits to operate the new lines will be asked of the City Council and the park board.

The cash fare on the buses will be the same as that on the elevated—10 cents, but free transfers will be given from the elevated cars to the bus riders and for those wishing to transfer to the buses from the elevated trains. The proposed weekly pass will be accepted on the buses as well as on the L trains.

Under the new plan, the cash fare rate, 10 cents south of Howard Street and 7 cents between that point and Evanston, remains unchanged, but the following reductions are contemplated under the proposed new time schedule:

Tickets good between points south of Howard Street will be sold at the rate of three for 25 cents instead of four for 35 cents as at present, a reduction of 8¾ cents to 8⅓ cents.

Tickets good between Evanston and Chicago will be sold at the rate of two for 25 cents instead of 13 cents straight. The saving is half a cent a ride.

Children between the ages of seven and twelve may ride between any point south of Howard Street for 3 cents and between any points north of Howard Street for the same amount, making a total fare of 6 cents from Chicago to Evanston as opposed to the full 13-cent ticket rate or 17-cent cash fare now charged.

School children between the ages of twelve and seventeen upon presentation of age certificate signed by their teacher, may purchase 50-ride coupon books for $2.50, good between any points south of Howard Street and for $4 between Evanston and Chicago. These books, which are good for an indefinite period, as long as the coupons last, provide a flat 5-cent fare in the city and an 8-cent fare to Evanston. Children under seven years of age when accompanied by an adult may ride free as at present.

The weekly passes will be good from midnight Sunday until midnight of the following Sunday. They will be placed on sale on Friday, the sale to continue until the following Wednesday. It is expected that the use of the pass will increase the number of short-haul riders and thereby decrease the average length of ride, which at present is 6¾ miles.

Britton I. Budd, president of the elevated, said:

> The rate schedules which have been filed with the Illinois Commerce Commission are a result of two years of serious consideration, which I have given to the subject of devising a more satisfactory form of fare on the elevated lines. I have long wished to see the quantity user given the benefit of a lower rate, which is impossible under the uniform fare system.
>
> I have given a good deal of thought to the zone system in common use in many European cities and tried in some of the eastern cities in this country. While the zone system is equitable in that the farther a passenger rides the more he has to pay, still there are practicable objections to its use in Chicago which has been built up under the flat fare system.
>
> The weekly pass plan, provided for in our new schedule, is based on the principle that the passenger who uses the lines frequently is entitled to a lower rate than

the casual rider. The same is true with regard to the new children's rates provided in the schedule.

The effect which this innovation in local transportation may have in the revenues of the company is problematical. It is a big business venture on which we are taking a chance because we believe it is based on correct principles and will be beneficial to the people now served by our lines and to the companies.

For that reason we are willing to make the experiment.

The various cities taking up the weekly pass have been mentioned in these columns from time to time. Now there are about sixteen in all which have successfully tried out the plan. However, this will be the first attempt to experiment with the pass in a city of more than 175,000 population. The pass plan for Chicago was worked out by Walter Jackson, fare consultant, who first put the pass scheme into operation at Racine, Wis., in the summer of 1919.

ROUTES FOR BUSES

The proposed bus routes are as follows:

Route No. 1—From Logan Square station west on Wrightwood Avenue to Columbus Avenue, returning to Logan Square station by the same route. Distance, 1 mile.

Route No. 2—From Fullerton Avenue station, on Fullerton Avenue to Commerce Avenue, south on Commerce Avenue to Belden Avenue, to Lincoln Parkway West, south on Lincoln Parkway and North Park Avenue, to North Avenue and west to Sedgewick Street, returning by the same route. Distance, approximately 2 miles.

Route No. 3—From Fifty-first Street station on Fifty-first Street, past Washington Park, on Hyde Park Boulevard, south on Everitt Avenue to Fifty-sixth Street, the north boundary of Jackson Park, returning by the same route. Distance approximately 2½ miles.

It is planned to operate the buses on ten-minute headways, but this schedule will be governed by the amount of traffic. Each bus will probably carry twenty-two passengers and will be patterned after the type of vehicle now being used by the Chicago, North Shore & Milwaukee Railroad in Wisconsin. It is said that the buses have already been ordered and are expected to arrive in time for placing them in operation early this fall.

Bus Line Would Interfere with Railway Business

C. B. Hammond of the Elmira, Corning & Waverly Railroad, Elmira, N. Y., has very forcibly expressed his disapproval of the proposed bus line between Elmira and Waverly on the ground that it would parallel and naturally compete with the interurban railway line. His claim is that the bus line would pay only if it drew business away from the trolley line, which would result ultimately in crippled railway service with a higher rate of fare. He claimed further that the earnings of the trolley company were not enough to pay operating costs and interest on the actual value of the property.

5,966,895 Five-Cent Passengers in Boston in July

By a careful selection of the routes over which it feels justified and authorized to give service at reduced rates the Boston (Mass.) Elevated Railway is spreading the 5-cent fare gradually in Boston and surrounding communities, so that today it is carrying nearly one-fourth of its passengers at 5 cents each.

In connection with the issuance of its financial statement for July, Edward Dana, general manager of the company, informs public that at least two more routes are in immediate contemplation for the nickel fare, one of those running out from the important Dudley Street terminal. Of course, the basic fare will continue at 10 cents, which is fixed by law and must remain unimpaired until the company shall have paid back the $4,000,000 which it has received fom the various communities it serves as their contributions to cover its operating deficit when income was running behind the cost of service.

The theory on which the Elevated can create 5-cent routes under the present law is that they do not take away traffic from the regular 10-cent routes. It will be noticed by the statement for July that the number of passengers traveling for 5 cents has increased from 1,634,926 in July, 1921, to 5,966,895 in July, 1922.

Accidents Reduced—Result of Safety Campaign

In a safety campaign to reduce the number of street car accidents in Atlanta, the Georgia Railway & Power Company has obtained a pledge of cooperation from virtually every business and corporation in the city operating a fleet of automobiles or trucks, this pledge promising that the companies will exact the greatest care of their drivers in order that accidents may be lessened. The idea of a co-operative campaign of this nature first originated with S. E. Simmons, superintendent of transportation of the Atlanta company, and since it became effective President Arkwright advises that there has been a notable reduction in the number of street car accidents in Atlanta occasioned by collisions with automobiles or trucks. By greater care on the part of both the motormen and drivers accidents have been so largely reduced that the railway company is now planning a similar movement with all civic organizations in the city, to carry on a campaign to interest individual drivers in the cause of "Safety First."

One-Man Car Issue Up

The one-man car proposition has again come up in Salt Lake City, where the Utah Light & Traction Company operates. The company has remodeled several of its cars for this kind of operation. Members of the State Public Utilities Commission and City Commissioners have been asked to inspect the cars. H. F. Dicke, general manager of the Salt Lake property, has arranged for a conference with the company employees, who will strenuously object to any proposal including this system of operation.

Would Substitute Bus for Railway

The abandonment of the railway system in Spartanburg, S. C., and the substitution of a bus service has been proposed to the City Council of Spartanburg by Henry M. Earle, attorney for the bondholders of the South Carolina Light, Power & Railways Company, who at a recent receiver's sale of that company purchased the properties and is organizing a new company to take over the railway on Sept. 1. The proposal has been set forth in a letter which has been sent to the Council.

Seeks Five-Cent Fare

The plan of Mayor A. V. Fawcett to raise the fare on the Tacoma Municipal Railway to 5 cents straight, without transfer interchange with the Tacoma Railway & Power Company lines, is opposed by Commissioners John L. Murray and Ira S. Davisson. Commissioner J. W. Silver, nominal head of the railway department, also declared that many tideflat workers had telephoned, threatening opposition measures if the city did away with transfer privileges. Mayor Fawcett then dropped his resolution providing transfer interchange. Two ordinances covering the same subject and establishing a straight 5-cent fare also went over for future consideration. It is expected that some effort to get more than 2 cents out of the nickel paid the city in fare will be made, by agreement with the Tacoma Railway & Power Company, before the subject is revived.

The report of City Comptroller John M. Roberts for the operation of the municipal line during June showed that it was more than paying operating costs, exclusive of interest and tax charges, and had $1,219 to apply toward these charges. This is the best showing made in recent years.

Hearing on Fort Worth Fare Issue Scheduled

Officials of Fort Worth, Tex., have brought action against the Northern Texas Traction Company to secure a reduction in fares from 7 cents now prevailing. N. A. Dodge has been appointed by the Federal Court as referee to hear evidence in the case. The hearing has been set for Aug. 28 in Fort Worth.

In discussing the coming hearing George H. Clifford, vice-president and general manager of the company, declared that the company could not maintain the present service if the fare were reduced. Mr. Clifford made comparisons with other cities to show that the service in Fort Worth is really worth 8 cents.

He placed valuation of the Fort Worth properties at $6,500,000 and asserted that the earnings of the company were less than 4 per cent on that valuation even with 7 cent fares.

Interurban Rate Cut

The Railroad Commission of California has authorized the San Francisco, Napa & Calistoga Railway to reduce its individual monthly commutation fares between all points to basis of fares in effect prior to the increase granted beginning with the year 1918. The authorization will bring about a reduction of 16⅔ per cent, restoring the fares to pre-war levels. The effective date is Aug. 25.

The reductions will affect employees of industries and others who require daily service between Vallejo, Napa, Napa Junction, St. Helena, Calistoga and other points. The reductions are shown as follows, the lower of the alternative rates not applying to limited trains.

Between Vallejo and	Present Fare	New Fare
Napa Junction	$4.62	$3.85
Napa Junction	5.28	4.40
Napa	11.64	9.70
Napa	13.38	11.15
St. Helena	23.82	19.85
St. Helena	27.36	22.80
Calistoga	30.00	25.00
Calistoga	34.44	28.70

The same percentage reductions will be made in commutation fares between San Francisco and points on the electric line.

Petitions Seek Repeal of Jitney Ruling

Petitions bearing the signatures of 1,800 persons asking the repeal of the ordinance barring jitneys from certain streets have been filed with the Board of City Commissioners of Fort Worth, Tex., as a counter move in the fight to compel the Northern Texas Traction Company to reduce fares from 7 cents to 6 cents. The City Commission pigeon-holed the petitions, on the ground that the city government is now engaged in its greatest effort to force a reduction in fares, a hearing having been set before Referee N. A. Dodge for Aug. 28, referred to elsewhere in this issue, and until this hearing is held and the matter disposed of, the officials refuse to permit any new movement to be launched. Allegations set forth in the petitions are that the law tends to stifle one business in the interest of another and is discriminating in its application; that it is against a sound policy to grant a monopoly to the Northern Texas Traction Company and that as a result of the monopoly the fare has been raised 40 per cent to the great detriment and injury of the citizens.

Conductors Relieved of Ticket Selling on Chicago Surface Lines

An order relieving the conductors of the Chicago Surface Lines of the duty of selling tickets on the cars was granted by the federal court on Aug. 17. The order became effective during the week ended Aug. 26, contingent, however, upon the Surface Lines furnishing the court with a list of all places at which tickets may be purchased by the passengers. The order received some opposition despite the promise made by Chester Cleveland, City Hall traction attorney, that the city would agree to the change as an inducement for the men to settle the strike.

The Surface Lines have already completed arrangements for the car tickets to be on sale in more than 340 convenient stores, offices, and banks throughout the city.

A committee of the trackmen conferred last week with Williston Fish, general manager, and Harvey P. Fleming, chief engineer of the Surface Lines, on the new wage offer which has been made to the men. The new rate, 54 cents an hour, it is expected, will be adopted by the men.

Two groups whose wages have not yet been settled by a vote of the union men were to have held meetings early this week to consider the new scale. Completion of negotiations with them and with the trackmen will mark the close of wage debates.

Transportation News Notes

Seeks Increased Fare. — The New York State Railways has petitioned the Public Service Commission for permission to increase passenger fares in Utica and vicinity.

Approves Bus Petition.—The Massachusetts Department of Public Utilities has approved a petition of the Northern Massachusetts Street Railway for the ownership and operation of jitney buses in the town of Athol.

Collection of Excess Fares Discontinued.—Collection of the 10 cents excess fare from passengers who pay their fare on cars instead of purchasing tickets at stations, as authorized by the state law, has been discontinued by the Indiana, Columbus & Eastern Traction Company, Cincinnati, Ohio.

New Transfers to Be Put in Use.—W. R. Alberger, general manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has announced that a new type of transfer will be put into use on Sept. 1. On one transfer passengers will be allowed to travel between any two points within the transfer limits.

Lower Fare Request Denied.—Mayor Quigley's request for a uniform 5-cent fare within the city limits of Chelsea, Mass., has been denied by Frank Hardy local manager of the Chelsea division of the Eastern Massachusetts Street Railway. Mr. Hardy said it would be impossible to make such a reduction and keep the division on a paying basis.

Free Rides for Men of Fleet.—When the Pacific Fleet visited Seattle, Wash., on July 3, 15,000 passes, good over Seattle's Municipal Railway System for one day, were issued to the officers and men of the fleet. The passes read "Good for transportation on the line of the Seattle Municipal Railway July 3, 1922, when presented by an officer or an enlisted man of the Pacific Fleet."

Will Discharge Passengers from Rear.—The United Traction Company, Albany, N. Y., is making arrangements to equip all the double-truck cars with devices which will enable the operator of the one-man cars to discharge passengers from both the front and the rear. The new plan of passengers alighting from the cars at the rear, will relieve congestion.

Excursions Favored.—Trolley excursions are becoming popular at Hartford, Conn. The Connecticut Company a few weeks ago established the running of one big car from Hartford to Crystal Lake and now it takes three cars to accommodate those who go. The excursions are run Wednesday afternoons with an average of 200 persons. The round trip is 60 cents, while the regular fare is $1.25.

Twelve Rides for $1 Authorized.—The Massachusetts Department of Public Utilities recently authorized the Brockton & Plymouth Street Railway, Plymouth, Mass., to issue tickets containing twelve rides for $1 in place of the present form, containing twenty rides for $1. Officials of the company at a hearing before the commissioners said the twenty-ride experiment had proved unprofitable to the company.

Will Carry Mail.—Owing to the suspension of the Dayton, Toledo & Chicago Railroad, the Dayton, Covington & Piqua Traction Company, West Milton, Ohio, will transport mail from Dayton to Englewood, Union, West Milton, Pleasant Hill and Covington. Plans for the delivery of mail to residents along the route of the suspended railroad were formulated by the railway mail service in the Cincinnati post office.

No Promise of Lower Fares.—President Lucius S. Storrs of the Connecticut Company, New Haven, Conn., stated recently that it was impossible at this time to say when fares would be lowered in Connecticut. He stressed the fact that the company was feeling the business depression and that the weather had not been conducive to heavy summer traffic this year. He would give no indication and no encouragement to the idea that fares would drop in the near future. It was all a matter of expenses and revenues, he said.

Five-Cent Fare Denied.—The petition for a 5-cent fare between stations on the Boston, Revere Beach & Lynn Railroad has been denied by the Massachusetts Department of Public Utilities. Mayor Noone and the City Council of Revere favored the lower rate. The present fare is 10 cents between stations with a 5-cent fare to school children within the limits of the cities and towns. The department in its decision said that it would be impracticable at this time to differentiate for the purpose of fare collection between the local and the through riders.

Personal Mention

A. R. Baxter Appointed General Superintendent at Indianapolis

Amos R. Baxter, Rushville, Ind., has been appointed general superintendent of the Indianapolis & Cincinnati Traction Company, Indianapolis, according to an announcement by C. L. Henry, president. Mr. Baxter has been in the employ of the company several years and is promoted from auditor. He will have headquarters at 310 Traction Terminal Building, Indianapolis. C. A. Dugle has been named auditor with headquarters at Rushville. Mr. Henry also announced the appointment of George W. McKenney to the position of transportation superintendent. Mr. McKenney has been chief train dispatcher of the line and will be succeeded in that position by Frank McClelland. The three men have been in the service of the company for years. Mr. McKenney is the Democratic candidate for treasurer of Shelby County.

R. L. Hughes, formerly superintendent, is now general manager of the Ashtabula (Ohio) Rapid Transit Company.

E. B. Hardin is now auditor of the Piedmont & Northern Railway, Charlotte, N. C. The position was formerly held by J. M. Martin.

E. M. Gilbert has been elected vice-president, to succeed Thomas Cheyne, of the W. S. Barstow Management Corporation, New York, N. Y.

Charles Elsey has been elected president of the Tidewater Southern Railway, Stockton, Cal. He was formerly treasurer and will continue this work in addition to his new duties.

P. F. Thompson has been appointed superintendent of the Scioto Valley Traction Company, Columbus, Ohio. This position was formerly held by C. Skinner.

L. W. Van Bibber, for some time auditor of the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, is now auditor of the Columbus, Newark & Zanesville Electric Railway with headquarters at Springfield.

E. Carey is auditor of the Sault Ste. Marie (Mich.) Traction Company, S. V. McLeod is purchasing agent and James N. Franz is general manager. F. M. Turnbull was formerly auditor and L. L. Jacobs purchasing agent.

Fred Lacy has been promoted to the position of master mechanic of the Highland Grove Traction Company, McKeesport, Pa., from that of electric engineer and engineer of overhead construction.

F. H. Watriss, who has been vice-president, is now president of the Austin (Tex.) Street Railway, E. P. Wilmot filling the vacancy in the vice-presidency. J. F. Springfield was the president before the recent change.

H. H. Sanborn has been elected president of the Fresno (Cal.) Interurban Railway, to succeed Thomas M. Paterson, who becomes vice-president, succeeding F. O. Cooke. H. J. Culler is agent in charge of all stations.

Franklin P. Jones is now president of the West Chester (Pa.) Railway. He was elected to this position to fill the vacancy caused by the death of George D. Woodside. Mr. Woodside had been president since 1916.

C. V. Link has been appointed assistant to the vice-president of the Cincinnati (Ohio) Traction Company. E. H. Berry, formerly engineer of roadways, is now engineer of maintenance of way, while J. H. Sundmaker is acting as engineer of roadways.

Jack Groff, who has been engineer of overhead construction of the Grand Forks (N.D.) Street Railway, has been promoted to the position of master mechanic. Norman Jackson is engineer of overhead construction, and Pete Housour is engineer maintenance of way.

Gaylord Thompson, general manager of the New Jersey & Pennsylvania Traction Company, is a candidate for the City Commission of Trenton, N. J. Mr. Thompson is a civil engineer by profession and has had considerable experience in municipal work. He is a native of Ohio. He went to Trenton in 1913.

E. M. Knight, who for the past several years has been resident engineer in Parkersburg, W. Va., of the Monongahela Power & Railway Company, has been promoted and will have headquarters at Fairmont, W. Va., as assistant to the chief engineer of the system. Mr. Knight will be succeeded here by Howard Carr of Fairmont.

Charles P. Hoffman, president of the Bethlehem Transit Company, South Bethlehem, Pa., has taken over the duties of general manager in addition to those of president, which he has held for some time. V. R. Weaver is now auditor, the position held formerly by M. M. Cannon, and W. H. Garner is now superintendent.

D. E. Byerly, who was formerly superintendent of the Montgomery Light & Power Company, Montgomery, Ala., has accepted a similar position with the Hattiesburg (Miss.) Traction Company. He assumed his new duties a few days ago. J. L. Haley, formerly manager of the Hattiesburg company, has accepted an executive position with the Adirondack Light & Power Company, New York, and will take up his duties there before the end of August.

F. T. Pomeroy has been elected president of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio. He had been connected with the company for some time and previous to his present work was third vice-president and secretary. Other changes have been made recently. L. M. Coe has been elected vice-president, filling the position formerly held by L. J. Wolf, and C. J. Mayers has been appointed auditor, succeeding A. F. Jones.

Obituary

James Kennedy, for several years associated with *Railway and Locomotive Engineering* as associate editor and managing editor, died on Aug. 14. At the time of his death he was editor and president of the Angus Sinclair Publishing Company. Mr. Kennedy was in charge of the locomotive shops of the New York Elevated Railroad from 1879 to 1902. He was seventy-two years old at the time of his death.

M. C. Ewing, secretary, treasurer and general manager of the Wisconsin Valley Electric Company, Wausau, Wis., died on Aug. 10, after an illness of more than a year. Mr. Ewing was one of the principal figures in the promotion and construction of the Wausau Street Railroad and became its general manager. In 1909, three years after the building of the railway, the company was consolidated with the Wausau Lighting & Power Company and Mr. Ewing was made general manager, secretary and treasurer, the position he held at the time of his death. Mr. Ewing was interested in public utility matters throughout the State. He was one of the promoters of the railway system in Grand Rapids and led in the development and consolidation of the water power of Wisconsin River Valley. Mr. Ewing was president of the Wisconsin Electrical Association in 1915.

S. L. F. Deyo, who was in charge of the construction of the first subway in New York City, died at his summer home in Norfolk, Conn., recently. He was for some time chief engineer of the Interborough - Metropolitan Company, New York. Mr. Deyo started his railroad work, after graduating from Union College in 1870 with the degree of civil engineer, as a rodman on the Harlem River branch of the New York, New Haven & Hartford Railroad. Later he was in charge of construction of the line from Harlem River to Pelham Bay as resident engineer. From 1873 to 1876 he served as assistant engineer for the improvement on the Fourth Avenue line. For five years Mr. Deyo was superintendent of the American Metaline Company. Before becoming chief engineer of the Interborough-Metropolitan, he was chief engineer of the Rapid Transit Subway Construction Company of New York.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES
BUSINESS ANNOUNCEMENTS

Efficiency of American Labor

The question of the efficiency of American labor, particularly in comparison with the standards of output which prevailed prior to the war, is the subject of an article in the July number of the *Monthly Labor Review*, contributed by Ethelbert Stewart, U. S. Commissioner of Labor Statistics. Mr. Stewart shows that the basis for much of the current belief that the American workman is not as efficient now as formerly is found in general statements which have no backing of statistical proof. Against this state he presents considerable data from particular industries showing that a proper consideration of all the elements entering into production does not evidence a general slackening of effort on the part of the workers but in a number of industries increased efficiency is shown. Mr. Stewart urges the need of time-cost studies as a basis for scientific measurement of labor efficiency, not with a view to "speeding up" industry but for the purpose of establishing a definite standard by which the work may be judged.

Elastic Tariff at Last

One of the very important phases of the new tariff bill is its provisions for flexible tariff. This is the first time any elasticity in tariff rates has won the approval of either branch of Congress. The amendment proposing to enlarge the Tariff Commission did not prevail, but the commission is authorized to hold hearings and to conduct continuous investigations with the idea of remedying any inequities that may be found in tariff rates. The Tariff Commission will submit its finding of facts to the President, who is empowered until July 1, 1924, to revise rates, either up or down, not to exceed 50 per cent. The date of July 1, 1924, was selected by the majority party so that in the event of a change of administration the power would not be conveyed to a Democratic President.

The present measure is no different from any of its predecessors so far as unanimity of opinion is concerned about its fairness. It is all a matter of degree. It all depends upon the point of view. It would be manifestly impossible to expatiate at length upon the provisions of the bill to the industry from all angles. And it probably would do no good to do so. The point of view of the purchaser is seldom the point of view of the buyer. For instance, is there much to wax enthusiastic over, either to the buyer or the seller, about the fact that telephone, telegraph, trolley and electric light poles of cedar or other wood were placed on the free list on motion of Senator Kellogg, whereas it had been proposed originally to place a duty of 10 per cent on such imports?

The metal schedule has undergone more meddling perhaps than any other single section. In its final form, however, the more important rates remain little changed from those provided in the House bill. The Senate made substantial reductions in duties on tool steel ores and alloys. The rate on pig iron has been reduced from $1.25 to 75 cents a ton and on scrap from $1 to 75 cents. There has also been a slight reduction in rates on structural and fabricated material and a reduction from 7-40 of 1 cent per lb. on steel rails to 1-10 of 1 cent per lb. and an additional duty of 10 per cent on cold-worked nickel, alloys, bars, etc., and slight decreases in the duty on tool steel.

In the closing days of the tariff debate a heavy reduction was made in the Senate in the duty on incandescent electric lights, the rate standing in the bill as it goes to conference at 20 per cent ad valorem.

The bill has gone to conference under a special rule and Republican leaders say they hope to have it enacted into law by Oct. 1. There have been reports that the measure will be the object of sharp controversy in conference, particularly as it relates to the American valuation and the foreign valuation plans, the former being the House and the latter the Senate plan, but the general belief is that Chairman Fordney of the House committee on ways and means will yield to the Senate.

Coal Situation Only Slightly Relieved

Little Surcease Apparent for Electric Railways in Cleveland Settlement—Utility Associations Are Exerting Their Influence with Authorities at Washington

SO FAR as the electric railways and other utilities are concerned the coal situation is largely a bundle of contradictions. Just now it appears more than likely that most electric railways will succeed in muddling through without being seriously crippled, but for others, particularly small companies, unless help comes very soon, there will be curtailment of service in the near future with complete abandonment of operation in prospect for the not distant future. The very meagerness of the requirements of the smaller companies would seem to make it easier for them to secure supplies than for the large companies to do so, but even for the smaller companies it is not altogether a matter of ingenuity in making purchases. They, too, can only hope to go along, living from hand to mouth, as it were, while the operators and the miners bicker.

It is possible for the most part only to generalize about the coal situation. Everybody and every section is suffering, but the degree of the suffering is tempered by many different elements. It can not be said that all New York is suffering from the shortage more than is New England or that Michigan is worse off than Illinois. In other words, the degree of suffering can not be reduced to geographical or political divisions and sub-divisions. Thus in one of the largest cities of the country one large system is fairly well fortified for the immediate future by supplies of coal on hand and others in prospect, while another company is only a few days removed from the curtailment of service and possible shut down of some lines.

Railway operators reading this account will say it is a tale of woe. It is. Some of it is not new. It would, indeed, be a pleasure to be able to say what prospects are ahead, but there is no one that knows. Statistics show that increasingly more coal is being mined and that the non-union fields are in the position to produce record tonnage. Moreover, Mr Hoover says that a large percentage of coal operators have continued to sell coal at the agreed price when they could have had $8 or $10 for the asking. He is outspoken in his praise of these operators. All this, however, is only provocation to the operator who sees his supply of coal on hand constantly diminishing or has been gouged by one of the unscrupulous or so-called bootleggers in coal. And it does him little good to know that the House has passed a bill for an impartial investigation of the coal industry and that the Senate is expected to pass the bill within a few days. What could anybody predict of a definite nature about the outcome of a situation in which politics, chicanery and greed are mixed to the extent that these elements are blended in the coal and railroad crisis? One measure of satisfaction remains for the utility operators, however, in the knowledge that the case of the utilities is being brought before the authorities at Washington with all the resources that the national bodies representing the electric railway, gas and power industries can command.

As for the settlement at Cleveland there is little blinking the fact that both sides regard it as merely a truce, with each of the contestants retaining their arms and preparing for a resumption of hostilities on a larger scale. Thus is the gloom thickened, but it is a warning that may well be heeded for the future. It is the opinion in Washington—almost unanimously held—that all the operators eventually will accept the Cleveland agreement. So far as the Government officials are concerned, they will have little patience with any other course. Their position is that the public's need of coal is more important at this time than any issue involved in the strike. In Washington the viewpoint of Government officials and members of the Congressional bodies is regarded as important, not so much from any law the Government can invoke, but from the fact that they are assured complete publicity for their sentiments on this subject and in that way can crystallize public opinion. Whether or not one agrees with the degree of optimism thus expressed about the power of public opinion in this particular instance will probably vary inversely with his real knowledge of the present temper of the operators and the miners.

Car Building Increases

Operations at car building plants of the J. G. Brill Company have been steadily increasing since the early months of the year and are now on a larger basis than at any time since the slump following termination of the war.

Orders have been coming in fairly regularly of late, and while a good portion of this has been in small lots, a number of large contracts have been taken. In addition to demand for new equipment the company reports a comfortable business in replacements. There has been a good demand for trucks all along, an evidence of the economies being practised by railways in getting the most service out of their equipment.

The company reports a steady demand for its "Birney" safety car. It has been the practice to build cars of this type for stock, about two-thirds complete, in anticipation of demand. Recently, however, construction work has not kept much ahead of orders.

Opportunity for Forehanded Buyers

Increases in wages in the steel industry to become effective Sept. 1 and the imminent prospect of higher coal costs are likely to be reflected in increases in electric railway equipment costs in the near future. It appears that prospective buyers will do well to consider this with a view to placing orders now for contemplated later purchases.

Metal, Coal and Material Prices

Metals—New York	Aug. 22, 1922
Copper, electrolytic, cents per lb	13.975
Copper wire base, cents per lb	15.625
Lead, cents per lb	5.925
Zinc, cents per lb	6.575
Tin, Straits, cents per lb	32.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.725
Somerset mine run, Boston, net tons	8.00
Pittsburgh mine run, Pittsburgh, net tons	......
Franklin, Ill., screenings, Chicago, net tons	......
Central, Ill., screenings, Chicago, net tons	......
Kansas screenings, Kansas City, net tons	......
Materials	
Rubber-covered wire, N. Y., cents per lb.	6.05
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.05
Linseed oil (5-bbl. lots), N.Y., cents per gal.	91.50
White lead, (100-lb. keg), N.Y., cents per lb.	12.50
Turpentine, (bbl. lots), N.Y., per gal	$1.30

Rolling Stock

Clinton, Davenport & Muscatine Railway, Davenport, Ia., is contemplating the purchase of six double-truck interurban cars.

Eastern Wisconsin Electric Company, Oshkosh, Wis., recently placed an order with the St. Louis Car Company for five interurban cars to be used on the lines between the cities of Oshkosh and Fond du Lac.

Boston (Mass.) Elevated Railway has overhauled and painted since Jan. 1 of this year 491 cars, as compared with 282 during the same period last year.

Track and Roadway

San Diego & Arizona Railway, San Diego, Cal., has received permission from the California Railroad Commission to construct an industrial track at grade across Twenty-third and Twenty-fourth Streets in National City, San Diego County.

Indiana Service Corporation Fort Wayne, Ind., has requested the Board of Public Works for a franchise for double switch curve connections at West Creighton Avenue and Calhoun Street and also for a twelve block extension on Wells Street.

Northern Texas Traction Company, Fort Worth, Tex., is just finishing the work of laying new steel on its South Main Street line in connection with the paving of this street with asphalt over a concrete base. The company is paving between its tracks.

Southwestern Traction Company, Temple, Tex., is committed to the construction of an interurban line from Rosen Heights, a suburb of the city of Fort Worth, Tex., to Lake Worth, the city's bathing and summer resort, 10 miles distant. Surveyors are in the field, according to Henry Hutchings, first vice-president of the company. It is announced that as soon as the survey is completed and estimates and specifications prepared, active construction work will begin. The right of way has been secured, and all permits in connection with the building of the line granted. The line will run down the center of the nine-mile bridge road to a point west of the old aviation hangar, and will then turn to the left and proceed directly to the lake. A loop will be run past the Southwest Motor Club's clubhouse to the dam, then back toward Arlington Heights.

Power Houses, Shops and Buildings

New Brunswick Power Company, St. John, N. B., is installing a new turbine in the St. John power plant.

The Pine Pluff (Ark.) Company and the Arkansas Light & Power Company have moved into their new home recently erected in that city at 411-13 Main Street. The firms have been located at 512 Main Street.

Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, has completed the work of installing the necessary new equipment at power substations for use of 60-cycle current. Heretofore the line has been using 25-cycle energy furnished by its own power houses, but some time back an agreement was reached with the Dayton Power & Light Company to supply 60-cycle current, and the work of making the necessary change in equipment was started at once.

Trade Notes

A. A. Murphy has been appointed resident sales manager of the Industrial and Railway Paint and Varnish Division of the du Pont company, with headquarters in New York City. He will be located at the new office of the Paint and Varnish Division, 30 Church Street. Mr. Murphy has been with the du Pont company for many years and is an experienced paint and varnish man.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that a second large shipment of railway material for the electrification of the Chilean State Railways was made recently. The train consisting of thirty-three cars was started from the East Pittsburgh works by wireless. E. M. Herr, president of the company, closed a switch on a pole near the train and this reacted to the wireless circuit on the locomotive, releasing the controller and causing locomotive to start.

New Advertising Literature

Quigley Fuel Systems, Inc., New York, N. Y., has just issued bulletin A, giving a condensed description of the Quigley powdered coal system and appliances. The layout of a typical coal mining plant is shown and the method of fuel distribution and control briefly described.

St. Louis Car Company, St. Louis, Mo., has issued bulletin 100 on electric car specialties. This includes manually operated folding door and step mechanism, sash fixtures, window guards and fasteners, grab handles, gongs, seats and seat handles, curtains, fare boxes, ventilators, etc.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently issued a leaflet describing arc splitters for controllers. The life of a controller is dependent to a large extent upon the design of the magnetic blowout which is used for rupturing the arc that is established when the controller contacts are separated under load. Arc splitters assist in rupturing the arc by cooling it and also by causing it to form two or more loops which have a total length within a given magnetic field that is much greater than the length of a single loop.

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Mayor Puts Forth Visionary Plan

MAYOR HYLAN'S transit plan for New York City has been made public. For five years he has been criticising every constructive suggestion made by others to improve the city transit situation. Now he takes some 8,000 words to describe the plan which he advocates, but omits to say whether this proposal is indorsed by any transportation engineer or is based on expert knowledge of traffic conditions.

Briefly, the Hylan plan calls for 126 miles, seven new tunnels, a bridge, the recapture of 97 miles of existing subways or all of it the city under its present franchises can take over, the establishment of a $25,000,000 bus line and the scrapping of a large part of the existing surface lines and elevated lines in Manhattan. Altogether, the Mayor says that this work can be carried out for $600,000,000, but it has been estimated in the offices of the New York Transit Commission that the cost would be well over $1,000,000,000.

Fortunately, there are many things to intervene between the proposal and its consummation. In the first place the Board of Estimate has to be convinced in its favor, and then the state authorities, who probably will be far harder to convert. Then there are such uncomfortable barriers to pass as the constitutional debt limit, with final compensation to present owners of property scrapped. Probably Mayor Hylan realizes these difficulties as well as any one else. That is one reason why the plan has advantages as a campaign issue. It can be kept in that capacity for years before a spade has to be thrust into the ground.

The Rio Engineering Congress and the American Electric Railway

MANY railway engineers do not realize the importance, at least to South Americans, of the International Engineering Congress at Rio this month. It is being held in connection with the Centenary Exposition in that city of the declaration of independence by Brazil from Portugal in 1822, and the engineering congress is the first of an international nature to be held on South American soil, just as the exposition is the first one, international in scope, to take place in South America.

According to tradition, Paris is the center of culture for the Latin world, and this is perhaps one reason why the South American engineers in the past have looked largely to France for inspiration. There are other and stronger reasons, however, constantly becoming more controlling, which dictate a closer connection with the engineering profession of this country. One of the most important is that the conditions in South America, with its great distances, comparatively scanty population and undeveloped resources, much more closely resemble those in this country than those which exist in any country in Europe. The second is the ever-growing number of engineers in South America who are graduates of our engineering schools. Hence in electric railway practice it is safe to say that each continent can learn something of the other's practice and that those south of the Isthmus will find much to interest them, particularly in the efforts toward electric railway standards being made in North America. The latest reports from Rio are that at least twelve countries are taking an active part in the engineering congress there, and as most of our engineering organizations will be represented at the Congress, it should result in a closer rapprochement between the engineers in both countries. It may even be that the American Electric Railway Association could with advantage to every one concerned include in its membership all of the larger South American systems. Two or three are already members and others might be induced to join if convinced that to those so far distant it was worth while.

Loyalty Means Nothing to Some People

THE electric railway industry has experienced during its history all kinds of strikes—those in which the company made vigorous effort to operate its cars and those in which the cars remained in the carhouse, those where the public supported the company and where it supported the men, strikes which lasted less than an hour and those which continued for more than a year. Nevertheless, a strike has been going on now in Buffalo for nearly two months, which is unique. Never before, probably, have the men in one city under the same management volunteered in such numbers to operate the cars in a city where a strike was in progress. Yet this is what is being done in Buffalo today by men from Philadelphia.

One of the labor papers professes it cannot understand such action. It points out that some time ago the plan was adopted of settling the wage to be paid in Philadelphia upon the average of the wages paid in Buffalo, Cleveland, Chicago and Detroit. Hence, in its opinion, the men who go from Philadelphia to take the place of the strikers are assisting "to crush the union that has helped to maintain the Philadelphia wages." In other words, it is thought unbelievable that the men in Philadelphia should help the management in Buffalo, Cleveland, Chicago or Detroit, because this action might mean a slight reduction in their own wages.

Such an attitude is unbelievable only to those who disregard two very important considerations. One of these is the realization which has come in Philadelphia, as well as in some other cities, that the prosperity of the employer and that of the employees are very closely associated; hence self-interest prompts each to promote the welfare of the other. The other consideration, ignored by those who cannot understand the action of the Philadelphia men, is that of loyalty, where loyalty calls for some effort. Of course, to some this word "loyalty" means nothing. But to the Philadelphia employee it means a great deal. This is shown by statements from some of the men who have gone from Philadelphia to Buffalo, as published in the P. R. T. "Service Talks." One of these follows:

> We of the P. R. T. came to Buffalo to show our belief in the Mitten Plan—in appreciation of what it has done for us and for the purpose of holding the Buffalo men's jobs open to them. The latter effort has been thwarted because the union successfully intimidated the men who desired to return to their old jobs. This has been easier of accomplishment by the union because of the foolish promises of protection, held out by Buffalo's Mayor, who seems trying to make good his pre-election pledges and his public promises to the men that the union would win.

The logical result of this feeling by the men from Philadelphia is manifested in the improved service given. In fact, the change in the demeanor and extent of the courtesy exhibited by the imported men in Buffalo, as compared with that previously shown, has been so marked as to attract favorable comment in the daily press. This is of course as it should be. It comes not only from an appreciation of past favors but from an intelligent self-interest, because a co-operating management and men can accomplish wonders in any industry.

Short-sightedness in the direction of an insistence on immediate gain has been the cause for frequent failure, not only of individuals, but of groups of individuals. It is the spirit which prompts the employee to do the work only "that he is paid for," that is to give the minimum which will be accepted for service without bringing immediate discharge. It is this spirit—the spirit which cannot understand the motive of the Philadelphia employees in operating the Buffalo cars—which is fatal to progress and prosperity.

The Three Dromios of Municipal Politics

AMERICAN political life presents strange anomalies. It would really seem that the larger the city the more nearly does it come to committing political suicide. Thus New York has its Mayor Hylan, Chicago its Mayor Thompson and Buffalo its Mayor Schwab. And the worst of these is Schwab, so they say. Of the record in office of Mayor Hylan little need be said. Of the record in office of Bill Thompson, particularly during the war, little need be said. But of the record in office of Mayor Schwab there is much to be said. He is the youngest in office of the triumvirate, but he is probably the deadliest of the three. All of them have been in office during electric railway strikes. All of them have been openly sympathetic with organized labor. It is no crime to sympathize with labor, but it is a crime for a man in public office to lend the weight of his authority to any cause not in the best interests of the general public. And this is what all of them have done, Mayor Thompson less spectacularly perhaps than the others. In short, all of them are traction baiters. And as such they are a mutual admiration society.

Hylan and Thompson did pretend to preserve a degree of decency in connection with their activities during the strikes in their cities, but Schwab has given Buffalo a terrible black eye. New York and Chicago by their very bigness may live down the disaster done by the election of Hylan and Thompson, but Schwabbery, as the Buffalo *Commercial* calls it, has made the name of Buffalo a stench in the nostrils of the whole country. Still it is difficult to keep from laughing when the correspondence is read which passed among these three Dromios congratulating each other on the success of the auto in meeting the need for transportation during the strikes which beset their cities. Of course, the classical allusion from the "Comedy of Errors" is distorted by the idea of the brothers being triplets instead of twins, but the idea is not destroyed that they are so much alike as to be mistaken for each other. When Hylan and Thompson and Schwab are considered, respect increases for the observation which led the late Viscount Bryce to question the capacity of the American city for self-government.

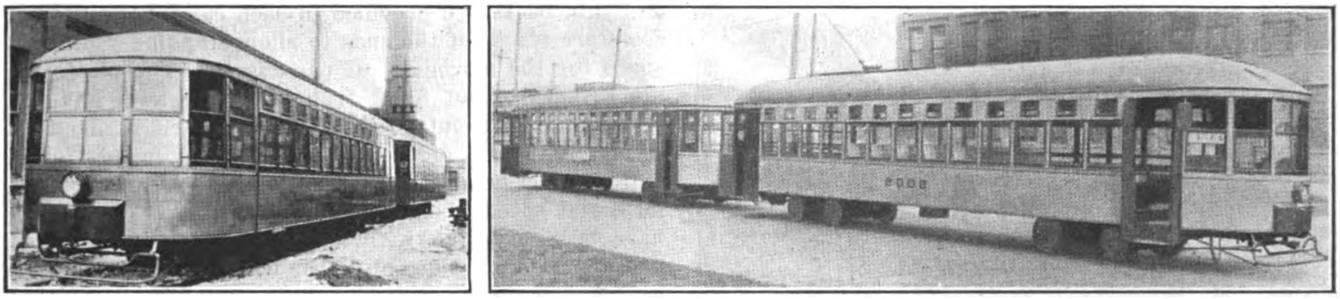
Convention Meetings at Chicago Should Function on Time

IT IS not too early to point out the necessity for all of the associations to economize time and begin their sessions at Chicago promptly, if the maximum results are to be obtained. Recent meetings of the several executive committees at which the programs for the different associations were reviewed show a wealth of topics and a need for as much time as possible for their consideration. It is a healthy sign that the work of each of the associations is expanding, but such a condition carries corresponding obligations. Possibly this expansion of scope during the past year is most evident in the case of the Engineering Association and is due in part to the fact that during the past twelve months the association's co-operative activities with other technical bodies have assumed unusual proportions and importance. It was apparent at Atlantic City last year that every available minute was needed to get through with the schedules of this association and even then a great deal of the discussion had to be curtailed, owing to lack of time. This year the situation is intensified to the extent that the number of topics to be considered has increased.

One most obvious way of gaining part of the greatly needed time is that the meetings shall begin promptly, and it is satisfactory to note that the Engineering executive committee has already decided that its sessions will begin on the minute of the announced time. Railway men are accustomed to operate their cars on schedule so there should be a ready response to this decision. Similar official action could well be taken by the other associations.

That such meetings can be held punctually and that it is worth the effort so to conduct them was evidenced in Chicago last March during the convention of the American Railway Engineering Association, where all meetings started on time to the second and where a very large program was fully covered within the time allotments, thus calling forth praise from many quarters. Electric railway operators will not be outdone by their steam road brethren and there is no doubt that an "on time" program for all the associations can be carried through. If figured on a financial basis, with the cost of the convention divided by the time available for sessions, the value of each minute will be found to be enormous. Of course, this is not an entirely fair method of evaluating the time because there are other benefits from the convention besides the sessions, but some idea of the importance of utilizing all of the time available for the sessions can thereby be obtained.

It therefore becomes a duty of every delegate at Chicago to do his bit by being on time when the meetings are called to order.



VIEWS OF BOTH SIDES OF THE TWIN CITY RAPID TRANSIT COMPANY'S TWO-CAR TRAIN

Two-Car Train Weighs 490 Lb. per Seat

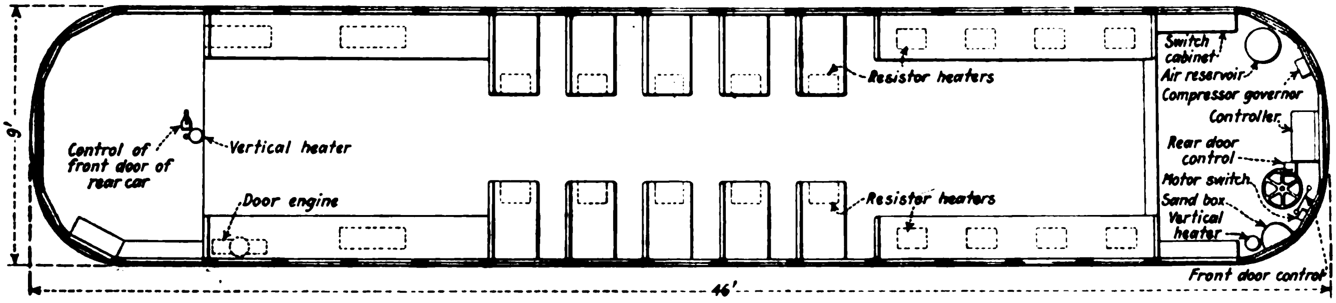
Experimental Two-Car Unit, Built by the Twin City Rapid Transit Company, Weighs 51,500 Lb. and Seats 105 Passengers—Has Low-Floor, Inside-Journal Bearings, Trucks Equipped with Band Brakes and Front Car Heated with Resistors

ONE of the big transportation problems that has arisen in St. Paul, Minn., during the past few years has been to route a sufficient number of cars through the congested business district in rush hours to remove the people from the street corners. On the basis that the solution rested not in adding to the number of cars, which would further aggravate the accentuated traffic conditions, but in increasing the size of each unit, the Twin City Rapid Transit Company has constructed a two-car train of new design. It is believed that train operation will prove a long step forward in the handling of travel on the heavy traffic lines in St. Paul. The operating results of this completed train on several of the heaviest traveled lines radiating from the business center of St. Paul has been so satisfactory that the company intends to construct a number of its future cars along the same general lines and use them on the denser traffic lines in Minneapolis.

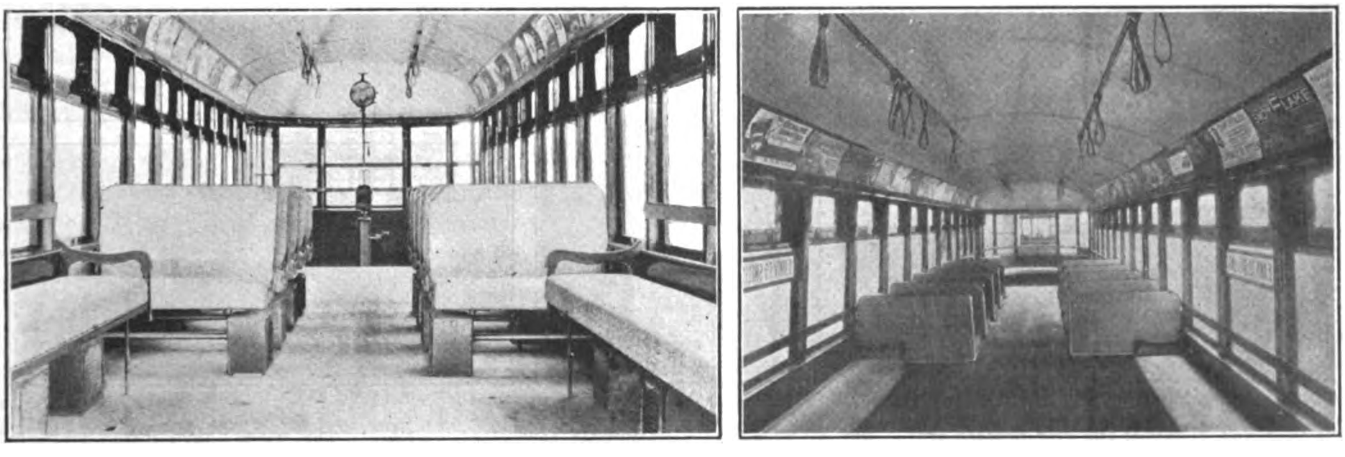
The train consists of two motor cars, permanently connected by the tubular coupler. Each car is 9 ft. wide outside and 8 ft. 6 in. wide inside. Both cars are 46 ft. long and the over-all length of the train is 94 ft. The rear car seats fifty-seven people and the front one forty-eight people, a total seating capacity for the train of 105 people. The two-car unit weighs 51,500 lb., although it is hoped to incorporate refinements in future cars which will reduce the weight to about 23,000 lb. per car. Thus in the first design the low weight of 490 lb. per seat has been attained and if the contemplated design perfections are possible and feasible this feature will be reduced to about 438 lb.

LOW-FLOOR INSIDE-JOURNAL TRUCKS

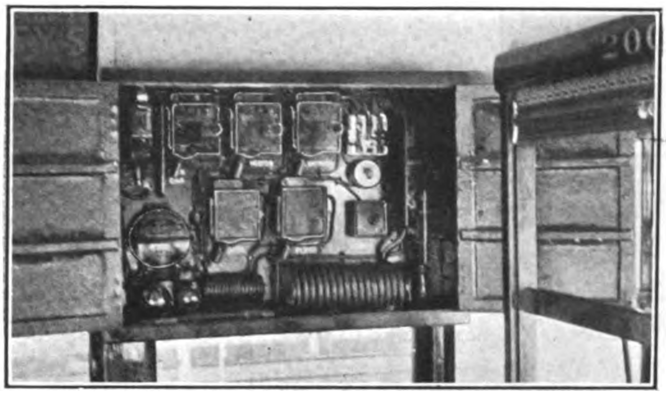
Numerous departures from standard practice have been resorted to in order to make the unit capable of swallowing a street corner crowd. With this purpose



PLAN OF THE FRONT CAR OF THE TWIN CITY TWO-CAR TRAIN



BOTH FRONT AND REAR CARS HAVE AMPLE AISLE WIDTH AND STANDING ROOM



CHOKE COIL, LIGHTNING ARRESTER, SWITCHES, ETC., GROUPED IN A CABINET ON THE LEFT SIDE OF THE FRONT PLATFORM

in view, standing room is liberal, doors are wide and the steps and car floor are low. The low floor height of 32 in. is the result of a specially designed truck having inside journals and band brakes and two 25-hp. safety car motors. The wheels are 26 in. in diameter and are mounted on hollow axles. The use of the compact safety car motor and the inside journal has left ample room for an 8-in. brake drum on each axle. The brake drum and band are not unlike the drive-shaft type in use on heavy duty automobile trucks. The elimination of brakeshoes has made for quiet operation and smooth stopping. Since a more durable material is used, the small amount worn away with raybestos lined hand brakes will insure that adjustments and replacements will be less frequent than with cast-iron brakeshoes bearing directly on the wheel tread. The additional life of the wheel was also a factor that was considered in the use of this type of brake. The truck bolster is supported by two full elliptical transverse springs the ends of which extend between the wheels. Placing motors on these trucks is carrying one step further the development of the inside-journal, low-floor trucks, which have been experimentally worked out in trailer operations during the past few years.

SEATS ARRANGED TO PREVENT CONGESTION

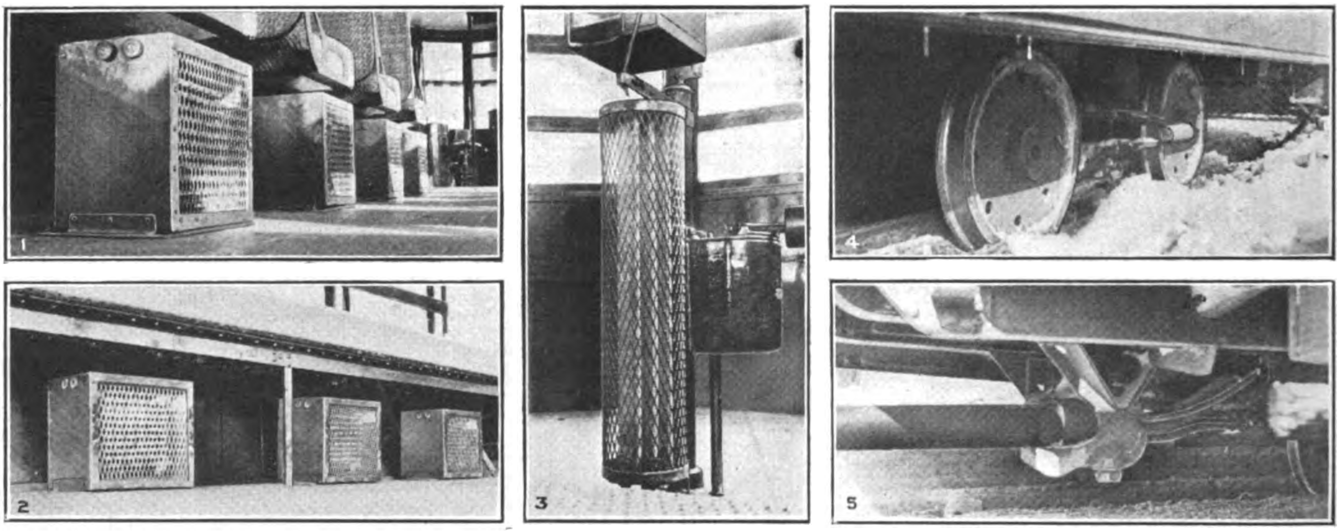
The seating arrangement and floor plans are shown in the accompanying drawing. Ten rattan cross seats of the non-reversible type with full spring cushions and thin backs are provided in each car. Longitudinal seats are placed at the ends to allow standing room and space for the movement of passengers. The platforms are dropped about 8 in. from the floor level and the step height is about 10 in. The step itself is about 14 in. above the top of the rail. Large loading platforms and low step heights were considered necessary to facilitate the speedy boarding of passengers. These cars have been provided with substantial double insulated floors and double sides up to the window line. The arch roof has a double ceiling and the windows are fitted with double sash. Instead of roof ventilators, ports with sliding glasses in cast aluminum frames have been placed above each window. The glass itself is held rigidly in the frame against a wicking insert by four brass fingers. The port can be opened and closed by means of a small knob inserted through a hole bored in the center of the window.

RHEOSTATIC HEATING USED

The resistors for the motors of both cars are used to heat the first car. A grid unit is bolted to the car floor under the end of each cross seat and four under each of the forward bench seats. Each grid is protected on the end and top by a metal housing, and the two sides are covered with a pressed metal grating to allow air circulation. Additional coil heaters to supplement if necessary the rheostatic heating have been placed under the rear bench seats, a vertical heater on the farebox stanchion on the rear platform and another against the car front forward of the front exit door. The rear car is completely equipped with standard electric coil heaters.

UNIQUE SCHEME OF DOOR CONTROL

The scheme of door control is distinctly unique. The double set of rear doors of the forward car are opened and closed by a door engine, the electric control for which is located beside the main controller at a convenient height for the motorman. The motorman operates it with his knee, and a mirror on the corner post enables him to see when all passengers have boarded. A similar knee-operated control mounted on the farebox stanchion of the first car and operated by the conductor opens and closes the front exit doors of the rear car. The doors at each end of the train are mechanically



RESISTORS USED TO HEAT CARS IN ST. PAUL

Nos. 1 and 2—All of the grid heaters are placed under the ends of cross seats and beneath the front bench seats.

No. 3—The electro pneumatic control of the front exit of the rear car and auxiliary heaters are placed on the farebox stanchions.

No. 4—The trucks have inside journals, band brakes and 26-in. wheels.

No. 5—Close-up of coupler connection.

operated by the conductor of the rear car and the motorman. Thus it is seen that each car is arranged as a rear-entrance. pay-enter, front-exit unit. The purpose of this method of door control was to divide the work more evenly among the three men and reduce the time occupied by these operations. Thus the two conductors are responsible for one door each while they are taking fares, and the motorman, otherwise idle when the train is not in motion, is operating two doors.

AMPLE DOUBLE ENTRANCE DOORS INCLOSE THE STEPS

Both conductors give their starting signals directly to the motorman by buzzers having distinctive sounds. Both of these are distinguishable from the stopping signal given by the passengers.

Practically all of the control and auxiliary equipment has been brought together on the front platform of the first car. Besides the controller for the motors of both cars, the air reservoir, the compressor governor, sand box, switch cabinet, etc., are arranged as shown in the car layout. The cabinet contains the choke coil lightning arrester, main switch, heater, pump, light, door control, switches, etc. Each car has an individual compressor attached to the under side of the body and the reservoir for the rear car is placed on end in the front platform, where the absence of other auxiliary equipment allows room for the end seat.

TUBULAR COUPLER CARRIES MOTOR CABLES AND AIR CONNECTIONS

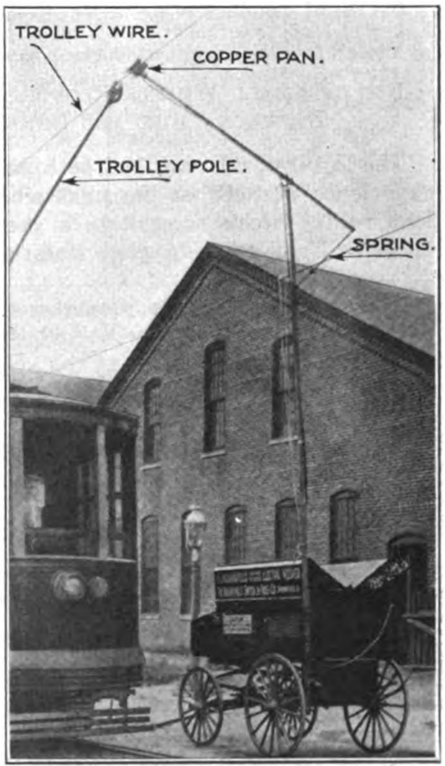
The method of permanently and safely coupling the two cars together has been worked out in a new way. The train connection is a tubular steel coupler through which are run the motor cables, bell wires and air hose. The connector is swiveled to each car through a four-legged frame riveted to the steel under-framing. An accompanying illustration shows the construction and fastening of the coupler. Both cars are equipped with emergency air valves which automatically apply the air in case the train connections should be broken.

Since the trial of this train began early last fall, it has lived up to its expectations in its ability to expedite rush-hour travel. Its operation has not been confined to one route; on the other hand, it has been operated on all of the downtown lines and at extreme peak-load traffic periods. At times over 250 passengers have been carried on one trip. Since there are no bulkheads, congestion has been moderated by the elimination of doors between the car body proper and the front and rear vestibules. This arrangement makes it easy for passengers to enter or leave the car and avoids congestion at the door opening. Such a condition is also alleviated by the ample design of the platform, for the body does not converge to the front from the end posts. The wide entrance doors also facilitate speedy loading. These cars are provided with wooden doors instead of wire gates, as has been the practice of the Twin City Rapid Transit Company in the construction of its city cars. Practically all the company's equipment consists of heavy single-end cars having an open rear platform, the steps of which are inclosed by either two or three double-folding wire gates.

Non-Interfering Trolley-Wire Connection for Arc Welders

Brief Description of a Device Developed in Brooklyn, N. Y., for Obtaining Current from Trolley Wire Without Constantly Removing Trolley Wire Connections

VARIOUS means have been developed for overcoming the necessity of constantly removing the usual pole and hook type trolley wire connection commonly used to tap the trolley wire for current supply to the various forms of arc-welding equipment used for track repairs. The accompanying view shows a device developed some time ago by the way and structures department of the Brooklyn Rapid Transit System, which has been found to serve this purpose very well. It consists essentially of a mast or upright, attached to the welding equipment, upon the top of which is mounted a lever arm having at its outer end a copper pan which fits under the trolley wire. The pan is grooved to permit the wire to fit into it, thus providing a smooth under run for the trolley wheel. This pan is of sufficient length so that lateral movement of the wire is minimized. It is held against the trolley wire by means of a spring attached to the short end of the lever arm. This spring has a tension which holds the pan against the wire at a pressure sufficient to prevent arcing and somewhat greater than that used for trolley poles on cars. When necessary the tension on the spring can be released and the lever arm lowered, or the entire lever arm and mast may be rotated.



LIGHT AND SIMPLE TROLLEY-WIRE TAPPING OUTFIT

The mast is in two parts and the entire rig is made up with the view to portability and lightness. It was found after considerable experimenting that bamboo made the best material for this outfit.

Limit of Voltage in Conductor Rails

Author Gives Arguments Against High Voltage on Third Rail and Submits Calculations for a British Suburban Electrification Based on Long Island Railroad Data from 1922 Report to International Railway Congress

THEODORE STEVENS, a consulting engineer, of London, recently lectured on electric traction at the London County Council's School of Enginering and Navigation. He dealt especially with the risks involved in the use of high voltage in conductors near the ground. He quoted the opinions of other engineers from reports submitted to the International Railway Congress held in Rome during April. The French decision was that 1,500 is the maximum permissible voltage near the ground. For higher voltages overhead construction must be used. Excerpts from George Gibbs' report were quoted as follows:

> There are important objections to a third rail being used *for general electrification* . . .
>
> Serious consequences increase rapidly as the voltage in third rail is raised.
>
> Weighty objections to the use of 1,200 or 1,500 volts in third rail . . .
>
> Impracticable to install it within American railroad clearances properly insulated and protected in a manner which will adequately safeguard the public and employees.
>
> The decision which has been arrived at in England (Ministry of Transport's Electrification of Railways Advisory Committee's Final Report 1921) to allow the installation of a 1,500-volt third rail is, presumably, for special cases only and for operating conditions and clearances which do not exist in America.
>
> Overhead conductor promises to become standard for heavy electric traction . . . provides continuous contact at the train over complicated track layouts.

USE OF SMALL WHEELS REQUIRES MORE DISTANCE BETWEEN THIRD AND RUNNING RAILS

The lecturer, who has had both American and British experience, stated that the small wheels on much American rolling stock necessitate a greater space between third rail and running gage line than in England, but he knows of nothing to warrant use of 1,500 volts in a third rail near the ground either in England or America.

TABLE I—ESTIMATES FOR BRITISH SYSTEM BASED ON LONG ISLAND RAILROAD DATA

	Existing Long Island Railroad	Basis of Estimates Below
Route-miles	90	100
Single-track miles	227	200 plus sidings
Lines extend from terminus, miles	30	18
Motors cars	494	33 per cent fewer
Trail cars	140	15 per cent more
Number of substations	14	16
Substation plant, kw.	56,000	55,000
Miles between substations	4.5	same
Maximum trains per day	730	5 per cent fewer
Maximum peak load, kw.	34,400	15 per cent more
Rush-hour load, kw.	....	27,500
Passengers, 1920	59,134,000	....
Train-miles, 1920	3,769,000	50 per cent more
Car-miles, 1920	20,400,000	40 per cent more
Kilowatt-hours supplied, 1920	104,030,000	18 per cent less
Ton-miles, 1920	906,100,000	....
Maximum train weight, tons	672	45 per cent lighter
Average speed, m.p.h.	32	20 per cent slower

The most important consideration, in his opinion, is that to supply a third rail with 1,500 volts very seriously adds to the danger of employees on permanent way work, and to any other person who accidentally gets on the right-of-way. From this consideration the higher-voltage construction, he declared, is not justifiable even if cheaper to install or operate. That it is not cheaper, he showed by estimates.

In some London tubes for legal requirements a fourth rail is installed, but the electrical potential is comparatively near to that of the running rails, so that to touch this fourth rail involves small risk of electric shock, unless the person has an unusually weak heart. In one instance an employee got a shock from a sheet of iron lying on wet ground, which, on test, showed 20 volts to "earth." He anticipates that the Ministry will make rules to prevent the use of a fourth rail at even —600 volts from the running rail in addition to +600 volts on the third rail; because with third and fourth rails there is not room to carry on the work necessary on permanent way, and it could only be a menace to the lives of all who come near.

TABLE II—1922 COMPARATIVE ESTIMATES OF CAPITAL COSTS OF ELECTRIFICATION OF SUBURBAN RAILWAY (Details Above)

Voltage collected, volts	600	1,500
Power house	$30,000	$30,000
Cables and substations	25,000	12,500
Trackwork	15,000	37,500
Rolling-stock and electrical equipment	75,000	80,000
	$145,000	$160,000

Prices are stated here in dollars per single track-mile.

Dealing with the Advisory Committee's report, he insisted that it is necessary to apply the tests of practicability and safety and economy to this committee's advice. He found no evidence in its report that consideration was given to the necessity for protecting employees and public from unnecessary risks to life from 1,500-volt conductors near the ground. Neither did he find any evidence that those officials of the Ministry of Transport whose duties include caring for the safety of the public were called before this Advisory Committee in reference to third and fourth rails. They dealt with overhead conductors only. There was no evidence that the committee considered in detail what is involved in its statement that 1,500 volts *or a multiple of 1,500* should be permitted on a third rail.

A three-wire system formerly existed in the two parallel tunnels of the City & South London Railway, where each tunnel had a separate 500-volt system with a total of 1,000 volts. The two were separated by such a distance that no one could get a 1,000-volt electric shock. It seems extraordinary that the committee agreed to a multiple of 1,500 volts on a third rail without limiting the multiple. It is fortunate that the Ministry, by publishing the report, did not sanction anything so liable to cause unnecessary deaths as is inseparable from a high voltage in a rail near the ground within easy reach of any one.

NO ADVANTAGE IN COST GAINED FROM USE OF HIGH VOLTAGE

Mr. Stevens stated further that carefully prepared estimates for 600-volt and for a multiple of 1,500-volt construction, based on details of British suburban service, show that there is no advantage in cost of the higher-voltage system, and that whatever is spent on rendering protection to life by guarding third or fourth rail from contact adds further to the disadvantage in capital cost and in maintenance cost of the higher voltage. The lecturer used data given in Mr. Gibbs' report to the International Railway Association as a basis for some calculations. The Long Island Railroad, said Mr. Gibbs, is "an example of electrification, of a compact network of lines none of which extends more than 30 miles; therefore current distribution can be made economically by a low-voltage system. This fact, Mr. Stevens said, renders the engineering details available for comparison with British conditions.

Hints on Engineering Field Work

The Purpose of Field Work on an Electric Railway—The Kind of Surveys Made—Helpful Apparatus—Suggestions as to the Solution of Special Problems

BY JOSEPH E. RAPUANO
Maintenance of Way Department, the Connecticut Company,
New Haven, Conn.

BEFORE discussing the methods of field engineering, let us first understand clearly the uses of the information obtained. Broadly speaking, these are two in number. The first is to provide the field data which the designing engineer requires to design and execute the proposed work and to estimate its probable cost. The second is to convey the designer's views to those in charge of construction. The first of these requirements is covered by the surveys, investigations and inspections preliminary to the design, and the second, by the staking out of the work and its inspection during construction. Both of these requirements can best be fulfilled by a thorough cooperation of all parties concerned in the proposed work.

Undertakings of the kind under consideration on an electric railway may be divided into two groups. The first includes extensions, additional second track, track to be abandoned, new spurs, and renewals which necessitate either a relocation of the present track or a change in the method and manner of construction. Permission to carry out work of this kind must generally be secured from the municipal or state authorities having jurisdiction over such improvements, and, in addition, the Public Service Commission must approve the method and manner of performing the work.

The second group includes renewals or straight maintenance, where the contemplated work necessitates no change in the method and manner of construction. The field information for this second group of topics is generally of use only to the engineer in charge, who must make request for a proper appropriation to cover the probable cost of the work and, in addition, make requisition for the needed material.

When making a survey for work of the first group, which is generally drawn to a scale of 1 in. equals 40 ft., the engineer in charge should locate all underground, surface and overhead obstructions which may require removal or shifting, as well as all curb lines, traveled way lines and street lines. When possible, also, where poles to carry feed wires or overhead trolley wires are to be erected, he should locate all existing poles, whether company owned or not; all property division lines, which in most cases make ideal locations for pole settings, and all driveways and so prevent absurd pole locations. An approximate magnetic north should also be shown on all plans which are presented to the authorities.

As a base line for the surveys just mentioned and those that follow, the general practice is to use the gage line of one of the rails where available and locate as many details as possible by means of offsets from this line. When no rail is available, as in the case of new work, the curb lines or an offset line from the street line will answer the purpose. The important item to bear in mind is that the method best adapted for each particular case is the one that will least interfere with car operation and at the same time produce satisfactory results. Usually the engineer will find it desirable so to plan his work that the required data will be obtained in the early hours of the morning so as not to interfere to any extent with car operation, and at the same time avoid the general traffic congestion later in the day which is sure to hurry his measurements and try his patience.

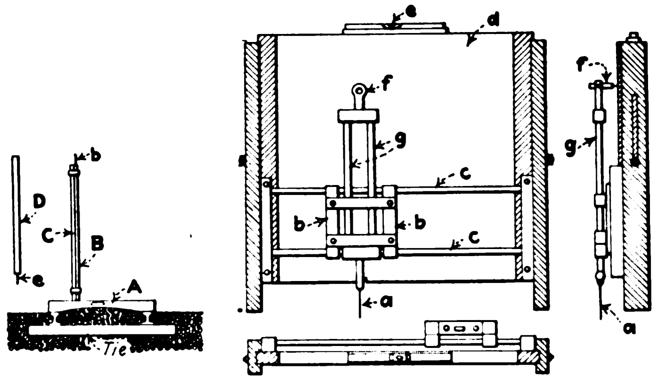
SURVEYS FOR SPECIAL TRACKWORK

In making a survey for a proposed installation of special trackwork the engineer in charge should follow the same precautions except that, in addition, measurements should be taken with a view toward the preparation of a map with a scale of 1 in. equals 10 ft. or 5 ft., depending upon the size and nature of the proposed layout. Wherever traffic conditions make it practical, gage-line intersections are obtained and a direct intersection angle is read. It also makes for better results to locate as many details as possible from this same intersection angle point. Offset lines are sometimes run out when gage line intersections are practically out of consideration, but the results are obviously indirect and the chances for error are multiplied by the greater number of operations to be performed to arrive at the result. Where there is any question of a cut back of a curb at any corner to allow for proper car clearance, the curb should be located with care so that the proper amount of cut back may be determined. In a survey of this kind the section of the rail to abut the special work should also be noted, together with its joint drilling, as this will determine the proper connections. Most railway companies specify that the steel companies shall not only furnish the trackwork but also be responsible for its proper fitting in the ground. When this specification is included, the steel companies in nearly all cases send an engineering representative to check the survey before building the work, so that chances for error may be eliminated. Where possible, all gage-line intersections and other important points obtained during the course of the survey should be referenced, preferably to a pair of existing joints in the rail. This precaution obviously will not only enable one to locate further details at a later date, and with much less loss in time, but it will also expedite the staking out of the proposed work, and moreover will prove of value in case the steel company should find a discrepancy in the angle turned.

Another form of survey that the maintenance of way engineer is often called upon to handle is the survey for evidence to be offered in court cases, including the settlement of accident cases in which the railway company is a party. Here the engineer must not only locate such details and compile such information as will satisfy his own technical viewpoint, but he must also follow the wishes of the company's legal representatives as to their estimate of the relative importance of the details to be secured. If this field information is thus obtained, satisfying both the technical and legal aspects, the engineer on the stand may have a fair chance of escaping the irony aimed at him by the opposition in an effort to discredit his testimony.

SURVEYS FOR SMALL BRIDGES AND CULVERTS

When the design, construction and maintenance of small bridges and culverts are handled by the way department directly, all engineering data and information concerning the work must of necessity be obtained by its engineers. Except for new work, where details of the subsoil, soundings and other special data must be procured, most of the field work will consist of inspections to determine deterioration, wear and serviceability, due to time, weather, and change in rolling stock. By means of these periodical inspections and consequent maintenance, these structures can be kept in serviceable shape from year to year until their complete renewal is advisable. In connection with overhead obstructions on bridges and elsewhere, it is possible for the way department, by means of the apparatus shown just above at the left, to make a record of the shortest distance from the rail level to the wire, wire trough and lowest part of the bridge structure. This apparatus consists of a dry wood board, *A*, made to fit the two rail heads and the crown of the pavement, and a wooden rod, *B-C*, graduated to read up to 14 ft. or more. The auxiliary wooden rod *D* is added to *B* by inserting the cylindrical end *e* in a recess provided in the cylindrical end *b* of the main rod, thus enabling one to measure beyond the reach of the main rod. The record of these measurements thus obtained can be kept up to date by remeasurements as the occasion demands and so become a source of valuable information for all concerned.



AT LEFT, A SIMPLE DEVICE FOR MEASURING THE HEIGHT OF OVERHEAD OBSTRUCTIONS. AT RIGHT, DEVICE FOR DETERMINING RAIL AND WHEEL CONTOURS

It will often be the case that the way department must make periodical investigations concerning the wear of the rails and car wheels, and when this work is properly carried out the results prove of special interest in the case of future renewals. A home-made apparatus for obtaining rail and car-wheel scribings, designed by Albert L. Donnelly, division engineer, the Connecticut Company, is here shown in the second drawing and can be made in almost any company workshop. The accuracy of the readings obtained depend entirely upon the care taken in using this device. As shown, it consists of a metallic needle, *a*, mounted upon a carriage, *b-b*, which can move upon the metallic slides *c-c*, which in turn are secured to the wooden frame *d*. One end of this frame is equipped with a level tube, *e*. The paper upon which the scribing is to be outlined is tacked upon the wooden frame underneath the pencil *f*. In operating the instrument the needle is carefully made to pass over the surface to be outlined by a slight pressure upon the needle which is guided by the hand of the operator. As the needle passes over the surface of the rail or wheel, its horizontal motion is governed by the carriage sliding on the metallic slides *c-c* while its vertical motion is controlled by the rods *g-g*, which slide through holes in the carriage *b-b*. At the same time the pencil *f* records the outline in full size and the operation is complete.

CONSTRUCTION PROBLEMS

Let us now turn to the construction of track layouts. The approval to begin once obtained, the field engineer must plan on the staking out of the necessary line and grade information. Whenever possible this staking out should be done immediately after the approval is received, and at any rate before the street is torn up, to insure a saving in time and thus reduce the cost of the engineering. Unfortunately, due sometimes to simultaneous starts on various jobs and a small engineering force, this ideal procedure cannot always be followed, so the best use must be made of the conditions as they exist. An inspection of each situation will determine the most desirable method of staking out this construction information. On new work, when the track trench has already been dug from approximate data, center line stakes can usually be relied upon to furnish enough guidance for the construction foreman. These stakes may now and then be knocked out by careless workmen, but in the long run good foremen have no difficulty in keeping them if they are set firmly. These stakes are generally set 50 ft. apart on straight track and along radius curves, and sometimes closer on sharper curves and wherever the same stakes are used for both line and grade and the grade calls for shorter stations. The general procedure, however, is to set points on an offset line, preferably from the gage line, so that they will not be disturbed during the grading and trackwork.

These points are set either on stakes where the soil admits, or on regular track spikes driven where the ground is solid enough to prevent the use of wooden stakes. When a concrete foundation will not permit the ready entry of a regular track spike it is customary to use a short spike, only long enough to pierce the wearing surface of the pavement and perhaps just start into the foundation. Now and then points must be set in either a brick, concrete or similar hard pavement which will not permit the entry of any spike. In this case holes can be center punched and colored in the pavement, in which case the staking out should be done as nearly as possible to the time of its actual use by the construction crew, in order to prevent the points being lost. In every case the points should be stationed or numbered and chalked up on the curbs opposite or on guide stakes to facilitate the work of locating them by the construction crew.

Still another method of staking out information can be employed but only in the case of a double track where one track is renewed before the other is touched. In this case the dummy rail of the track to be tackled last is stationed off and the back of the rail is chisel marked at these points with the aid of a regular track chisel. The proposed gage line of this rail is then run out and offsets are read from this line to the existing gage line of the present dummy rail, at the various station points chisel marked on the back of the rail.

A line and grade sheet, like that reproduced, is next made out, for the foreman's guidance, showing at each station the offset from the existing gage of this present dummy rail to the gage line of the proposed dummy rail of the track to be done first. This line and grade sheet is employed also when other methods of staking out are used and should contain not only a record of the points staked out but any other information which may be of value to the construction crew.

The method just described can best be employed where car operation is either infrequent or can be interfered with without impairing the maintenance of time schedules. The disadvantage of this method, from the standpoint of the track foreman, is in the use of the many varying offsets which generally necessitate his constant individual attention, whereas the use of a simple and constant offset would permit him, with greater security, to intrust the work to the sub-foremen and their understudies.

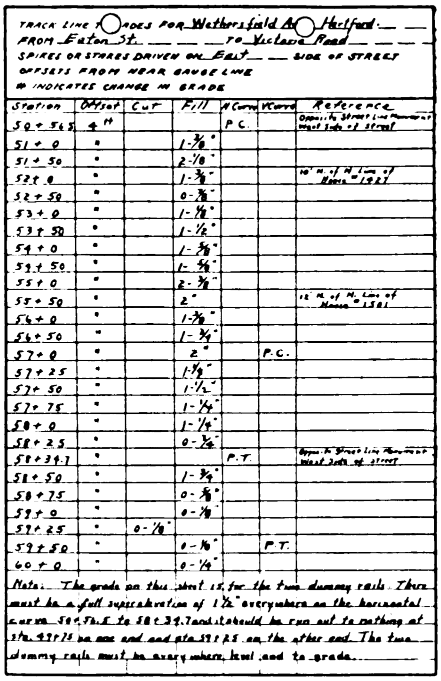
In giving line on a long tangent it is always well to double reverse the instrument and choose transit stations so that they fall at intersections of grades, in order to please the eye if there should be slight swings in the line as a result of instrument work. Considering the short length of the general run of street railway curves the method of offsets from the tangent is much used in running out curves and proves of great advantage in saving time. It is much preferable to the method of deflection angles which require more instrument work and constant annoyance to car operation. When final grades are run out in city work, great care must be used in city work and the construction crew instructed to work to the nearest quarter of an inch so as to get proper results.

STAKING OUT SPECIAL TRACKWORK REQUIRES ADAPTABILITY TO CONDITIONS

The staking out described relates to straight track and flat curves, and its execution furnishes ample opportunity for the engineer to show his ingenuity and discretion. The staking out of special trackwork is another problem and often is trying, because the work often has to be done under traffic congestion and the precision required in the measurements is greater. If the trackwork, however, has been correctly built at the mills, and no error has been made in the field data furnished to the steel company, its staking out should cause no undue worry. Up to recently some steel companies were furnishing this staking out information on an offset line from the gage line, but this practice has given way, generally, to the more efficient method of giving data on the actual gage lines. This latter method has the double advantage of enabling the engineer to see directly how the work fits on the tangents and also permits of points being set on any offset from the gage line. The number of points given are generally enough to insure a ready fitting of the parts, and yet not too numerous to cause confusion. Another important item in staking out special trackwork is to show the construction crew where to cut the old work to insure a proper fit of the new work. Information for cutting the old work is given on the steel company's plans on both ends of the new work. It is well, however, to give the construction foreman cuts on one end only and allow him to work out the cuts on the other end while fitting the work. This precaution is taken for the simple reason that sometimes the new work has been built too short at the mills and would thus necessitate the use of "dutchmen" or short pieces of rail to close the gap if both ends of the old work were cut simultaneously.

CLOSE SUPERVISION IS NECESSARY TO SECURE GOOD RESULTS

The supervision of all track and paving work by competent inspectors is another necessary means of securing desired results. All ties and rails should be inspected and either accepted or rejected before being sent on the job in order to eliminate unnecessary transportation charges. Where trackwork is done by the company forces the roadmaster and his assistants should be given full responsibility for the proper execution of the work. Where, however, as quite often is the case, trackwork is let out on contract, it is quite necessary to supervise the work and for this purpose the company inspector must be well grounded in the essentials of good track construction. He is the means of keeping the department in touch with the daily and weekly progress of the work and becomes the actual mouthpiece of the department in the interpretation of all the specifications affecting it. He should see that all paving is done according to agreement and should at all times bear in mind that the results will represent the efforts of his vigilance during the progress of the work.



TRACK LINE ○ADES FOR Wethersfield A○ Hartford
FROM Eaton St. TO Victoria Road
SPIKES OR STAKES DRIVEN ON East SIDE OF STREET
OFFSETS FROM NEAR GAUGE LINE
# INDICATES CHANGE IN GRADE

Station	Offset	Cut	Fill	H Curve	V Curve	Reference
50+56.5	4 ft			P.C.		Opposite Street Line Monument West Side of Street
51+0	"		1-3/8"			
51+50	"		2-1/8"			
52+0	"		1-3/8"			10' N. of N. Line of House #1927
52+50	"		0-7/8"			
53+0	"		1-1/8"			
53+50	"		1-1/2"			
54+0	"		1-5/8"			
54+50	"		1-5/8"			
55+0	"		2-3/8"			
55+50	"		2"			12' N. of N. Line of House #1501
56+0	"		1-7/8"			
56+50	"		1-3/4"			
57+0	"		2"		P.C.	
57+25	"		1-3/4"			
57+50	"		1-1/2"			
57+75	"		1-1/4"			
58+0	"		1-1/4"			
58+25	"		0-3/4"			
58+34.7	"			P.T.		Opposite Street Line Monument West Side of Street
58+50	"		1-3/4"			
58+75	"		0-5/8"			
59+0	"		0-1/8"			
59+25	"	0-1/8"				
59+50	"		0-1/8"		P.T.	
60+0	"		0-1/4"			

Note: The grade on this sheet is for the two dummy rails. There must be a full superelevation of 1-1/2" everywhere on the horizontal curve 50+56.5 to 58+34.7 and it should be run out to nothing at Sta. 49+75 on one end and Sta. 59+25 on the other end. The two dummy rails must be everywhere level and to grade.

LINE AND GRADE SHEET

Upon completion of the work, the public service commission in authority will generally make an inspection of the installation and report as to its acceptance for the state. The company should then measure the work to determine any increase or decrease in the length of the track due to the new construction and record the same in the company track mileage book, showing the total length of track which is owned and operated by the railway.

In conclusion it might be well to emphasize the necessity for ever keeping in mind the scope of all efficient field data which are to serve at all times as a proper guide to the finished work. There is no set rule as to the proper method for obtaining or furnishing this information, for circumstances alone, and the ability of the engineer to meet them, will be the deciding factor in each case. It is sufficient to remark that the methods here outlined will form a base line for the acquisition of others which no doubt will follow with proper effort and experience.

Traffic Survey in New Orleans

An Extended Survey Is Being Made of Traffic on Electric Railway Lines—Difficulties Encountered by Topographical and Other Conditions

A TRAFFIC survey of the New Orleans electric railway lines is being made for the city department of public utilities by the Beeler organization. Its purpose is to determine what improvements should be made in routing and service under the new settlement between company and city.

The peculiar layout of the city makes the routing of cars difficult. The principal streets are laid out parallel to the Mississippi River or perpendicular to it. Since the river turns a full 180 deg. and then reverses itself, it is evident that conditions are unique. The city was not all laid out at one time but is made up of numerous subdivisions whose streets do not always meet, so that many detours from a direct route must be made.

At present there is little or no crosstown service, certain direct lines being turned at right angles so that they provide, in a measure, for patrons desiring to ride across the ruling traffic routes. There is now but one through route passing entirely through the business district, and that route is not at all balanced as to traffic. It is expected that the crosstown service can be materially bettered.

The transfer situation is largely in a chaotic condition. An investigation is being made to see if, with the inauguration of an improved routing, the transfer system can be simplified. This should make it easier for the rider to reach his destination and at the same time reduce the abuse. At present the known abuse of transfers is a matter of serious concern to the operating officials.

New Orleans is not densely built up as is New York and most other large Eastern cities. A great majority of the population live in detached or semi-detached bungalows or two-story houses, making the residence sections cover a large area. It is possible that express service can be installed on certain lines to give better and faster service to the outlying territory. In the business section, which has many narrow and congested streets methods used for relief of congestion, will probably be practicable.

CITY'S RAPID GROWTH A FACTOR IN DETERMINING FUTURE REQUIREMENTS

The second phase of the survey deals with changes in the system to care for the future. New Orleans is growing rapidly and is now the second largest seaport in the United States. Plans will have to be made to provide for new lines as needed to serve the sections which are now developing.

Any rerouting plan will have to take into consideration conditions which are entirely outside of matters of operation. When New Orleans was still a comparatively small town, consisting of two fairly densely settled residential districts, with one business district serving as the connecting link, there were some six separate companies operating under independent franchises. Each company naturally tried to tap the most densely populated portions of the city. A congestion of tracks in these sections resulted, with routes laid out with no consideration except for competition to secure the maximum business for each company. In the worst section this had resulted in sixteen parallel tracks on fifteen adjacent streets.

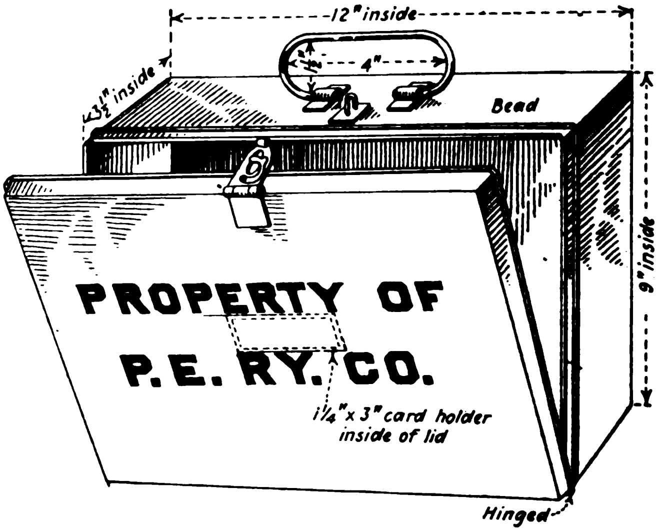
Normally it would not be difficult to correct this feature. In this instance, however, the terms of the indefinite franchise just adopted, under which the new company must operate, specify that not only must the usual paving of tracks be installed and maintained, but once having occupied a street the company is forced to maintain that paving so long as the franchise runs, regardless of whether the track is in active use, is discontinued, or is actually torn out. With this condition, any new track construction means added paving expenses, while abandonment or tearing up of poorly located or useless track gives no compensating relief from this heavy burden.

Conductor's Ticket Container Used by Pacific Electric Railway

READY FOR SERVICE

WHEN a conductor enters the service of the Pacific Electric Railway he is furnished with a supply of tickets, transfers, trip sheets, time cards, ticket envelopes, passenger report blanks, hat checks, cash fare receipts, witness cards, monthly report blanks, accident report blanks, passenger tariffs, miscellaneous report blanks and lost article cards he carries with him.

To protect this property from loss through theft, the company has recently standardized the practice for handling these supplies. All are provided with a metal conductor's ticket container. The container is made of black japanned metal, durable in construction and efficiently designed. The size is large enough to hold the necessary supplies and still is not so large that it cannot be put into locker on cars. The new metal container is plainly stamped "Property of the P. E. Ry." on the side, and enables the conductor properly to care for tickets, etc., issued to him in the safest, most convenient and efficient manner.



CONDUCTOR'S TICKET CONTAINER

Lightning Arresters for Chilean State Railways

LIGHTNING arresters of unusually high voltage have been built by the Westinghouse Electric & Manufacturing Company for the 3,000-volt electrification of the Chilean State Railways. They are designed to withstand the vibration and shock of railway service and are of the electrolytic type.

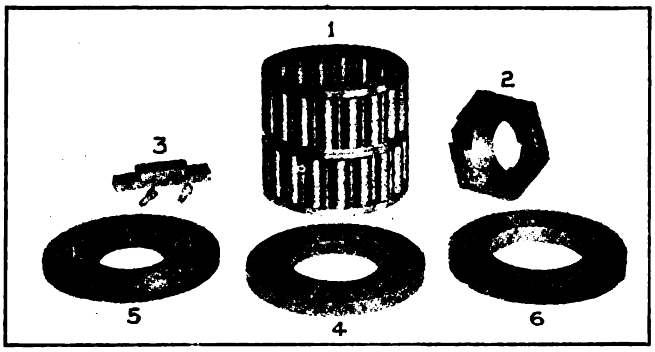
The working parts consist of twelve electrolytic cells with their balancing resistors and an expulsion fuse. The fuse is mounted on the door of the case so that the opening of the door opens the circuit. The fuse chamber at the left is lined with asbestos lumber and is provided with a chute at the top, which extends out of the operating chamber of the engine cab.

The electrolytic cells are held in place on a felt pad by a jar holder with two cells as a unit. Each unit is held in place by a stud projecting from the back of the case and this construction prevents the jars from breaking and makes them easily removable.

The cell is shunted by a resistor to make certain that the voltage is equally divided among them. The resistors are mounted on the micarta panel that serves as the terminal board. The hinge bracing on the case prevents the heavy door from sagging when open, and a strap is supplied at the bottom to carry the weight of the door when closed.

Roller Bearings for Car Journals Receive Severe Service Test

THE accompanying illustration shows the various parts of the Stafford roller bearing which has been given a test by the Michigan Central Railroad for the past year and a half in freight service. This design of roller bearing is now being manufactured for electric railway service by the Stafford Roller Bearing Car Truck Corporation, Lawton, Mich. Besides the set of rollers and frames, this type of bearing has six parts; the bearing unit, adjusting nut, adjusting nut lock and screws, thrust bearing and thrust bearing inner and outer plates. One of the principal features claimed for the design is the use of staggered rollers mounted in a double-squirrel cage to provide a continuous supporting surface, regardless of the sway or set of the axle. For a 5-in. x 9-in. journal thirty-six rollers in two sets of eighteen each are used. The rollers are of oil-treated chrome steel ¾ in. diameter and 2½ in. long.

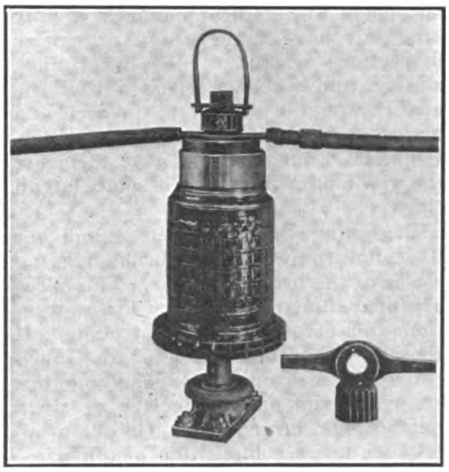


ROLLER BEARING UNITS
(1) Roller bearing. (2) Adjusting nut. (3) Adjusting nut lock and screws. (4) Thrust bearings. (5) Thrust bearing inner plate. (6) Thrust bearing outer plate.

In the test conducted by the Michigan Central Railroad, trucks equipped with this type of bearing were installed under a flat car used in logging service. After operating 2,806 miles the trucks were transferred to a gondola car used in sand and gravel service and run 990 miles, when they were again placed under a box car and used in mixed train service for 3,654 miles. The entire service mileage for the test was 8,375 miles. During this period no trouble was experienced with the bearings, nor were any repairs necessary.

Commutator Repairing Facilitated by Device for Holding Armature from Turning

A CONVENIENT device for holding an armature from turning while the cummutator nut is being removed or tightened is in use in the Kenmore Shops of the Northern Ohio Traction & Light Company. The device consists of an old car center bearing which has been bolted to the concrete floor and into which a keyway has been cut. A scrapped pinion turned down to sufficient size is dropped into the center bearing and a key is slipped between the pinion teeth and the key seat in the center bearing. Another key is dropped in between the armature shaft and the pinion, and the armature is then in a position to resist any turning effort. Using this device, sections of the commutator can be removed with less trouble than if the armature were lying horizontally.



A HOME-MADE DEVICE FOR HOLDING AN ARMATURE WHILE COMMUTATOR REPAIRS ARE BEING MADE

In connection with this device, there is also used another old pinion which has been tapped and fitted with a setscrew. It is attached to the commutator end of the armature shaft and serves both to hold the spanner from slipping while the nut is being tightened and also to hold a loop to which the crane hook is attached during the handling of the armature.

Temperature for Preheating Cast Iron and Steel

IN ORDER to compensate for the lower melting point of cast iron as compared with steel, the Metal & Thermit Corporation, New York, N. Y., recommends that in preheating cast-iron sections, preparatory to thermit welding, these sections be heated only a little more than necessary to show color, such as a dull red heat. This will result in a quieter pour, the fusion will be just as perfect and no hairline cracks will appear. Probably this is because the expansion curve is much greater up to a red heat than it is from the red heat to the white heat and that the sections are, therefore, practically fully expanded at this dull red heat. It is also true that the thermit steel at first heats and expands the sections with which it comes in contact and, therefore, the slight difference in preheating is negligible.

System for Proper Brake Maintenance Pays*

How Accidents and Delays that Are Due to Brake Failures Have Been Practically Eliminated by a Comprehensive Inspection and Maintenance System

By O. R. HILL
Master Mechanic Rockford & Interurban Traction Company, Rockford, Ill.

MUCH can be done toward preventing accidents, maintaining schedules, and reducing the expense of removing cars from service by having brakes in good operating condition at all times. On our property we have given the subject of brake maintenance considerable attention, and have been amply repaid by a great reduction in the number of cars removed from service for bad brakes and the almost total elimination of accidents and delays due to brake failures. We have not made any radical changes of any kind but have inaugurated a regular inspection system, which we follow closely, and we have insisted that the men whose duty it is to inspect and maintain our brakes do a thorough job. It has been our desire to have them use the right part in the right place at all times.

Beginning where the air system has its connection with the brake rigging we have the brake cylinder. This piece of apparatus requires very little attention and gives very little trouble. It should be thoroughly cleaned and lubricated at least once every six months, at which time any defective or worn parts should be replaced. On our property we use a composition piston packing cup which requires no expander ring and requires only enough lubricant to keep the cylinder walls from rusting. We have had better success with this cup than with the leather ones. The piston sleeve should be lubricated with a small amount of grease at each inspection period. The brake cylinder should be securely anchored to the car underframe so that it cannot move when the brakes are applied. Whenever possible we have lowered our cylinders by using hangers so that the body levers lie in the same plane with the radius bars on the trucks. The forces in the pull rods and body levers are then in line and do not have a tendency to buckle the levers or to pull the car body down on the trucks.

Practically all of our cars are equipped with air brakes for regular service but have hand brakes for emergency use. We have had trouble trying to keep these hand brakes in operating condition. We have taken hand brakes from cars being overhauled in the shop that were rusted so tightly that it was necessary to heat them to remove the staff. This condition has been helped by lubricating the staff where it passes through the floor, at each inspection period, with penetrating oil such as is used in many garages for removing bolts that are stuck. I believe that the proper way to keep a hand brake of this type in operating condition is to require the motorman to make at least one stop each day with it. We now have a number of our cars equipped with the staffless type of hand brake. This brake has been very satisfactory, as it eliminates the point of greatest trouble with the older type of brake, which is the point where the staff passes through the floor.

Body levers should be of the proper size to withstand the heavy stresses placed upon them, should be of the proper length and have the holes properly spaced. They should be supported by substantial hangers. We use a hanger to the top of which is bolted a 1-in. maple strip upon which the body levers rest and upon which they slide when the brakes are operated. A little center plate grease is applied to this maple strip at each inspection period. This strip has quite a long life and is easily renewed when worn. We have part of our body lever hangers much more heavily constructed and securely anchored than would be necessary to carry the levers. This is done to enable them successfully to withstand the shock of the lever striking the safety stop in case of a broken brake rod. There are two of these safety stops attached to the hanger in such a way that should either brake rod fail, the body lever to which it is attached will strike its stop before the piston travels the length of the cylinder and thus permit the car being brought to a stop by the brakes on the truck to which the good pull rod extends. On a property like our own where a large number of different types of cars and trucks are in service, it is very convenient to have the different levers, brake rods, hangers, etc., charted so that they may be easily identified by repairmen whose duty it is to renew these parts at the inspection carhouses. Body levers should be arranged at such an angle that they will stand as nearly perpendicular to the center line of the car as possible when the brakes are applied.

PULL RODS SHOULD BE MADE OF HIGH-GRADE MATERIAL

The pull rods are very important parts of the brake rigging because of the fact that their failure frequently means a serious accident. Although we now use ordinary mild steel for pull rods on our property and have had no trouble with it, still I believe that they should be made of a better material. Some kind of iron similar to Norway iron which will bend rather than snap off should be used for these important parts. The point where the jaws are welded to the pull rod is frequently a place for trouble due to failure of the weld. A number of roads eliminate this point of possible trouble by using a pull rod made of flat material with the jaws either bolted or riveted on, thus doing away with the welds. I have had very little experience with this type of rod but it looks like a good scheme. Some roads give their pull rods a tension test in a machine in the shop before they are installed on the car. I understand that one of the large electric railways in the East tests its brake-rigging by applying the brakes with the air pressure 50 per cent above standard and by hammering the rods with a light sledge.

On trucks equipped with the so-called "circle bars" trouble is usually experienced from the roller in the pull-rod jaw wearing a notch in the center of the bar and then catching in this notch and setting up the brakes when rounding sharp curves. On our property we use a double-plate arrangement similar to the trolley used on some light conveyor systems, the pull rod being attached at one end by a pin while the other end carries two rollers, spaced about 8 in. apart, which bear on the circle bar. This arrangement has done away with all trouble from brakes sticking in curves and from notches being worn in circle bars. Circle bars should be lubricated at each inspection period with center plate grease or some similar grease which adheres well to the bar.

Brake release springs should be kept in good condition at all times so that the brake rigging will return promptly to the full release position and not have a tendency to drag. They should be kept tight so that they will not rattle and wear the eyes so quickly. Truck levers should be of proper dimensions and have holes correctly spaced. Care should be exercised by repairmen when changing levers to see that the proper ones are put in. This applies particularly to a property like our own where there are a number of different trucks in service which have similar brake levers and hangers. This is another instance of where the charting of brake rigging parts is a great advantage.

Brake hangers should be renewed before their holes show much wear. A set of badly worn brake hangers will cause the brakes to grab and chatter when applied, making a very disagreeable stop. This chattering accelerates the wear and will finally cause the failure of some part of the brake suspension if not corrected.

Turnbuckles become worn and loose quite rapidly and require constant attention, as a broken turnbuckle may easily cause a serious derailment. When they are badly worn there is also the liability of threads stripping when the brakes are applied resulting in a great loss of braking power. Turnbuckles should have their threads lubricated so that they can be easily adjusted and should be equipped with locknuts or some other device to prevent the adjustment changing while the car is in service. Automatic slack adjusters have come into quite general use in place of turnbuckles and are quite successful in maintaining a constant piston travel.

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*Paper presented before railway section of Wisconsin Utilities Association, Green Bay, Wis., Aug. 17-18.

Shoe heads are subject to much wear and should receive considerable attention from inspectors and repairmen. A shoe head which is badly worn so that the shoe is not properly held in line with the wheel is a source of much annoyance and expense. It wears the shoe unevenly so that it must be removed and scrapped before full wear has been obtained. The two prongs at each end of the shoe head receive considerable wear and are sometimes damaged by the wheel cutting through a shoe which has been left on too long. We are now using a shoe having a straight lug across each end, which makes it very easy to reclaim heads with worn ends by simply cutting a seat on each prong and welding in a small piece of flat steel extending entirely across the head. On trucks equipped with brake beams it is very important that the shoe heads be kept securely attached to the beams at all times. If they are allowed to become loose, the bolts, holes and surfaces of the beam and head will become badly worn in a very short time.

Brakeshoes should fit the heads closely, any burrs or lumps on the shoes which would prevent a good fit being removed before the shoes are put on. Keys of the proper size and curve should be used and care should be exercised to see that the key is properly entered through the lug on the shoe.

HARDENED BUSHINGS, PINS AND BOLTS REDUCE TROUBLES

Wherever possible holes for brake pins, hanger bolts, etc., should be fitted with hardened bushings and the pins and bolts themselves should be hardened. Brake rigging so equipped will remain in good condition very much longer than if hardened pins and bushings are not used. The bushings should be a good driving fit in the hole which is to receive them, should be of the proper length so that they do not project above the surface of the piece after they have been driven home, and should have the sharp inside corner slightly chamfered. Hardened pins should have the cotter-pin hole drilled so that there is a little space between the cotter and the lever or jaw. The edges of this cotter-pin hole should be slightly chamfered to prevent the cutting of the pins. The end of the pin should have a short taper to make it easier to insert without having the holes lined up exactly and without danger of driving out the bushings. At present we are using a forged and hardened pin, but we favor the machined pin as it is more uniform in diameter and has a better finish. We have been bushing practically all holes in our brake rigging and using hardened pins on all trucks overhauled during the last one and one-half years and have noticed a very marked improvement in the general condition of the brakes on our cars.

The proper adjustment of brakes is very important. Most brake inspectors adjust brakes by "feel," that is, they learn to know by the sound when they shake a turnbuckle whether or not it is properly adjusted. This method, however, is not always reliable, and the brake should always be examined while applied and any changes in adjustment made that are found necessary to make the car brake evenly.

One more point which I would like to mention is the matter of the standardization of parts for brake rigging. Of course there are many parts, such as levers, pull rods, hangers, etc., which must be more or less special for the different trucks and types of cars, but with such parts as pins, bushings, shoes, heads, etc., there is a great field for standardization. We now have a change in mind on our property which will eliminate three different brake heads and one type of shoe.

Regulate Service According to Traffic*

A Car Always in Sight Should Be Motto of Electric Railways—Frequent Passenger Counts Necessary to Adjust Service to Traffic

By NELS C. RASMUSSEN
Superintendent Wisconsin Valley Electric Company,
Wausau, Wis.

WE CANNOT expect the schedule which suited traffic ten years ago to be sufficient at this time. It has been my observation that the amount and direction of the traffic is not the same from one year to the next, neither is it the same in one season of the year as in another season of the same year. Formerly we used to have a lot of pleasure riding in the summer time, but the pleasure of automobile riding has taken this business away from the electric railways to a great extent, except in a few instances. Now we must look to the steady passengers to keep up our traffic.

We must lay out our schedules for the rush-hour traffic periods to the best advantage. In some cities if service is frequent enough and distances not too great a good many people go home for their noon luncheon. This kind of traffic should be encouraged as much as possible, as the cars usually are not loaded heavily at that time. The evening rush is usually the time when most street railways are put to the task in handling an enormous amount of one-way traffic in a comparatively short time. That is when usually every available car is pressed into service. On a double-track road, where cars can be readily added to the service, this is not so difficult, but on a small or medium-sized single-track road it becomes quite a problem, as often switches are not so located as to permit the operation of cars between those regularly scheduled. Double heading is often resorted to in this case, but as a rule this does not increase the headway; in fact, it very often slows it up. On our property we were confronted with this problem a couple of years ago, and we had either to double head all of our regular cars during the morning and evening rush hours or decrease the time between the cars. We decided on the latter and shortened our headway five minutes on city lines and ten minutes on suburban lines. To do this it was necessary to move some of our switches in order to establish proper meeting points for the cars. This we did, and the result at that time was very gratifying, as we not only handled traffic better and faster but increased it about 30 per cent.

However, this summer general business conditions in our city have been somewhat depressed and traffic on our lines has slowed up to some extent, and we are now considering cutting one car off during the hours of light traffic. This again will require us to put in another switch on the suburban line, but we believe we can do that, and save a car about six or seven hours per day, so the money spent for installing this switch should bring good returns.

We have also tried other methods, such as shifting a car from one line to the other. We are doing this in the morning for one trip, when we have a large number of workmen going to one of the principal industries on one of our lines. They all come from one general direction on another line, and to avoid transferring we run this car directly through to the industry mentioned, and the car coming in to the transfer point at that time is shifted. This eliminates transferring a carload of passengers and has proved very popular with the patrons using this service.

In a good many instances the laying out of a schedule has been guesswork, especially in former years. I believe a superintendent should check his service every now and then by getting an accurate count of passengers on certain points on the line at certain times of the day. He should then chart the result and compare the number of seats furnished to take care of the traffic shown on the chart, not forgetting that the more frequent service he is giving the more traffic will be built up. I am a firm believer in frequent service, and my motto is "A car in sight at all times."

We must not lose track of the fact that our greatest competitor, the privately owned automobile, is steadily teaching people the riding habit, and when their auto is not available, the street car is their next step, as they will not walk as they used to do in former years.

We have also made other adjustments, such as in the leaving time of cars from the heart of the traffic center. For instance, our suburban cars were leaving the traffic center on the hour, twenty minutes after the hour and forty minutes after the hour, but we discovered in a very short time that the clerks in the stores, and laboring men, who are working, say, until 5 o'clock, could not catch the 5 o'clock car. For those who lived in the city, it did not make much difference, as they were able to catch the 5:10 car, but the suburban passengers had to wait until 5:20. We therefore changed the schedule so that now our suburban cars leave the heart of the traffic center at ten minutes after the hour, thirty minutes after the hour and fifty minutes after the hour, and now all clerks and laboring men who quit at 5 o'clock can catch the 5:10 suburban car. If they live within the city they can be home in fifteen minutes, and if in the suburban territory in thirty minutes after quitting work.

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*Abstract of paper presented before railway section of Wisconsin Utilities Association, Green Bay, Wis., Aug. 17-18.

If it is found to be impossible to speed up the schedule during the light hours of traffic, it might in some instances be possible to turn certain cars back before reaching the end of the line. Care should be taken, however, not to impair the service, and it is much better to run a car a trip or two where it is not needed than to cut off a trip where there is the slightest necessity of operating to the end of the line.

Keep on a'Courtin' that Gal*

Companies Make Grave Mistake to Stop Public Relations Work with Improving Conditions—Homely Analogy of the Public and One's Wife Makes Plain What the Task of Winning Good Will Is

By Labert St. Clair
Director Advertising Section
American Electric Railway Association, New York City

One of the gravest dangers which now confront the industry is that managements, satisfied with their increasing prosperity, will neglect their public relations. The management which now cuts down its advertising and other public relations work is making a costly mistake. The public must be courted continuously in every possible way if its good will is to be re-retained.

"But," it is declared, "I don't have to advertise any longer. The crisis is passed. All my people demand now is a good ride. With that they will be thoroughly satisfied."

This argument is as fallacious as the one that all a husband has to do to keep his wife's affections is to feed and clothe her well.

The public and wives are just alike in that they they expect something more than the legal requirements of aid from those who would court their favor. And if they don't get a little extra attention, the first thing the neglectful husband knows along will come Mr. Jitney Bus, or some other stranger with a dyed mustache and many promises, and an elopement will follow. Of course, this stranger won't do half the things he promises, but the wife who is getting scant attention save board and keep is likely to be attracted to him, anyhow.

Need for Advertising Nearly as Great as Ever

The public needs to be told the facts about electric railways now through advertising even more than it did when roads were in great financial distress. Unthinking persons, and even some of those who do think, are likely to believe unless the whole situation is explained to them that simultaneously with this prosperity which is just coming over the horizon, rates of fare should go back to where they were before the war. Of course such a procedure, before roads have had an opportunity to readjust themselves, would be ruinous. But how is the average car rider to know this and many other things of great importance to his service, if it is not explained to him?

Tell the public the facts. If things are getting brighter, say so. A smile always is more attractive than a frown. I honestly believe that, down in his heart, the average man and woman wants his electric railway and other public utilities to be prosperous. If they are not prosperous, the town in which they operate cannot be. And no one wants his town to go back. The thing to do, therefore, is to show how general prosperity is dependent upon utility prosperity. And the way to get this fact across to the public is to advertise.

The day for weeping, certainly, is past. You see many persons drop a coin into a crippled hand-organ grinder's cup once, but you seldom hear of any one employing him to play continuously.

Good Public Relations Man Not Hard to Find

Here and there we still find a few public utility companies which pay no attention to public relations because they say they have no expert in this work to do it for them. This is not a good excuse for neglecting such an impotant feature of our business. Of course, there isn't an advertising expert in every company, but there is always one man who has made a success of married life. Place him in charge of public relations and tell him to apply to the public the plans that he finds works well in dealing with his wife, his children and his neighbors, and your public relations will improve.

In the beginning let him regard his position as that of the street car company and his wife as that of the riding public. Then make him understand that his biggest job is to keep the wife happy. He quickly will recognize these fundamentals.

The husband must bring home the bacon. But that is not enough. He must take his wife into his confidence about how the bacon is procured, what the outlook is for more bacon, and when a few eggs and cake can be expected on the side. The more the wife knows about the details of the getting the more help she will give and the more patient she will be. The bacon is the electric railway ride.

The husband must deliver a few surprise packages along with the bacon. Give the wife just a little more than she expects. It will please her. The weekly pass is a good example of this.

The husband must take pride in keeping his personal appearance apace with that of the rest of the household. The electric railway company which doesn't keep its cars clean is comparable to the husband who sits around the house in his undershirt on Sunday and refuses to shave.

Finally, if a wife's co-operation is expected, her advice must be asked on questions of mutual interest. She may give valuable aid, and even if she doesn't, it will improve relations to give her a chance to help. The electric railway company which does as it likes in all things without consulting its riders is going to have much the same sweet time as the husband who buys his wife's hats without consulting her.

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*Abstract of address presented before the banquet of the railway section of Wisconsin Public Utilities Association, Aug. 18, 1922.

Safety as an Operating Factor*

By F. R. Coates
President Community Traction Company
Toledo, Ohio.

The development of accident prevention in industry began several years ago and the result was a marked decline in the number of industrial accidents. At the same time the number of utility accidents, due to public conditions, street and home, was increasing alarmingly. Barnum was right, there is one born every minute. Only he referred to suckers, I refer to fool auto drivers, and of all the hazards we public utility railway men have to contend with, this constitutes the greatest.

The auto deaths in ten American cities, picked at random, show increases in five and decreases only in cities where safety campaigns have been in progress during the past two years:

	1920	1921
New York	756	865
Chicago	542	668
Philadelphia	232	191
Detroit	240	134
St. Louis	102	97
Milwaukee	72	67
Rochester	37	38
Flint, Mich.	52	25
Louisville	18	20
Grand Rapids	16	17

Of the 12,588,949 motor vehicles in use in the world, 83 per cent, or 10,505,666, are in the United States.

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*Abstract of paper presented at meeting of the Electric Railway Section, National Safety Council, Detroit, Aug. 28-Sept. 1.

Three times as many persons meet death by automobile accidents as are killed in all the factories, mines, railroads, and other industries. That means 500,000 automobile accidents a year. Every thirty-five minutes that your watch ticks off, records the death of another person due to an auto accident. This is but one phase of the operating officials' troubles as far as accidents are concerned, but it is the most important one and is bothering every one of the operating officials in the country.

Safety as an operating factor must be reckoned with. A few years ago operating heads gave scant heed to it until it had been demonstrated most forcibly to them that it was the one thing most needed if accident costs were to be reduced. We find in Toledo that well organized safety work pays and, largely through this channel, we are able to make the following comparisons:

REDUCTION IN ACCIDENT AND LITIGATED CASES HIGHLY GRATIFYING

In eight years or from 1914 to 1921, public accidents were reduced from 3,008 to 2,295 and employee accidents from 306 to 152 for 1921. During the same period the total expenditure for accidents went from $149,225.19 to $69,729.74, the litigated cases from ninety-one to twenty-two and the per cent of accident cost to gross revenue from 7,813 to 2.35. Of this record we are justly proud, but realize that it could not be accomplished unless we enjoyed the hearty co-operation of our employees, due almost entirely to our safety talks to them plus the work done with the public.

The attitude of employers today is greatly different from that maintained ten or fifteen years ago. There are many employers today who are willing to consider the question largely from its humanitarian standpoint alone. The number of these men is increasing daily, but there still remains a large aggregate of employers who must be approached through their pockets rather than through their hearts.

The operator and the manufacturer have learned the lesson that safety methods pay:

First, because they are the means of saving life and limb, not only to the employees but to the public as well; and

Second, because the saving of dollars and cents as a result of the efforts expended returns twofold.

French Lick Convention

THE second annual convention of the Great Lakes Division, National Electric Light Association, will be held at French Lick Springs Hotel, French Lick, Ind., Sept. 27, 28, 29 and 30 in joint session with the fourteenth annual convention of the Indiana Electric Light Association. A very comprehensive and interesting program has been arranged under the direction of Harry Reid, president of the N.E.L.A. Division, and Secretary R. V. Prather.

Union Internationale de Tramways

THE dates of Oct. 2 to Oct. 7, 1922, have been selected for the eighteenth convention of the Union Internationale de Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles. The meeting has received official recognition from the Belgian government, and an attractive social program has been arranged in connection with the meeting. Technical sessions will be held each morning, from Monday to Friday inclusive, and there will be an afternoon technical session on Thursday. A list of the papers follow:

1. "A study on the increase in first cost and in operating expenses of tramways, interurban railways and bus lines, as compared with the period before the war," by A. Mariage, chairman of the board and general manager of the Société des Transports en Commun de la Région Parisienne.
2. "Automatic substations," by L. Sekutowicz, director of the technical service of the "Omnium Lyonnais" at Paris.
3. "Electric welding and other kinds of welding for railway tracks and railway shops," by E. d'Hoop, director of the Brussels Tramways Company.
4. "The financial condition of the Swiss railways from 1913 to 1920," by Charles Rochat, general manager Geneva Electric Railways.
5. "The use of mercury arc rectifiers for tramways," by M. Odermatt, engineer of Brown, Boveri & Company, Baden, Switzerland.
6. "Motor rail cars for interurban lines," by J. de Croes, chief engineer, Société Nationale des Chemins de Fer Vicinaux, Brussels.
7. "Comparison of the different systems for the electrification of interurban lines," by A. Pirard, general manager of the Société Anoyme d'Enterprise Générale de Travaux, Liege.
8. "Motor bus service organization in great cities," by H. E. Blain, assistant managing director London Underground Railways and London General Omnibus Company Group, London.
9. "One-man cars," by P. N. Niewenhuis, manager of the Arnhem Municipal Tramways.
10. "Modern improvement in tramway rolling stock," by C. J. Spencer, general manager London Group of Tramway Companies, London.

This is the first meeting of the association since the war, in fact since a meeting which was scheduled to be held in Budapest in 1914. The official language of this association is French, and that is the language in which the papers and proceedings of the association are published.

American Association News

Large California Delegation Going to Chicago

W. V. HILL reports that the California delegation to the Chicago convention of the American Electric Railway Association will be about twenty-five strong. Arrangements have been made for a special Pullman to take the party to Chicago.

Mr. Hill is now in Washington to confer with Charles L. Henry, the association's representative there in national relations. While it is not now expected that there will be legislation on the present steam railroad strike, the association's representatives are prepared to prove to any congressional committee that the electric railways should be exempted from the provisions of any such bill, just as they were under the Esch-Cummings bill.

Good Will Signs

THE advertising section of the American Electric Railway Association has just brought out five "good will" signs, 14x18 in., printed in colors, relating to the reliability, safety and other advantages of electric cars for urban service. These signs can be used either in car windows or posted around the property of a railway or manufacturer interested in promoting the welfare of electric railways. Member companies can secure copies gratis.

Claims Association Expands Objects

FOR some years the American Electric Railway Claims Association has been handicapped by the statement in its constitution outlining its "objects." This year a determined effort will be made to change the constitution to accord with the present conditions. The clause drafted for the constitution and approval by the executive committee of the Claims Association reads as follows:

> The objects of this association shall be to endeavor through co-operation, study and discussion to ascertain, inaugurate, maintain and develop those modes of procedure, practices, policies and ethics most effective in preventing accidents, determining and discouraging unreasonable claims, minimizing inequitable expenditures and other waste, defending against unfair demands, adjusting claims owed, and otherwise advancing the ultimate best interests of member companies and those they serve.

The clause at present in the constitution, as adopted in 1906 and later amended, reads as follows:

> The objects of this association shall be to bring together those engaged in the claim departments of urban and interurban railways and the electrified sections of steam railways for the interchange of ideas and to promote the mutual protection of such companies from fraudulent claims.

It is thought by the executive committee that under the present constitution no paper can be presented at the convention unless it relates to the foregoing very limited object. Hence the desire for a change.

Tentative Programs of the American and Affiliated Associations

(Corrected by the Association up to Aug. 31, 1922)

American Association

Monday, Oct. 2

Registration, etc.

Tuesday, Oct. 3

10:00 A.M. to 1:00 P.M.

Convention called to order.
President's Address.
Report of Executive Committee.
Report of Executive Secretary.
Report of Treasurer.

Appointment:
(a) Committee on Resolutions.
(b) Committee on Recommendations in President's Address.

Committee Reports:
- Constitution and By-Laws—C. L. HENRY, chairman.
- Memberships, Company and Associate—F. R. COATES, chairman.
- Company Section and Individual Members — MARTIN SCHREIBER, chairman.
- Co-operation with State and Sectional Associations—W. H. SAWYER, chairman.
- Finance—J. H. PARDEE, chairman.
- Publicity — J. N. SHANNAHAN, chairman.
- Publications—L. S. STORRS, chairman.
- Co-operation with Manufacturers —E. F. WICKWIRE, chairman.

Address by a prominent industrial executive: "Development of Community Transportation and Its Effect on Other Industries."

Discussion:
- Public Relations—Series of Short Talks; Opening address by VICE-PRESIDENT M. C. BRUSH, American International Corporation, who will introduce the following speakers for five-minute talks:
- H. B. FLOWERS—"Keeping in Touch with Local Organizations."
- MARTIN SCHREIBER — "Results in Southern New Jersey."
- BRITTON I. BUDD—"Use of Company Publications."
- BARRON G. COLLIER — "Utilizing Company Advertising Mediums."
- L. S. STORRS — "Relation of the Public Press to the Traction Problem."
- W. H. SAWYER—"How I Use Paid Newspaper Space."
- J. P. BARNES — "Value of State Publicity and Information Bureaus."
- C. E. MORGAN — "Telling Your Story Through Employees."
- P. S. ARKWRIGHT—"Public Speaking as a Publicity Medium."
- Speaker to be announced later—"The Operation of a Community Committee Plan."

Wednesday, Oct. 4

Committee Reports:
- Nominations.
- Election of Officers.
- Committee of One Hundred—GUY E. TRIPP, chairman.
- Valuation — J. P. BARNES, chairman.

A report dealing with economic procedure for appraisals; with comments on various court decisions and property valuations. "Yard Stick" method of valuation.

Committee Reports:
- Electrolysis—W. J. HARVIE, chairman.
- Policy—BRITTON I. BUDD, chairman.
- National Relations — CHARLES L. HENRY, chairman.
- Mail Pay—L. H. PALMER, chairman.
- Joint Committee of National Utility Associations—RANDAL MORGAN, chairman.
- Education—EDWARD DANA, chairman. A comprehensive report with theses, covering the following phases of educational work:
- Co-operative Courses with Universities and Colleges.
- Similar Co-operation with High Schools and Trade Schools.
- Co-operation with Manufacturers.
- Conducting Classes on University Extension Plan.
- Instruction of Supervisory Forces.
- Company Sections.
- Shop and Departmental Apprentice Courses.
- Distribution of Company and Association Literature.
- Americanization of Foreign Born Employees.
- Instruction in Courtesy to the Public.

Address on a National Topic by a Federal governmental official.

Past-Presidents' Day:
Short talks by oldest living and other past-presidents of the Association, subject introduced by JOHN M. ROACH, and the meeting to be conducted by PAST-PRESIDENT GEN. GEORGE H. HARRIES.

Thursday, Oct. 5

Committee Reports:
- Trackless Transportation—H. B. FLOWERS, chairman.
- Uniform Motor Vehicle Law—C. D. CASS, chairman.
- Maintenance and Construction of Highways—W. J. HARVIE, chairman.
- Special Taxes—C. D. EMMONS, chairman.
- Resolutions.
- Recommendations in President's Address.
- Address by HON. CARL D. JACKSON, chairman Wisconsin Railroad Commission.
- Address by a well known public official on "Taxation of Public Utilities," to be followed by a discussion by a member of a state public utility commission.
- Paper on some phases of Trackless Transportation.
- Unfinished business.
- Installation of Officers.

Engineering Association

Monday Morning, Oct. 2

Registration.

Monday Afternoon

Convention called to order.
Address of President.
Report of Executive Committee.
Report of Secretary and Treasurer.
Presentation of Past-Presidents' Badges, H. H. ADAMS, Master of Ceremonies.
Safety Address—W. H. BOYCE, general manager Beaver Valley Traction Company, New Brighton, Pa.

Committee Reports:
- Reorganization—F. R. PHILLIPS, chairman.
- Unification of Car Design—H. H. ADAMS, chairman. A study of car design containing valuable data on good practices.
- Heavy Electric Traction—SIDNEY WITHINGTON, chairman. Electrified Mileage and Locomotive Tonnage Data on Electrified Roads, United States and Abroad —Supplement to Bibliography.

Tuesday Afternoon, Oct. 3

JOINT MEETING WITH ACCOUNTANTS' ASSOCIATION

Safety Address.

Report of Joint Engineering-Accounting Committee—CHARLES R. HARTE, chairman (Engineering); H. C. KIMBALL, chairman (Accountants). This report contains a classification code including all items in construction and reconstruction so arranged that Interstate Commerce Commission account numbers may be adhered to. The code is designed so that at any time during progress or after completion of a job, the cost of any item of work may be readily determined.

Committee Reports:
- Equipment—R. H. DALGLEISH, chairman. Wheel Tread and Flange Contours, Helical Gears, Trolley Contact Devices, Review of Existing Standards.
- Buildings and Structures—FRANK H. MILLER, chairman. Design of Typical Shop Building and Layout Design of Small Bridges, Culverts and Trestles, Review of Standards and Recommendations.

Paper—"Related Function of Engineer and Accountant in Public Utility Development," EDWIN D. DREYFUS, engineer West Penn Railways, Pittsburgh, Pa.

Wednesday Afternoon, Oct. 4

Safety Address.

Committee Reports:
- Way Matters—W. F. GRAVES, Chairman.
- Standardization of Frogs and Car Clearance Easements.

Proper Location of Tongue Switches.
Wheel Tread and Flange Contours.
Revision of Girder Rail Specifications.
Design of Substitute Ties.
Welded Rail Joints.
Wood Preservation.
Specifications for Sundry Track Materials.
Dimensions of Frogs Used in Tongue Switches and Split Switches.
Track Construction on Paved Streets.
Review of Standards and Recommendations.

JOINT MEETING WITH AMERICAN WELDING SOCIETY

Paper—"Possibilities of Welding and Need for Research and Standardization"—C. A. McCune, president American Welding Society.
Paper—"Welded Rail Joint Problems"—E. M. T. Ryder, way engineer Third Avenue Railway System, New York City.
Paper—"Application of Welding—Electric, Gas and Thermit—in the Electric Railway Shop."

Thursday Afternoon, Oct. 5

Safety Address.
Committee Reports:
Power Generation—E. H. Scofield, chairman.
Advance in Art of Power Generation, Action Toward Joint Study by All Associations Interested.
Electrolysis; Review of American Committee Report.
National Electrical Safety Code.
Automatic Substations.
Wire and Cable Specifications.
Power Distribution—M. B. Rosevear, chairman.
Overhead Wire Crossing Specifications—joint actions of national associations under auspices of A.E.S.C. looking toward formulation of national standard.
Wire and Cable Specifications.
Composition and Wear of Trolley Wire.
Lightning Protection.
Pole Reclamation.
Automatic Substations.
Electrolysis — Review American Committee Report.
National Electrical Safety Code—Adoption by A.E.S.C. as national standard.
Wood Preservation.
Aluminum Wire.
Review of Standards and Recommendations.
Purchases and Stores—W. H. Staub, chairman. A study of methods of taking periodical inventories.
Standards — Martin Schreiber, chairman.
Presentation of 1921 Report of Joint Committee on Stores Accounting for approval of Engineering Association.
Report of Committee on Resolutions.
Report of Committee on Nominations.
Election of Officers.
Installation of Officers.
Adjournment.

The American Bureau of Welding announces that a meeting of the Welded Rail Joint Committee will be held Thursday morning, Oct. 5.

T. & T. Association

Monday Morning, Oct. 2

9:30 a.m. to 12:30 p.m.
Registration, etc.

Monday Afternoon

Convention called to order.
Annual address of President.
Annual report of Executive Committee.
Annual report of Secretary and Treasurer.
Appointment of Convention Committee.
(a) Resolutions.
(b) Nominations.

Committee Reports:
Merchandising Transportation — E. M. Walker, general manager Terre Haute Traction & Light Company, chairman.
A Report on Practical Business Getting:
Making By-Products Pay.
Selling Under a Zone System.
Meeting Bus Competition.
Increasing Freight Business.
Getting Auto Owners' Business.
Selling to Your Employees.
Making Salesmen of Employees.
Increasing Interurban Business.
Selling the Weekly Pass.
Boat Line Co-ordination.
The One-Man Safety Car.
Summer Resort Business.
Discussion led by Edward Hungerford, nationally known writer on railway matters, and followed by E. C. Spring, general superintendent Lehigh Valley Transit Company.
Round table discussion of weekly pass and other forms of reduced rate tickets, led by G. T. Seely, vice-president Pennsylvania-Ohio Electric Company.

Tuesday Afternoon, Oct. 3

Report of Committee on Nominations.
Election of Officers.

Committee Report:
Traffic Regulations—H. B. Flowers, vice-president and general manager United Railways & Electric Company of Baltimore, chairman.

Address:
By C. F. Fitzmorris, Chief of Police, Chicago, Ill., on Traffic Conditions and Regulations in Chicago. General Discussion of Report.

Committee Report:
Safety Work—W. H. Boyce, general manager Beaver Valley Traction Company, chairman.

Discussion:
J. P. Barnes, president Louisville Railway; H. T. Bell, secretary Chicago Safety Council, and others.

Wednesday Afternoon, Oct. 4

Committee Report:
One-Man Car Operation—C. E. Morgan, general manager Brooklyn City Railroad, chairman.
Paper — Lightweight Interurban Cars—J. P. Pope, general manager Kentucky Traction & Terminal Company, Lexington, Ky.

Discussion:
Paper — Turnstile Cars—J. E. Duffy, general superintendent New York State Railways, Syracuse, N. Y.

Thursday Afternoon, Oct. 5

Committee Reports:
Personnel and Training—J. E. Wayne, vice-president and assistant general manager York Railways, chairman.
Discussion. Francis L. Dunhoune, Baltimore, and others.

INTERURBAN HOUR

In charge of E. C. Spring, general superintendent Lehigh Valley Transit Company.
Presentation of Past-Presidents' Badges.
(President L. H. Palmer will officiate as Master of Ceremonies.)
General Business.
Report of Committee on Resolutions.
Election of Officers.
Installation of Officers.
Adjournment.

Accountants' Association

Monday Afternoon, Oct. 2

President's Address.
Committee Reports.

Tuesday Afternoon, Oct. 3

JOINT MEETING WITH ENGINEERING ASSOCIATION

Report of Joint Engineering-Accounting Committee—Charles R. Harte, chairman (Engineering); H. C. Kimball, chairman (Accountants).
Paper—"Related Function of Engineer and Accountant in Public Utility Development," Edwin D. Dreyfus, engineer West Penn Railways, Pittsburgh, Pa.

Wednesday Afternoon, Oct. 4

Presentation of Past-Presidents' Badges.
Paper—Public Utility Accounting—Walter H. Timm, clerk New Hampshire Public Service Commission, Concord, N. H.
Paper — Budget Control — Harry A. Snow, Detroit Edison Company.

Thursday Afternoon, Oct. 5

Program to be announced.

Claims Association

The details of the program of the Claims Association have not yet been made public. They will be issued soon in a pamphlet by President Cecil G. Rice.

Executive Committee American Electric Railway Association

THE August meeting of the executive committee of the American Electric Railway Association was held in New York on Friday, Aug. 25. Those in attendance were President Todd, Vice-Presidents Emmons, Shannahan and Coates, F. E. Webster, L. H. Palmer, R. P. Stevens, W. H. Sawyer, H. G. Bradlee, John G. Barry and George H. Tontrup, members of the executive committee, Past-Presidents Henry, Stanley, Pardee and Harries, and several chairmen of committees who presented their reports to the executive committee.

The first of these reports to be presented was that of the finance committee. Mr. Pardee said the association now has about $30,000 of unpaid dues of members and that it was most desirable that these dues be collected before the convention. Mr. Welsh reported that he was now making a campaign to collect these unpaid dues. The report of the committee on trackless transportation was then presented by Mr. Flowers and accepted.

Mr. Henry then spoke for the committee on national relations and Mr. Emmons for the committee on subjects and meetings. Mr. Emmons' report is represented by the program printed in this issue. Mr. Shannahan presented the report of the committee on publicity, and Mr. Henry the report of the nominating committee. This report is printed by itself on this page.

Mr. Henry explained in connection with these nominations that the committee had first asked Mr. Budd, who had served as first vice-president this year, to accept the nomination for president next year, but that he had said that his personal and business affairs would not permit him to give the time during the coming year which would be required as president. The committee therefore nominated him again for the office of first vice-president and had nominated Mr. Emmons as president. The nominations were accepted by the executive committee.

Mr. Coates then made a report for the committee on company and associate membership, and said that on Aug. 25 there were 325 railway members, fourteen associate members, and 224 manufacturing members. This is an increase in each group as compared with a year ago. A number of individual members were then elected to the association.

Mr. Welsh reported that up to date 55,500 sq.ft. of exhibit space was sold. This is an increase of about 5,500 sq.ft. over the total of last year. The exhibit committee hopes that the total this year will be about 60,000. Mr. Welsh explained that more than 150 manufacturing companies had already applied for exhibit space, that arrangements have been made for a fare-and-a-half for the round trip to Chicago and that a large attendance was expected at the October convention.

Mr. Welsh then explained about the appointment since the last meeting of the executive committee of Col. John Price Jackson at the recommendation of the joint fuel committee, to act for the three utility associations in Washington in the coal crisis to assist in getting priority for member companies and push through shipments of coal. The appointment was authorized by the executive committee with the proviso that the cost should be limited to $4,000.

M. R. Maltbie of Baltimore was appointed special representative of the Association to the National Traffic Officers' Convention at Atlantic City Sept. 18 to 25, and V. L. Havens of *Ingenieria Internacional* and Calvin W. Rice were appointed to represent the Engineering Association at the International Engineering Congress, to be held at Rio de Janeiro, Brazil.

At the suggestion of Mr. Storrs, the executive committee approved the submission to the members of a slight change in the constitution. The constitution at present requires the executive committee to hold a meeting just before and just after the annual convention and at the time of the mid-year meeting, to hold nine other meetings during the year, and to determine the time and place of these meetings at its first meeting after the convention. The change recommended and approved by the executive committee does not require it to make this selection of time and place for the nine last named meetings at its first meeting.

The request of the Engineering Association for an appropriation of $20,000 to pay for a test of rail joints was considered. The test was considered desirable but an appropriation was deferred until it could be determined that the association had funds available for this purpose. Mr. Palmer reported that Mr. Maltbie of the mail pay committee had found that many replies to the questionnaire sent out by the committee had been filled out very carelessly, indicating that the questions had not been carefully read. In consequence, many of these replies had to be sent back for correction. He urged greater care in the filling out of these blanks.

The committee then adjourned to meet on Monday, Oct. 2, at 10 a.m. at the Drake Hotel, Chicago.

"An Interrupted Operation"

WHEREIN HORTENSE HORSESENSE SAVES THE DAY

OF COURSE you don't know what this title conceals. Neither do any others outside of the actors who will appear in the piece and the author. There are to be seven leading men and they will be helped out by ten babes of the beauty chorus and twenty singers who knock 'em dead. Oh, boy, you are admonished to bring the wife. The reason is that she probably has an idea, judging from you, that there isn't anything clever about a railway man. But now you bring her, for the whole cast of this show is made up of railway men and maidens and it is accredited by the insiders with the prospects of being one of the greatest hits ever manufactured out of anything less than professional material. And after the show there will be dancing. If you're lucky perhaps you'll dance with one of the ten show "babies." Recollections of college days, what? Spunk up. It will only cost you 5 berries, including dinner. And what's 5 berries with such prospects ahead. The place is Marigold Garden, Chicago—fifteen minutes from the Drake Hotel in a "Yellow" or on one of Henry Blair's cars. The Time—Wednesday night, Oct. 4, 6:30 p.m., with no closing hour scheduled. The occasion, the American Electric Railway Association convention. Men and women of the industry are going to prove that not all the sprightly ones are on Broadway or all the stars in Hollywood. Here is the cast of characters:

Ellick Traxion, the Victim.
Prof. The Peepul, M. D., Superintendent.

Dr. Comish
Dr. Labor Borde } Operating Surgeons

Hon. G. D. Politiks
O. Lemme Fixit } Visitors

Hortense Horsesense, President of the Society for the Prevention of Cruelty to Utilities.
Miss Dividends—Niece to Traxion.
Nurses, Attendants, Policemen, etc.

Oh, yes, a word about the author. He is John E. Wilkie, vice-president of the Chicago Railways. Mr. Wilkie also wrote the songs. 'Nough said.

Officers Nominated for Next Year

THE nominating committee of the American Electric Railway Association has made the following nominations for officers of the association for the year 1922-23:

President, C. D. Emmons, president United Railways & Electric Company, Baltimore, Md.

First Vice-President, Britton I. Budd, president Metropolitan West Side Elevated Railway, Chicago, Ill.

Second Vice-President, J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

Third Vice-President, Frank R. Coates, president Community Traction Company, Toledo, Ohio.

Fourth Vice-President, W. H. Sawyer, president East St. Louis Railway, East St. Louis, Ill.

Treasurer, Barron Collier, president Barron G. Collier, Inc., New York City.

Four members of the executive committee whose terms will expire in 1925, two to be railway men and two manufacturers:

Paul Shoup, president Pacific Electric Railway, San Francisco, Calif.

James P. Barnes, president Louisville Railway, Louisville, Ky.

H. D. Shute, vice-president Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

C. K. Knickerbocker, vice-president Griffin Wheel Company, Chicago, Ill.

The committee making this report consisted of Charles L. Henry, chairman; George H. Harries, H. B. Flowers, B. A. Hegeman, Jr., E. F. Wickwire, Edward Dana and Horace Lowry.

Recent Happenings in Great Britain

Electric Supply Development—Safety of Passengers—Ballasted Tramway Tracks—Jubilee at Glasgow

(From our British News Representative)

THERE is an expectation that the passing by Parliament of the electicity (supply) act, which received the Royal assent on Aug. 4, will soon lead to a sensible development of the supply and use of electric power for all purposes all over the country. The act is supplementary to one of the same name which was passed in 1919 and which set up a public body called the Electricity Commissioners with wide powers for the development of electricity supply. The country is being divided into electricity districts and joint electricity authorities composed of representatives of various interests are being constituted. These will develop their districts and carry out co-operation and consolidation schemes. The interests of existing undertakers are protected so much that little can be done except by consent. The new act confers a power the want of which was paralyzing the whole scheme, namely, the power to the joint authorities to raise capital by borrowing for the purpose of acquiring generating stations and providing new ones. The interests of railway companies using or proposing to use electric traction are safeguarded, and it is hoped that a general supply of electricity at a cheap rate will encourage electrification. The development of the scheme, however, must take considerable time.

Passing Stationary Tramcars

It now appears hopeless to expect that any tramway by-law will be authorized for London to prevent other vehicles from passing a stationary tramcar on the near side while passengers are leaving and entering the car. On July 18 the London County Council had before it a report which narrated the previous unsuccessful attempts of the Council to get the Ministry of Transport to countenance a regulation for the prevention of accidents caused by motor and other vehicles driving through tramcar passengers at car-stopping places. It was also narrated that the municipalities of Manchester, Liverpool, Burnley and Preston had unsuccessfully tried to get Parliamentary powers similar to those possessed by Glasgow for several years. On the point made by the Minister of Transport that it is already a statutory offense to drive a motorcar in a manner dangerous to the public, the Highways Committee pointed out that there are considerable difficulties in the way of obtaining evidence except of accidents. In all the circumstances the committee was of the opinion that no purpose would be served at present by seeking Parliamentary powers. The Municipal Tramways Association has, however, been asked to further the legislation.

In reference to street accidents in which tramcars are involved, the London County Council has decided that the following new instructions to be issued to their tramway employees:

"In every case of accident the fullest particulars must be reported at once for the information of the general manager. No information respecting any accident is, under any circumstances, to be given to any member of the public. Every assistance must be given to the police officers, but the Council's servants are reminded that they are not bound to answer any question that may tend to incriminate them, and particularly that in the case of a serious accident any statement may be taken down and used in evidence in the event of a prosecution."

All this, it will be observed, is of special interest to the claims department. In the past there has been considerable clash on the question of giving information about accidents to the police. The latter in London are not, as in other parts of the country, employed and controlled by the local authority; instead they are under the Home Office, a department of the British Government.

Tracks on Right-of-Way

Middlesex County Council recently sent a committee of its members to visit Birmingham and Liverpool to inspect the arterial roads which are being constructed on which high-speed tramway tracks laid on ballast are being built. In the ordinary way street tramways in this country have to be of the most rigid type in order that the tread of the rails shall be absolutely flush with the paving. Hence, heavy rails are laid direct on a 6- or 8-in. concrete foundation, with elaborate rigid rail joints. But if matters can be arranged so that the tramway has its own right-of-way, then sleeper and ballast construction, giving a flexible, cheaper and more silent track, can be adopted. This is what is being done in the two cities mentioned as well as in a few others.

In Liverpool the committee found another complete scheme of arterial roads similar to that of Birmingham. The widths are from 12 ft. to 150 ft. and in one case 250 ft. The cost of track construction is about 50 per cent less than the usual street type, so that the saving sets off the cost of buying additional land for the wide road. Noiselessness, high speed and small wear and tear are features. The committee hopes to see similar arrangements adopted in Middlesex.

In connection with the electrification of Edinburgh tramways, the Town Council has decided to use top-covered double-deck cars on the northern routes where the gradients are as steep in places as 1 in 9. Slipper brakes will be employed as well as the ordinary brakes. The Ministry of Transport has approved the type of car which has been proposed.

The jubilee of Glasgow Tramways is to be celebrated on Aug. 19. It was on Aug. 19, 1872, that the first tramway line in the city was opened for traffic. The tracks were laid by the municipality, who leased them to a company for twenty-three years. At the end of the lease the Town Council took over the working and afterwards converted the system from horse to electric traction and operated it with the great success which the tramway world knows. As to the coming recognition of the jubilee, it is proposed that every employee on Aug. 19 shall be granted a gift of £1, that the members of the corporation and guests be entertained at luncheon, and that a reception and dance be given in the banqueting hall of the City Chambers in the evening.

An Ancient One

After a career of more than fifty years the Plymouth, Stonehouse & Davenport Tramways Company was on July 1 taken over by Plymouth Town Council on the expiring of a lease. The undertaking was the first to be constituted under the much-execrated Tramways Act of 1870. A personal note is that J. Barber Glenn, who was appointed secretary of the company at the outset, has continued to hold that office ever since. During the last two years he has also been managing director. He rode on the first horse car on the line fifty-two years ago and on the first electric car of the company in 1901, and he drove the last car of the company's service on the night of June 30, 1922. Mr. Glenn entertained the officials and employees of the company at a farewell supper on June 28. Thus ends a chapter—and a very long one—in the tramway history of the city of Plymouth.

Tramway Wages

In the light of the general fall in wages in Britain, the employers' side of the National Joint Industrial Council for the tramway industry has given three months' notice to terminate the existing agreement as to tramwaymen's wages, with a view to full reconsideration of the whole question by the National Council.

Arrangements have been completed for the transfer of the underground cable railway known as the Glasgow District Subway from the company hitherto owning and working it to Glasgow Municipality. I have previously referred to the negotiations for purchase of this line which was worked at a loss and to the fact that the purchase money represents only 10s. per £10 share of the company. The company will operate the line until the Town Council can obtain a Provisional Order to purchase it.

Louisville Ordinance Passed

City Legislative Body There Reverses Itself on Recent Action Affecting Louisville Railway Settlement

The city of Louisville, Ky., has changed front in regard to the matter of settlement of its railway problem. Where only a few days ago the city had rejected a settlement ordinance, it turned around on Aug. 24 and passed a bill in favor of the Louisville Railway carrying an initial 7-cent cash fare and a 6-cent ticket rate. There is, of course, a great deal more to the matter than that, but the passage of the ordinance is the big outstanding event of all the recent moves. It is a distinct victory for the management of the company and is regarded locally as largely a personal triumph for President James P. Barnes.

The railway matter at Louisville has been in the public eye for a long, long while now. After several years of scrapping before the former city administration and the present one, without any success for the company, the latter in the early part of 1921 filed injunction proceedings in the Federal District Court, Western Kentucky division, at Louisville, asking an injunction to prevent the city from interfering with the collection of an increased fare. The suit was carried to the United States Court of Appeals, and then to the Supreme Court, which sent the case back to the Court of Appeals on a claim of lack of jurisdiction. The latter court reached a decision favorable to the company.

LITIGATION LAID ASIDE

Rather than continue the litigation an effort was made to pass an ordinance which would prove satisfactory to the city and the company. This ordinance was introduced the latter part of June, and has been buffeted about since that time.

Two weeks ago the measure was defeated by the lower board of the City Council by a vote of twelve to six. By many this was interpreted to mean a reopening of the breach between the company and the city, but on Aug. 22 the ordinance was again placed before the Council and it was passed by a vote of ten to eight. On Aug. 24 the ordinance as passed by the lower board went before the Board of Aldermen and was passed unanimously.

Mayor Huston Quin, who has been away on a vacation, returned to the city on the evening of Aug. 24, prepared to sign the ordinance the next day, in the event that the Aldermen voted in favor of it. For some time it had been well known that the Aldermen were strongly in favor of the measure, the drawback having been with the Councilmen.

On Aug. 25 Mayor Quin called President A. A. Will of the Aldermen and Jacob Isaacs of the City Council to the City Hall, to be present at the signing of the ordinance. This action practically closes the matter and places the railway in a position where it can pay fair wages, keep up its equipment and install necessary improvements.

For a period of eighteen months or so, under a 7-cent fare, the company has been able to put its house in very fair order. Through improvement of the power department, installation of one-man cars on the light travel lines and abandonment of some unnecessary parallel lines the company hopes to be able to save considerable money and to improve its service materially. Eventually the company plans to install lighter cars on its interurban lines.

On Monday, Aug. 28, a letter was mailed to each stockholder arranging for a meeting to be held on the afternoon of Sept. 11 and inclosing a copy of the ordinance, checked against a certified copy, as finally passed by the City Council. The stockholders at the meeting on Sept. 11 will be asked to ratify the plan as carried in the ordinance. A directors' meeting will be held after the stockholders' meeting.

President Barnes at various times in discussing conditions affecting the company has discussed the trackless trolley and the bus as possibilities for development by the company in the future in meeting its transportation requirements. These are all intangible so far as their immediate application is concerned, but the company for some time has been considering plans for enlarging its riverside, or main power plant, on the banks of the Ohio River, and eventually doing away with its old plant on Finzer Street.

New Scale Announced

All wage controversies between employees and trolley companies in Syracuse, N. Y., have ended with the settlement of the wage question on the Syracuse Northern Railroad, operating from Syracuse to Brewerton and South Bay.

The terms of a contract under which the men will receive 48 cents an hour for a ten-hour day have been announced by T. C. Cherry, manager of the company. Under the old contract, which expired on May 1, the men received 55 cents an hour with the same working conditions. When the contract expired the men asked 70 cents and the company demanded 45 cents. A wage of 45 cents has been paid pending settlement of the controversy. The new scale is retroactive to May 1.

Electric Railways Proposed for Arizona, New Mexico and Colorado

Articles of incorporation have been filed in Phoenix, Ariz., with the Arizona State Corporation Commission by the Staley System of Electrified Railway, covering 750 miles of new railway to be constructed in Arizona in the near future. The same people will also make application for the right to build 350 miles in New Mexico and 75 miles in Colorado as soon as advised by the Interstate Commerce Commission, to which body they have already made application for a building permit covering a total of 1,175 miles. They will also file on some 100 miles in Old Mexico, extending from their lines in southern Arizona to the Gulf of California.

The incorporators and directors are R. E. Grace and Judge Carl A. Davis, Phoenix, Ariz.; William L. Staley, Los Angeles; Theodore H. Lohman, San Diego, and W. E. Bell, East Las Vegas, N. M. The officers named are William L. Staley, president; Theodore H. Lohman, vice-president; W. E. Bell, secretary and treasurer. The capitalization is $40,000,000, of which $751,300 is subscribed.

This system in the United States would begin on the Utah-Colorado state line, about 40 miles north of the southwest corner of Colorado, and would extend southerly, passing near Cortez, Colo.; the Shilrock Indian Agency, N. M.; Farmington, N. M.; Grants, N. M., and Luna, N. M., thence down the Blue River and the San Francisco River, passing through Clifton, Ariz.; thence down the Gila River in Arizona to near Safford, Ariz.; and thence westerly, passing near Winkelman, Florence, Casa Grande, Ariz., and southwest to the Arizona-Republic of Mexico boundary line; thence westerly to near Yuma, Ariz. Branches will be constructed to Tucson, Phoenix, Winkelman and Benson in Arizona, and to Durango, Colo.

A very remarkable feature of this new enterprise is included in its articles of incorporation, which say that there shall not at any time be any bonded or mortgaged indebtedness of any description placed or allowed on any of the property of the corporation, either real or personal, or on any other of its assets.

Will Contest Suit.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will contest the suit of the city of West Allis which seeks to compel the company to move its tracks to the center of the road. This removal as ordered would cost the company $1,500,000.

$600,000,000 Construction Program

New York's Mayor Outlines Scheme to Recapture Transit Lines and Build New Routes—Transit Commission Chairman Ridicules Some of Mayor's Proposals

MAYOR HYLAN'S long-heralded plan for new subways and other transit facilities for New York was announced on Aug. 27 at the City Hall and will be presented to the Board of Estimate on Sept. 6.

The plan proposes the spending of $600,000,000 on thirty-five new subway routes, extensions and tunnels, the recapture of the West Side subway line now being operated by the Interborough, the recapture of the whole of the subway system operated by the B. R. T. under the dual subway contracts, the operation of all of these by the city at a single fare, the establishment of a $25,000,000 bus system to feed the subways and the gradual elimination of all elevated and surface lines.

Acknowledgment is made in the general statement that some legislation will be necessary, but the matter of financing the construction program, which is to cover a period of fifteen years, is dismissed more or less casually on the assumption that revenue from recaptured lines will release $500,000,000 of city bonds from the debt limit consideration and that sums available within the debt limit and the revenue resulting from increased assessments will do the rest.

ANNOUNCEMENT MADE BY MAYOR'S SECRETARY

The announcement of the plan was made by John F. Sinnott, the Mayor's secretary, who gave out for publication a twelve-page general statement as to the plan, what it would accomplish and what its execution would cost, a separate document setting forth the proposed new routes in detail, a third document giving twenty-seven "salient features" of the plan and a fourth paper giving the order of construction.

One of the outstanding characteristics of the statement issued by the Mayor is that he does not use the word "may" at all, but definitely says that the city "will" do this and do that. He further asserts that the plan will not only be adopted but that work on the proposed new lines will commence virtually at once and that much of the work, as well as the recapturing of the lines at present privately operated, will be accomplished before his term ends.

The statement is a mixture of constructive proposals, historical statements and criticism of the dual subway contracts, the Transit Commission, Governor Miller, the Republican legislature and George McAneny. It contains also many statements as to the purposes to be accomplished, with several references to the 5-cent fare and "the longest ride obtainable anywhere on earth for a nickel."

The plan includes, says the Mayor's statement, new subway trunk lines in and to all boroughs, other new subway lines, extensions to existing lines and a bridge and tunnels uniting all boroughs—in all, thirty-five new subway routes, extensions and tunnels. Says the Mayor:

> The city intends to spend $600,000,000 during the next fifteen years to construct and equip these new rapid transit lines. It intends to begin its first construction immediately—as soon as the necessary detailed plans can be prepared by the engineers—and it intends to have new subway lines in operation before the expiration of the term of the present elected city officials. The construction of these new rapid transit lines will go on at the same time in all boroughs.
>
> These new rapid transit lines will be constructed by the city itself. The city will have no partners in this gigantic enterprise and it will entertain no partnership in the operation of any of these lines when finished. It will be exclusively a city undertaking.

Under the heading, "Salient Features of Mayor Hylan's Plan for Real Rapid Transit," the following summary was given out by John F. Sinnott, his secretary, at City Hall:

> It provides thirty-five new subway routes, extensions and tunnels.
>
> It provides 126 miles of new subways and tunnels, in addition to 111 miles of existing city owned rapid transit lines, making a total of 237 miles.
>
> It provides 379 miles of single track (two rails) in addition to 331 miles now in use, making a total of 710 miles.
>
> It provides new rapid transit lines costing with equipment $600,000,000 (exclusive of tri-borough bridge and Staten Island tunnel) besides the city's investment of $300,000,000 in existing lines.
>
> It provides for "recapture" of 97 miles of existing subways in 1925 and 1926.
>
> It provides for immediate construction of new subways and tunnels in, through or to all boroughs.
>
> It provides the longest ride anywhere on earth for a nickel.
>
> It provides for unified city operation of all city-owned rapid transit lines on a 5-cent fare.
>
> It provides for the termination of the city's contracts with the Interborough and Brooklyn Rapid Transit.
>
> It provides a new and direct route to Coney Island.
>
> It provides complete direct routes to the new boulevard across Jamaica Bay to the Rockaways.
>
> It provides direct rapid transit routes from Washington Heights, Harlem and the Bronx to Queens, Brooklyn and Staten Island without passing through Manhattan Island.
>
> It provides for a bridge and tunnel making the north short of Long Island directly accessible to the upper part of Manhattan Island and the Bronx.
>
> It provides six new tunnels besides the one to Staten Island.
>
> It provides for immediate transit relief in all boroughs by the use of city-owned buses, until the new rapid transit lines are built.
>
> It makes every part of every borough easily accessible to every other borough at a 5-cent fare.
>
> It will add hundreds of millions of dollars each year to the assessed valuation of taxable real estate expanding the city's borrowing margin and increasing the city's annual revenues.
>
> It will induce and stimulate the construction of new residential and business buildings in all parts of the city for many years.
>
> It will spread prosperity in all boroughs.
>
> It will ultimately result in the elimination of all elevated structures and in the construction of additional underground rapid transit lines.
>
> It will ultimately result in the removal of all surface tracks, the discontinuance of surface car operation and the installation of a city-wide and city-owned bus system to be operated in conjunction with the city's new rapid transit lines.
>
> It will put an end to the illicit and unwarranted attempts of private operating companies to increase car fares in New York City.
>
> It will result in the complete elimination of strikes and incident tie-ups because it provides equitable working conditions for railway employees.
>
> It will end Wall Street manipulation and stock jobbing with city transportation securities.

Chairman McAneny of the New York Transit Commission charges that the Mayor's plan is "wholly deceptive" and meant to be so, inasmuch as the Mayor and his transit advisers must have known that the power of initiation for construction of new lines rests wholly with the Transit Commission and that the city is powerless to act without its approval. Mr. McAneny said:

> The Mayor's choice of a time for the launching of a plan, after five years of inaction and nearly a year after the appearance of the plan of the Transit Commission, suggests irresistibly that the discussion he is provoking is expected to parallel the period of the political campaign.
>
> His choice of time, of course, is a circumstance that the Transit Commission cannot alter. The commission, however, is quite prepared to enter into any discussion that the proper enlightenment of the public demands, whether now or at any other moment, and will proceed accordingly.

In criticising the financial features of the Mayor's plan Mr. McAneny declared that the Mayor has failed to include many expenditures which will add almost $200,000,000 to the estimate of $600,000,000. Some of those listed by Mr. McAneny were the cost of tearing down the elevated structures and of extinguishing the franchises for the surface lines. Although the Mayor proposes to do away with elevated and surface lines eventually, he does not take into consideration, according to Mr. McAneny, that the courts have repeatedly held that bus lines cannot parallel routes for which the surface companies hold franchises.

COMMISSION CHAIRMAN DISAGREES WITH MAYOR

The Mayor's plan said that the city's present borrowing margin was $150,000,000, and this would be sufficient for the initial expenditures. According to Mr. McAneny, however, this amount does not really exist, and if it did it is already mortgaged for present engagements, such as $35,000,000 to complete the dual subway contracts and $60,000,000 for the Staten Island tunnel. There is also $25,000,000 that the Hylan administration plans to spend for a bus system, and this amount is not included in the $600,000,000 estimate. Nor is the money for the Staten Island tunnel, or for the tri-borough bridge.

The amount needed to recapture the two lines on which the Mayor's whole plan is based was put at $60,000,000 by the Mayor a few weeks ago, but Mr. McAneny declared that this sum was only a fractional part of the sum required. The amount needed to recapture the two lines, according to the chairman of the Transit Commission, would eat up the $150,000,000 quoted as the city's present debt margin.

In reply to the Mayor's contention that adoption of his plan would mean a permanent 5-cent fare. Mr. McAneny declared it would have just the opposite effect.

The Truth About Buffalo

Brilliant Account of Issues There Written for Philadelphia Public Ledger by Its Special Correspondent

Raymond G. Carroll has placed lucidly before the people of Philadelphia through articles contributed by him to the *Ledger* of that city a complete statement of the issues involved in the Buffalo strike. Mr. Carroll writes for the *Ledger* from New York City regularly, but went to Buffalo to cover this assignment on the spot. He is a newspaper man of long training and is familiar with labor issues through many years of experience on the newspapers in New York, and with railway and commission regulatory matters through specializing on these subjects when connected with the New York *Evening World*.

Raymond Carroll is both a forceful and brilliant writer. His accounts show the human interest touch in him to be highly developed. For this reason some of the things he says appear perhaps to be overdrawn, but that is accounted for more because of the setting in which the reader finds them than because they are lacking in any of the essentials of accuracy. Mr. Carroll, for instance, does not hold the Buffalo newspapers in very high regard. It is one thing of course to say that, but it is quite another to paint the picture of a vacillating press as Mr. Carroll has done. He says:

> The leading English-language newspapers of Buffalo are largely in the hands of second-generation direction, and it has not been proved anywhere that genius is inherited.
>
> With one exception, the lake journals follow the policy of least resistance, straddle most public questions, and take no decided stand upon anything. They are lukewarm upon the best civic issues, and handle their "one-fifth Mayor," Schwab, with velvet gloves. That virtually every civic organization has denounced the street railway strike caused barely a ripple in their placid editorial unconcern over a walking multitude.
>
> The substantial citizens of Buffalo would welcome some new blood in the city's fourth estate.

The reader wonders, perhaps, how Mr. Carroll knows that Buffalo citizens would welcome such a change, but feels instinctively from what Mr. Carroll has said about the papers it would be the natural reaction of a public so supinely represented to desire a change.

Most of the story as told by Mr. Carroll is well known to readers of the *Electric Railway Journal* through the accounts of the issues of the strike that have appeared in this paper. Of the reasons for the strike as Mr. Carroll has analyzed them he says:

> "Stop Mitten at Buffalo," is the dictum of Gompers, Morrison, Mahon & Company, who fear that it will spread to other corporations than those engaged in supplying transportation. Those national leaders of organized labor do not want the toilers sharing in the profits proportionate to their effort, and participating in the management with their employers; they want toilers docile only to their edicts, paying their membership dues without a murmur, year in and year out.
>
> That is why the Buffalo strike has become a national affair, one of the most remarkable crusades in the history of capital and labor. And Mitten is going to win if he gets a square deal, and we of the telling craft are here to do what was our mission to France in the world war, "watch the boys from Pennsylvania make their objectives." If the New York newspapers don't think Philadelphia means business, let them send some really clever writers up here to talk with the lads in "the Mitten citadel."

Of politics in Buffalo Mr. Carroll says:

> One revelation of the Buffalo strike is the exposure that it has been of the fallacy of the commission form of government, a system that foists upon the taxpayers incompetent officeholders, who create what local legislation they choose, administer it as they like, and are responsible to nobody. Selected as candidates under the Direct Primary Law, the "five rulers" of Buffalo, represent a mediocrity that aghasts.
>
> The city's "one-fifth Mayor," Frank X. Schwab, is a former brewer, violently anti-prohibition, yet the votes of the East Side have put him in control of the police, fire and health departments. He had been no sooner in office than his acts demonstrated that "X," the unknown quantity in his name, stood for "organized labor." That fact gave the local minions of Gompers, Morrison, Mahon and Company their power to persuade the humble street railway workers that a strike was a sure-fire win.

Improvement Program Under Way in Southern California

A large program of improvement work is now being carried on by the Pacific Electric Lines, a large portion of which became necessary principally through franchise and legal obligation, while other improvements under way involve construction of new freight switching and freight storage sidings to take care of increased freight business, new substation in Hollywood to handle increased passenger business, rock ballasting Long Beach four-track line to place line in proper condition to handle heavy freight and passenger traffic, block signals on the Pasadena four-track short line and two interlocking plants on the La Habra-Whittier line. The estimated cost is $950,000. The following is the schedule of the improvement jobs now under way and contemplated within the next few months:

Long Beach—Four-track line on private right-of-way in Los Angeles from Ninth Street to Slauson Avenue, 2.7 miles four-track line; ballast with crushed rock.

Pasadena—North Raymond Avenue from Colorado Street to North Fair Oaks Avenue carhouse. Reconstruct and repave 1,000 ft. of double track, replacing 6-in. 72-lb. Tee rail with 7-in. 128-lb. grooved girder rail; rock ballast (mechanically tamped); renew redwood ties 6-in. x 8 x 8 ft. with creosoted Oregon fir ties; rail braces and tie plates; continuous joints; double concealed bonds; 7-in. asphalt concrete paving.

Pasadena—North Fair Oaks Avenue from Colorado Street to Walnut Street. Reconstruct and repave 1,221 ft. of double track, using the same type of construction as above on Raymond Avenue.

Los Angeles—South Hill Street from Eighth to Pico Street. Reconstruct and repave 3,158 ft. of double-track combination-gage track. Same type of reconstruction as indicated above for Pasadena jobs.

Los Angeles Harbor—Wilmington. Construct 19,842 ft. equivalent single track of freight storage trackage consisting of five freight sidings, total capacity 382 cars, using 60-lb. and 70-lb. rail. To provide additional storage facilities for freight traffic to and from the harbor.

Long Beach—Four-track line; also Long Beach double-track line; Kent Station, Dominguez Station and Abila Station. Construct three freight sidings, total length of trackage 4,674 lin.ft. of single track, total capacity 94 freight cars, using 60-lb. A.S.C.E. rail. To provide amply freight passing sidings on this line to avoid interruptions to interurban trains.

Pasadena four-track short line—Install automatic block signals between Sierra Vista and Oneonta Park, using six four-track steel signal bridges for mounting signals; 1 mile of four-track line to be block-signaled. Improvement made due to this section of the Pasadena Short Line consisting principally of long curves; signals required account increased traffic and to afford proper spacing for trains and increase safe operations.

Long Beach—American Avenue from Sixth Street to Ocean Avenue. Reconstruct and repave 2,735 ft. of double track, replacing 60-lb. A.S.C.E. rail with 7-in. 12-lb. grooved girder rail; rock ballast (mechanically tamped) renew redwood ties with 6 in. x 8 in. x 8 ft. creosoted Oregon fir ties; rail braces and tie plates; continuous joints; double concealed bonds; 7-in. asphalt concrete paving.

Los Nietos Station—Whittier line over Atchison, Topeka and Santa Fé Railway Company's San Diego Line. Install mechanical interlocking plant to provide protection for railroad grade crossing; electric interurban over steam road line.

La Habra Station—Whittier-La Habra line. Install all-electrically operated interlocking plant at railroad grade crossing of the Union Pacific System's Whittier to Fullerton new extension, where same crosses the Pacific Electric's interurban line.

Whittier line—Eyer Station-San Gabriel River. Replace 800 lin.ft. double-track pile trestle with 560 ft. common standard double-track pile trestle and four 60-ft. steel girders on concrete piers; remaining 830 ft. double-track pile trestle to be filled in. Flood control work.

Hollywood—Install Automatic Substation. Reinforced concrete fireproof structure, 1,500-kw. automatic substation machines. Also, reinforcement of transmission line between Sherman and Vineyard, approximately four miles, and construct new transmission line from Sherman to new substation at Hollywood.

Redondo Beach Resort—Install fifty floodlights to add to the attractiveness of the company's amusement structures and concessions operated at this popular resort.

Men Seek Former Wage

The petition of the employees of the Memphis (Tenn.) Street Railway to have the recent wage award of the arbitration board set aside and their former wage scale restored has been forwarded to Judge J. W. Ross at Jackson, Tenn. The petition reasserts the men's acceptance of the award as made by the arbiters and their determination to abide by their contract with the company at a sacrifice, but it is pointed out that this will mean a severe hardship upon the men's families this winter if the wage cut stands.

The officials of the company were asking a reduction in accordance with present costs of living as compared with last year. Employees were seeking an increase of 7 cents an hour over last year. For a time a strike was threatened, but this action was voted down.

Issues Order Covering Overhead Line Construction

In accordance with its Decision No. 10387, based on Case No. 1615, which involves the matter of the investigation on the commission's own motion, of the reasonableness of proposed uniform standards of overhead line construction for the State of California, the California State Railroad Commission has issued general order No. 64 covering rules for overhead line construction, which became effective July 1, 1922.

The commission was of the opinion that the application of the rules as specified in the general order would promote uniform and higher standards of construction and would insure more adequate service and greater safety to men engaged in the operation and maintenance of overhead electrical lines.

Remaining Lines to Open

International Having Established Normal Service in Buffalo Prepares to Start Up in Niagara Falls

Mitten Management, Inc., operating the local and interurban lines of the International Railway, Buffalo, N. Y., will never sign an agreement with the Amalgamated Association of Street & Electric Railway Employees of America and will continue to employ labor only on the open-shop plan, Henry W. Killeen, of Penney, Killeen & Nye, of counsel for the International, told Justice Harley N. Crosby in special term of Supreme Court. Mr. Killeen was arguing against efforts of the Buffalo Jitney Owners' Association to have the court vacate the injunction prohibiting them from operating within the city.

Justice Crosby reserved decision on the motion of the jitney drivers to vacate the injunction. Hamilton Ward, who appeared as attorney for the jitney men, is a prominent negligence lawyer in Buffalo who has conducted many suits brought against the International in accident cases.

Efforts on the part of the jitney owners to have the court appoint a referee to hear the testimony of Herbert G. Tulley, president of the International, failed when Justice Wesley C. Dudley declined to stay or modify an order previously obtained by counsel for the International restraining the examination of President Tulley by the jitney men.

Providing the municipal authorities furnish adequate police protection, local car service will be started in the city of Niagara Falls at 6 a.m. Sept. 4. It had been proposed to resume local service in Niagara Falls Aug. 28 but the city authorities were unable to guarantee sufficient police protection. The only service not being given by the company is in the cities of Niagara Falls and Lockport and on a few local lines in Buffalo where owl service has not yet been restored. On all other lines normal day and rush-hour service is being furnished.

Despite the injunctions obtained by the International restraining the operation of jitneys, hundreds of 10-cent buses are being operated unmolested by the police. Responsibility for this situation is placed squarely up to Mayor Frank X. Schwab by President Tulley. Attorney Killeen of the railway told the court that the police are willing to do their duty but "the Mayor has bedeviled them." Some arrests of jitney drivers have been made for technical violations of the traffic laws, but no driver has been charged with contempt of court for violation of the injunction of Justice Pooley.

Since the arrest of Robert C. Lacey, chairman of the board of arbitration of the Central Labor Council and former president of the organization, and five striking street car employees, members of the Amalgamated, there have been no further dynamite outrages on the local or interurban lines of the International. Previous to their arrest cars were dynamited almost nightly. Burns and Pinkerton detectives are working on the case. Local newspapers charge that the city police have so bungled the evidence and clues being obtained by private detectives that some of the union leaders against whom evidence was sought are thus far escaping detection.

Wage Hearing Concluded

The arbitrators' hearing on the question of wages to be paid by the Berkshire (Mass.) Street Railway was concluded on Aug. 25. C. Q. Richmond, general manager, told of the struggle of the company to make both ends meet. Thomas E. MacDonald, superintendent of the company, testified that fifty-five of the 300 employees own their own homes and forty of them own automobiles. Leslie Vickers, an investigator of industrial statistics, testified that living conditions were 20 per cent better than in 1914, as computed on the ratio of wages to the cost of necessaries, offering charts in evidence.

From the information submitted it appeared that, as against approximately 47, 50 and 53 cents an hour now paid to blue uniform men on two-man cars for the first, second and third years, respectively, the company proposed to pay 45, 47 and 50½ cents in renewal of the contract that expired on June 1. One-man car operators, who now receive 6⅜ cents additional to these figures, were to be paid 5 cents additional. These rates, it was stated, are the same as those established by arbitration this year for Connecticut Company employees. In lieu of these figures the men presented a demand to cover the year ending June 1, 1923, of 60 cents an hour for the first three months' service, 62½ cents an hour for the next nine months and 65 cents an hour thereafter. For operators of one-man cars 10 cents an hour additional was asked. The arbitrators will have further meetings to discuss the evidence and make a decision as soon as practicable.

Planning Other High-Speed Lines in Philadelphia

Mayor Moore of Philadelphia and President Mitten of the Philadelphia (Pa.) Rapid Transit Company recently discussed plans on the construction of other links in the network of high-speed lines for the city. The date for opening the Frankford Elevated to the public has been fixed as Nov. 5. Once the line has been placed in service, the Mayor said he would authorize the preparation of plans for the construction of other high-speed lines and among the first consideration would be the Broad Street subway, for which $25,000,000 was available. Mr. Mitten promised his aid in the building of other lines to care for the "present and coming needs of the city" and Richard Weglein, president of the City Council, pledged his co-operation.

Franchise for Hollywood Subway Grants

The Pacific Electric Railway on Aug. 18 was given formal permission to construct a subway under Bunker Hill, from the Hill Street Terminal of the company to Glendale Boulevard, in order to furnish rapid transit transportation to Hollywood and other northwestern parts of the city of Los Angeles and its suburbs. The project will represent an expenditure of $3,100,000 by the Pacific Electric Railway and will have the effect of removing all of the company's cars from Hill Street north of the company's Hill Street terminal. The Pacific Electric was the only bidder for the subway franchise at $100. It is a forty-year franchise. The engineering plans have been completed, rights-of-way for the subway have been secured, and construction work will start within a few months, officials of the company state. The City Council has instructed the city attorney to submit the necessary ordinance granting the franchise to the railway. Application for the franchise was made some months ago by the company, but the matter was thoroughly considered by the Board of Public Utilities and the Public Utilities Committee of the City Council before final action was taken.

Power Development Made Subject of Special Study

At a meeting of the executive committee of the Potomac Public Service Company, Hagerstown, Md., it was decided to install additional machinery in the plant at Millville. This step is made necessary by the great demands for power coming from all sections, and it is felt that additional generating equipment there is needed. It was brought out that the Potomac Public Service Company with all its power plants and water power, is using power to about the extent of its capacity when it is taken into consideration that a specified amount should be held in reserve to guarantee service. The remarkable growth in the power business was studied and it was felt that, as rapid as has been the demands for current the past two years, the same rate of growth can be expected for the next two years.

Urges Working Together for Railway and Personal Prosperity

All platform employees of the San Diego (Cal.) Electric Railway have been urged to show the highest possible degree of efficiency in the operation of cars and in the handling of patrons in a booklet compiled by Claus Spreckels, general manager of the property. He says that it is the aim of the company to make the railway one of the most efficient in the country and that efforts of all employees must be centered on one thing only, that of selling transportation. In conclusion he says:

> We believe the better service we give the greater will be our revenue, keeping in mind the fact that our own personal welfare and prosperity depend upon the prosperity of our car lines.

Financial and Corporate

Excellent Brooklyn Showing

Deficit of $350,857 for 1921 Converted Into Surplus of $1,765,527 in 1922

Striking improvement in the financial position of the Brooklyn (N. Y.) City Railroad is shown in the annual report of Vice-President H. H. Porter, a surplus of $291,519 replacing the deficit of $1,474,008 in the balance sheet of a year ago. Profit for the year ended June 30, 1922, aggregated $1,765,527. Announcing these figures, Mr. Porter pointed out that the value of the property of the company was greatly in excess of the capitalization of $12,000,000, and the bonded debt of $6,925,000.

The income statement appended to the report shows that the total operating revenue for the year was $11,687,750, contrasted with $10,457,171 during the corresponding period of 1921. Total operating expense was $8,450,221, as against $9,715,666. Gross income was $2,466,958, while in 1921 it was $332,832. Net income is given as $1,765,527. In 1921 this item was represented by a loss of $350,857.

BOOKS DON'T SHOW EXTENT OF IMPROVEMENTS

A note added to the condensed general balance sheet says:

> The books of the company do not reflect the additions and betterments to the property made by the Brooklyn Heights Railroad as lessee and claimed by it to have amounted to approximately $10,000,000, nor any liabilities in respect thereof, nor the claims of the Brooklyn City Railroad arising out of the termination of the lease; the amounts of these several items are in dispute.

The subway is not crowding out the surface lines as a factor of transportation, according to Mr. Porter, who says:

> The increased use of the recent subway extensions in the territory served by your company has resulted in diverting a certain amount of long-haul traffic to the subways, but any decrease in gross earnings from this cause has been more than compensated for by increased net earnings from short-haul traffic which the company has secured because of its frequent and convenient service. This is a particularly gratifying demonstration of the fact that your surface railroad is not only far from obsolete, but that it has an increasingly valuable function to perform which the public has recognized by its increased patronage.

After a thorough consideration of the report of the valuation Bureau of the New York Transit Commission, Mr. Porter declares:

> Your directors concluded that they could not recommend to the stockholders the acceptance of any of the appraisals made by the valuation bureau of the commission or the sale or disposal of the property of your company upon any basis except its present fair value.

The company maintains and operates a total of 216.92 miles of railroad on 110.2 miles of streets, and in addition owns various car houses, shops and other real estate, including the office building at 168 Montague Street and 85 Clinton Street.

The gross revenues from transportation have continued to increase during the year. This is due both to the growth of business and population in the territory served and to increased riding resulting from better service furnished by the company to the public. Operating expenses are less than during the previous year in spite of the fact that the company is, in addition to meeting all current maintenance, now engaged in the extensive reconstruction of its track system, replacing the old 94-lb. rail with new rail weighing 122 lb. per yard. During the season of 1922 it is planned to rebuild approximately 64,500 ft. of track, all of which will be laid in improved pavement.

INCOME STATEMENT OF THE BROOKLYN CITY RAILROAD

	Year Ended June 30, 1922	Year Ended June 30, 1921
Passenger revenue	$11,413,403	$10,179,968
Other car revenue	247	276
Total transportation revenue	$11,413,650	$10,180,244
Advertising and other privileges	100,004	118,393
Rent of land, buildings, etc.	127,499	115,654
Rent of tracks and terminals	46,054	41,785
Miscellaneous revenue	543	1,095
Total operating revenue	$11,687,750	$10,457,171
Operating Expenses		
Maintenance—way and structures	$1,203,973	$969,603
Maintenance—equipment	1,368,205	1,741,844
Power	986,910	1,200,983
Operation of cars	3,835,850	4,828,561
Injuries to person and property	524,310	522,859
General and miscellaneous expenses	530,973	451,816
Total operating expenses	$8,450,221	$9,715,666
Income before taxes	$3,237,529	$741,504
Taxes assignable to operation	931,521	500,515
Operating income	$2,306,008	$240,989
Non-operating income	160,950	91,843
Gross income	$2,466,958	$332,832
Income Deductions		
Interest	$428,319	$362,269
Rent of cars, tracks, etc	273,111	321,420
Total income deductions	$701,430	$683,690
Net income	$1,765,528	*$350,857

* Figures in italics denote loss.

During the year the company carried 243,538,467 passengers, an average of 667,228 passengers a day. This was an increase of 27,330,747, as compared with the previous year, or a gain of about 75,000 passengers per day. To accommodate this increased traffic the company operated 24,265,037 passenger car-miles, as compared with 23,594,065 during the previous year.

Mr. Porter warns that if municipal railway operation is carried out over the Williamsburg Bridge the Brooklyn City Railroad will cease all operation over the bridge. In his review of the affairs of the company Mr. Porter goes briefly into the history of this case as argued before the courts.

Edinburgh Tramways Shows Increase in Traffic

The report of the tramways department of the city of Edinburgh shows a total revenue for the year ended May 15, 1922, on the combined cable, bus and electric systems of £834,341, an increase over the previous year of £43,260. The number of passengers carried was 101,026,763, an increase of 3,014,881. The revenue last year was divided approximately 68 per cent cable, 22 per cent bus, and 10 per cent electric, but all the cable lines are now being converted into electric power, as previously reported in this paper. After deduction of interest, contribution to sinking fund, special expenditures and income tax, the system showed a net surplus on the year's workings of £24,571, which is considered quite satisfactory under the conditions in which the department has been operating. The revenue during the latter part of the year showed a distinct tendency to decline, due in part to slightly longer fare stages but also to prevailing bad trade. The coal strike was responsible for an increase in the cost of fuel during the early part of the year. The company owns 184 cable cars, forty-five electric cars, seventy-two single deck motor buses and fifteen char-a-bancs.

Indiana Merger Case to Be Argued in October

Oct. 4 has been set in the Indiana Supreme Court as the date for the presentation of oral arguments by attorneys on the appeal of the Indiana Public Service Commission and the Indiana Electric Corporation from the judgment of the Superior Court in Indianapolis sustaining the complaint filed some time ago by the cities of Indianapolis and Kokomo asking for an injunction to prevent the execution of the order of the commission which authorized the consolidation of seven Indiana electric, traction and gas utilities into the Indiana Electric Corporation. In setting the date for oral arguments, the court directed the attorneys for the cities of Indianapolis and Kokomo to file briefs of arguments before Sept. 4 and the attorneys for the corporation and the Public Service Commission to file their briefs before Sept. 19.

In overruling a demurrer filed to the injunction suit, the Superior Court judge said the action of the Public Service Commission in authorizing the consolidation and approving the issuance of securities for the consolidation was without authority and without force and effect. The cities, he said, have a right to maintain an action to enjoin the carrying out of the commission's order.

It was around the agitation in connection with the Kokomo case that the demand arose in political circles which threatens to manifest itself next winter in an appeal to the Legislature to amend the Public Service Commission law along the line of home rule.

Revised Plan Outlined

Pamphlet Issued Giving Details of Latest Security Exchange Proposed for Key Route

A pamphlet has been issued setting forth the latest revised plan for the reorganization of the San Francisco-Oakland Terminal Railways, Oakland, Cal. Briefly, it provides for the organization of an operating company and some subsidiaries, the stock of which shall be owned by the operating company. These companies are to succeed to the property now owned by the old companies.

The old securities, amounting to $48,879,000, have been segregated into four groups, based upon priorities of issue, security and market value and other practical considerations.

The first group includes $465,000 of bonds secured by two first mortgages on the Oakland, San Leandro & Haywards Electric Railway and the Twenty-third Avenue Electric Railway. It is proposed to exchange these, bond for bond, for new bonds with practically the same security, but maturing in 1938.

The second group consists of various first mortgage bonds and Oakland Transit Consolidated first consolidated 5 per cent bonds, amounting to $7,538,000, which will be exchanged, bond for bond, for the new operating company general and refunding 5 per cent bonds.

The third group includes $3,634,000 of junior bonds, which will be exchanged for an equal par value of the two classes of preferred shares of the new company, divided three shares of the 7 per cent cumulative prior preferred stock and one share of 7 per cent preferred stock.

The fourth group includes $3,177,000 Oakland Traction Company general consolidated 5 per cent bonds and $1,587,000 San Francisco, Oakland & San Jose Consolidated Railway general consolidated 5 per cent bonds, which will be exchanged for an equal par value of the two classes of preferred stock, one-half of each kind.

The old preferred stock now outstanding will be exchanged for the common stock of the new company on the basis of four shares of the old for one of the new. The old San Francisco-Oakland Terminal Railways common stock is wiped out entirely.

The general and refunding 6 per cent mortgage bonds, maturing in fifteen years, which are issued in exchange for old securities, will be junior to a first mortgage issue of $10,000,000, of which $2,500,000 will be issued at once, to provide cash required for the complete working out of the plan; $1,000,000 of this issue must be taken by owners of the new common stock as a condition of the issuance of that stock to them.

Old securities of $48,879,000 are thus reduced to new securities amounting to $22,163,500, which will be junior, except as to $465,000 to a $10,000,000 first mortgage. This $10,000,000 is in the nature of cash, for the reason it will pay off $703,000 equipment trust notes in cash and will provide for additions and betterments which will add to the tangible worth of the company's property.

The floating indebtedness of the old company will be paid in full and all past due coupons, except as to the bonds in the first group, are to be refunded into the new issues of bonds or preferred stock, as the case may be.

Notice was given that those depositors who deposited their bonds under the agreement of Dec. 1, 1919, and who did not withdraw their bonds on or before Aug. 20, 1922, would be deemed and treated as assenting to the new plan.

New Company Applies for Charter

The New Orleans Public Service Corporation, which has acquired, by purchase, the properties of the New Orleans Railway & Light Company, New Orleans, La., has filed application for a charter. The new company is given a nominal capitalization of $5,000, with the privilege of increasing its capital to $100,000,000. The capitalization is divided equally between preferred stock and common stock. The preferred stock holders have no voice in the management of the affairs of the company, except in regard to deferred dividends, and the stock is made redeemable by a majority vote of the holders of the common stock.

Separate Company for Small Load

The Green Bay Park Railway has been organized and incorporated to take over the property of the Bay Shore Railway, consisting of about 1½ miles of track leading from the city to a municipally owned and operated amusement park open only during the summer months.

The property was operated by the Wisconsin Public Service Company last year on contract with the owners and showed no profit, it is said, and has been more or less constantly in controversy between the owners and the city officials.

The new company was organized by Clement C. Smith, Milwaukee, and his associates, owners of the Wisconsin Public Service Company, to take over the property, when it was agreed that the transfer should be made for an amount to be fixed by the appraisal of the Wisconsin Railroad Commission. The commission has agreed to act as arbitrator and fix the value of the property. Pending the decision of the commission the line is being operated.

C. R. Phenicie, general manager of the Wisconsin Public Service Company, said that his company was not anxious to purchase the property because of its record of constant loss, but that the public seemed to expect his company to help out in the controversy between the city officials and the Bay Shore Railway. "It was thought unfair," said M. Phenicie, "to harness the Wisconsin Public Service Company with so unprofitable an enterprise and so the new company was incorporated."

Traffic Increases on Brazilian Tramways

The board of directors of the Brazilian Traction, Light & Power Company, Ltd., Brazil, S. A., has submitted its ninth annual report and accounts to the shareholders for the year ended Dec. 31, 1921, together with a report by the president on the enterprises in Brazil. The revenue of the company in Canadian currency follows:

Revenues received under contracts with subsidiary companies	$4,410,057	
Interest on investments and miscellaneous income	127,658	
		$4.537.715
General and legal expenses and administration charges	$166,465	
Interest and changes on secured gold notes and other loans	833,568	
Provision for general amortization	300,000	
		1.300.033
Net revenue		$3,237,682
Dividends on preference shares at 6 per-cent per annum		600,000
Surplus for the year		$2,637,682

The surplus revenue as shown in the table alone amounted to $2,637,682, which with the balance of $3,082,132 brought forward from 1920 gives a total of $5,719,814, which has been carried forward in profit and loss account.

The growth of the tramways service in Brazil is shown in the following figures. In 1918 there were 283,682,656 passengers carried; in 1919, 332,525,451; in 1920, 377,396,013, and in 1921, 412,176,127.

The report mentions the extensive power development which the directors have under way and which will benefit Rio de Janeiro and Sao Paulo. On the subject of new financing it is said that necessary capital requirements will be provided through the sale of securities. These requirements will include the amount necessary for the development of the hydro-electric installation at the Parahyba River just referred to and the funding of $7,500,000 6 per cent secured gold notes.

The annual meeting was addressed by E. R. Wood, a director, who told about the changes which have taken place in conditions in Brazil during the past year. In referring to the company's financing, he stated that of the $7,500,000 of company's notes maturing in December, there had already been redeemed in anticipation $2,000,000 and for the redemption of the balance the company had the necessary $5,500,000.

Deficit Changed to Surplus

For the five months ended May 31, 1922, the Nova Scotia Tramways & Power Company, Halifax, N. S., reports gross earnings of $635,552, against $653,118 for the same period in 1921. Operating expenses decreased from $579,619 for the five months of 1921, to $489,965 for the five months of 1922. The surplus for the five months period of this year was $53,685, against a deficit a year ago of $11,822.

Commission Statistics Reveal Railways' Plight in 1921

A reflection of the heavy odds against which city and suburban electric street railways in Ohio had to contend during the general business depression of the year 1921 is observed in statistics for those companies just compiled and made public by the State Public Utilities Commission at Columbus. These figures show that the city and suburban traction companies in Ohio carried 59,299,578 fewer passengers last year than they did in 1920, the total number of revenue car riders including transfer passengers for the state in 1921 being 719,242,805 as against 778,542,383 in 1920. During the past several months, however, general business conditions have picked up to such an extent that almost all of the eighteen city and suburban car companies in the State are carrying more riders than they were a year ago.

Operating revenues of the companies in 1921 decreased $1,355,066 over 1920. Operators of the properties, however, by practicing rigid economy, managed to reduce operating expenses $3,063,386 in 1921 over 1920. Of course the figures for operating expenses do not include anything for depreciation, taxes or interest on funded debt. A comparison of the revenues and expenses of the eighteen companies operating in Ohio for the two years follows:

	1921	1920
Operating revenue..	$39,383,780	$40,738,846
Operating expense..	30,630,491	33,693,877

Despite the fact that the revenue of the car companies decreased during the year, taxes for 1921 paid by these same companies increased $99,557, the taxes paid in 1921 totaling $3,047,993, while the amount in 1920 was $2,948,436.

The total investment in the city and suburban traction companies in Ohio at the beginning of this year was $110,685,740, according to the commission's figures.

Abandonment Authorized

Upon a finding that revenue is far below operating costs, the Railroad Commission of California has authorized the Sacramento Northern Railroad to suspend operation between Front and "M" Streets, Sacramento, and Headquarters Station, Yolo County.

This service was started in 1913 under an agreement whereby the West Sacramento Company was to defray the cost of operation. This company has not continued its payments and up to Feb. 1 of this year there was found to be due to the railroad $7,685.57.

In referring to objections made to the application to discontinue service the commission said:

> It is obvious from the record in this proceeding that it is impossible to continue operation without a very considerable monthly deficit and such deficit has been accumulating. Protestant, West Sacramento Company, offers no solution of the problem in that it has frankly stated, through its attorney, its inability to meet the present accrued bills and the expense of operation which would accumulate in future. This is not a matter in which any adjustment or increase in rates would offer a solution of the transportation problem, as any rate which would be assessed in volume sufficient to meet cost of operation would be prohibitive.

Financial News Notes

Line Abandoned.—The Meridian Light & Railway Company, Meridian, Miss., has been engaged in the work of taking up the tracks of the college car line extending from Highland Park north for about 1 mile. It was reported that a bus line would be substituted for the abandoned car line.

Increase in Capital Stock Authorized.—The State Corporation Commission has authorized an amendment to the charter of the Scranton & Wilkes-Barre Traction Corporation, Scranton, Pa., increasing its capital stock from $2,500,000 to $5,000,000. The headquarters of the corporation are in Richmond.

May Resume Operations.—Funds are said to have been raised to operate the defunct Norwalk-Shelby traction line with gasoline cars as soon as the tracks can be cleared. A new company has been incorporated by J. L. Baugh, Indianapolis; C. R. Irwin, North Fairfield, and others to carry out the plan.

Stock Recently Created Pays Dividend.—The United Light & Railways Company, Grand Rapids, Mich., has declared an initial dividend of 1¾ per cent on participating preferred stock and the regular quarterly dividend of 1½ per cent on the first preferred stock, both payable on Oct. 2 to stock of record of Sept. 15.

Six Months' Report Made.—For the six months ended June, 1922, the Illinois Traction Company, Peoria, Ill., reports gross earnings of $11,067,462 against $10,931,727 for the same period in 1921. After expenses and taxes a net remained of $3,290,678 against $2,846,837 for the six months ended June, 1921.

Railway Bonds on Market.—The Fletcher American Company, Indianapolis, has put on the market Gary Street Railway first mortgage 5 per cent bonds, due Oct. 1, 1937. The issue was authorized recently by the Public Service Commission. The bonds are being sold at 81 and accrued interest to yield about 7.10 per cent.

Issue Authorized.—The Interstate Commerce Commission on Aug. 11 authorized the issuance and sale of $550,000 of 4½ per cent bonds of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y. This issue was provided for in its mortgage and retained without issuance for the purpose of taking up the $550,000 of 6 per cent bonds.

Franchise Taxes Paid Under Protest.—Under protest the Washington Railway & Electric Company, Washington, D. C., has paid franchise taxes amounting to $247,808 for the year ended Dec. 31, 1921. The corporation counsel and the Washington Railway & Electric Company have not been able to agree on what constitutes the gross earnings of the company.

July Net $334,945.—For the month of July, 1922, the Brooklyn (N. Y.) Rapid Transit Company reports total operating revenues of $3,151,762, against $3,045,950 for July, 1921. Operating expenses increased from $1,950,480 in July, 1921, to $2,024,306 in July, 1922. The net income for the seventh month of this year was $334,945, against $288,570.

Abandonment Refused.—City Commissioners have refused the St. Johns Electric Company, St. Augustine, Fla., permission to suspend and abandon the operation of the trolley on the streets of the city and have instructed attorneys to protect the rights of the city under the franchise which they claim has been violated. The company has also been ordered to pay up for paving Central Avenue.

Refuses to Reopen Case.—The Indiana Public Service Commission has denied the petition of the city of Kokomo, Ind., for a reopening of the case in which the commission fixed a valuation on the property of the Indiana Railways & Light Company. At a hearing on the petition attorneys for the city contended that the valuation was too high. The valuation will be used for rate-making purposes.

Tracks Ordered Removed.—The tracks of the Tiffin & Fostoria line have been ordered removed from South Washington Street, Tiffin, by the City Council. The order is in the form of a resolution that "requests" the company to vacate the streets by April 1, 1923, and is preliminary to issuing bonds for the repair of the street. The tracks are only used for freight cars since discontinuance of city street car service there. Removing the tracks will force the company to move its freight depot, now at the south end of city.

Kansas Properties Reorganized.—The Kansas Electric Power Company, Lawrence, Kan., has been organized as the successor to the Kansas Electric Utilities Company, the Leavenworth Light, Heat & Power Company and the Bonner Electric & Manufacturing Company. It is controlled by the Consolidated Utilities Company. It owns all the capital stock of the Miami Valley Electric Company, Sidney, Ohio; the Union City (Ind.) Electric Company and the United Lighting Company of Albion, Pa. The Kansas Electric Power Company is operated by the Albert Emanuel Company, New York, N. Y. The following officers have been elected: President and general manager, Albert Emanuel, New York; vice-president, Victor Emanuel, New York; R. F. Rice, Lawrence; treasurer, C. B. Ziegler, New York; auditor, J. W. Pierce, Leavenworth; chief engineer, D. O. Vaughn, Leavenworth; managers, J. T. Skinner, Lawrence, and T. T. Parker, Emporia.

Traffic and Transportation

Discontinuance of Freight Facilities Results in Hardship

A petition has been presented to the Public Service Commission of Pennsylvania by the Allentown Chamber of Commerce asking that trolley freight service between Philadelphia and Allentown over the Philadelphia & Western and Lehigh Valley Transit Company be restored. Discontinuance of this service was allowed by the Public Service Commission on June 1 upon petition of the Philadelphia Rapid Transit Company, but loss of these facilities has not only resulted in the diversion of much freight from Philadelphia but is working a hardship among wholesale and retail dealers at Allentown, the Chamber of Commerce contends. Nearly all the fruit and produce for Allentown was shipped via the trolley lines, but since the service was discontinued many dealers are buying from the New York markets. A hearing on the matter will be given in the early fall.

Better Service Promised

General Superintendent Purinton of the Atlantic City & Shore Railroad Company has accepted the proposals submitted by Public Utility Commissioner Harry Bacharach to give Ventnor and Margate City better trolley service. Under the arrangement through service is to be established to Ventnor and Margate from the Inlet, Atlantic City, for the single 7-cent fare. The company will be permitted to continue a cut-off at Jackson Avenue, the boundary between Atlantic City and Ventnor, but will grant transfers whenever passengers desire to proceed farther south. More cars are also promised.

Residents of Ventnor City recently circulated petitions asking the Board of Public Utility Commissioners to probe the service and double fare of the Atlantic City & Shore Railroad, operators of the only trolley system on the island. Since last March Ventnor City and the railway management have been endeavoring to get together on some agreement that would give Ventnor adequate service.

Solves Problem by Operating Supplementary Bus Service

In an effort to put an end to the jitney problem in Tulsa the Tulsa (Okla.) Street Railway has put several passenger buses in operation as a supplement to its electric railway service. B. Hilburn, general manager of the company, who recently announced that in addition to the six 16-passenger buses received from Lima, he would purchase three more 25-passenger buses, said that the use of the buses was practical when co-ordinated with the railway. In a letter to the Public Utility Information Bureau he stressed the part that buses would play in future city transportation, but said that they would serve all interests best when operated in connection with the electric railways.

Jitney operation in Tulsa has been instrumental in retarding the progress of the railway property. This year the city administration agreed to eliminate jitney service on the East Sixth Street line and to eliminate a new bus line which paralleled the Kendall line of the Tulsa Railway for practically the entire length of the line. An arrangement was made whereby the Tulsa Street Railway was to operate buses on these lines, supplemental to its street car service, and on July 1 the company put into operation four twenty-five-passenger buses. On July 25 the company added one more twenty-five-passenger bus. These buses are operating on a schedule of nine minutes in the light part of the day, and seven minutes during the rush hours. By Oct. 1 the company expects to have sixteen passenger buses in service in Tulsa.

Duluth Case in Courts

Railway Authorized by Court to Charge Six-Cent Fare, but Must Issue Rebate Slips—Digest of Decision of Commission in the Rate Case Affecting the Duluth Street Railway

ALTHOUGH the Duluth (Minn.) Street Railway has been granted the right to collect a straight 6-cent fare by the Federal Court, it has been ordered by the same court to issue a rebate coupon for 5 cents with each six tickets purchased by a patron. The coupons are to be redeemable only in the event that the United States Supreme Court reverses the United States District Court's order granting the straight 6-cent fare. The company must be ready to comply with the rebate coupon order on Sept. 7, when it goes into effect.

The order for the rebate coupons was in the form of an amendment to the interlocutory injunction issued on July 31, placing the flat 6-cent rate in effect in Duluth on Aug. 1. City Attorney John B. Richards petitioned the court for the rebate coupons and Federal Judges Walter Sanborn, W. F. Booth and Martin J. Wade granted his application. The city is now preparing to appeal to the United States Supreme Court from the interlocutory injunction granting the 6-cent rate. The papers will be filed within a few days.

The original request was for an increase in fares from 5 to 7 cents, with four tokens for a quarter, but the order of the commission provided for a 6-cent fare and five tokens for a quarter. In obtaining an injunction, which the company now wishes to make permanent, it claims that a 6-cent fare, with five tokens for a quarter, will give no relief at all and would eventually cause the confiscation of its property.

The history of the case is reviewed by the commission in the decision which it handed down in passing upon the fare application. It is explained that pursuant to provisions of chapter 278 of the laws of 1921 the city of Duluth caused the property of the petitioner to be examined and appraised and submitted such appraisal as a part of the record in this case to the commission for its consideration. The representatives of the city and the company in many respects agreed upon the inventory and appraisal submitted. The property was appraised upon four different bases as follows:

Upon the cost of reproduction of the property based upon 1915 prices.

Upon the cost of reproduction of the property based upon the average of prices for ten years ending July 1, 1921.

Upon reproduction cost based on prices as of July 1, 1921, and

Upon a reproduction cost based upon units used in the actual construction of the property, or an investment basis.

The engineers representing the city and the company further agreed upon an inventory of the property and the appraisal, this inventory, so far as it affects all the physical property, excepting land, working capital, general overheads (engineering and superintendence, administration, organization and legal expenses), taxes during construction, interest during construction and cost of financing, development costs or going concern value, cost of power contract and accrued depreciation or present per cent condition of the property.

The agreed figures of the physical property, with the above exclusions, undepreciated, were as follows:

1915 prices, $3,488,161.
Ten year average, $4,864,437.
1921 costs, $6,308,966.
Reproduction or investment basis, $3,487,020.

The attitude of the commission was that these figures demonstrated that there had been an increase in replacement costs for this property, that at the present time all things were on a higher cost basis than that in existence during the period of construction of this property, and that there was an appreciation in value to be reflected in the final value for rate-making purposes.

The city and company also introduced figures to represent estimated cost of reproducing the property on the investment basis, or, in other words, to build up a figure to represent the original investment of the property as it exists at present. The city presented a total figure, undepreciated, of $4,504,638, while the company claimed $6,336,093. The investment account of the company, as of July 1, 1921, showed approximately $4,800,000.

According to the commission an analysis of the investment account showed that there was included therein money placed in the property in the early days of the company which had either been retired or had become obsolete, so that the present investment account contained the cost of certain items discussed by the commission under "Going concern value" and disallowed by the commission.

In connection with its claims the company set up a value of $150,735 for land. The city, through its assessor, placed a value on these lands of $118,094. The commission, however, found the fair value of the land to be $140,000.

Going Concern and Other Issues

The city and the company agreed upon the amount invested in materials and supplies to be $105,787. The balance of the working capital to be allowed was disputed, the company claiming $87,312 and the city allowing $24,213. Mr. Drum, the company's engineer, based his estimate upon an average of one-half month's current operating expenses and six months' capital expenses based on the year 1920. The one-half of capital expenditures amounted to $32,775. The attitude of the commission was that the company should be allowed $30,000 as a reasonable amount for working capital. The contention of the city was that as some of the general overheads were included in the unit prices, the balance of overheads should be less than 15 per cent. The company's engineer submitted specific amounts for each of the general overheads enumerated and not included in the original units used, his total varying from 18 to 20 per cent, depending upon basis of valuation.

After receiving the evidence the commission found that a reasonable allowance for general overheads was as follows:

> Engineering and superintendence, 5 per cent; administration, organization and legal expenses, 2 per cent; taxes during construction, 2 per cent; interest during construction, 5 per cent; or a total of 14 per cent on the physical inventory of the property for these items.

The company maintained that to the value of the property, including physical value, materials and supplies, general overhead and working capital, there should be added the sum of 5 per cent as a cost of financing. The city contended that the cost of financing should be considered in determining the rate of return. The attitude of the commission on this point was that, over a long period of years with changing relationships between stock issues and other security issues, the most practical method of providing for the cost of financing, in this case, was by giving due credit for such costs in the rate of return allowed upon the fair value of the property.

On the matter of going concern value the disposition of the commission was to recognize the principle that a utility in the determination of its fair value for rate-making purposes should have included what has been termed as going concern value. The company contended for an addition to the physical value of the present property sums aggregating $693,688 for expenditures or investments in property not now in existence. On this issue the commission said:

> It is a well-established practice, based on sound economics, that reserves should be established to provide for the replacement of property either destroyed or become obsolete due to development of the area. If the company failed to build up reserves from the so-called horse car period, which ended in 1890, any loss due to the change in the property should have been amortized in the immediately succeeding years. This statement also applies to each of the succeeding items claimed by the company. To capitalize such items at the present time would incorporate in the property a fictitious value, which has long since ceased to exist.

The commission quoted the famous Galveston case in connection with the claims made by the company for the cost of unifying the system and the loss of interest during operation. In analyzing all of these factors the commission found $500,000 to be a reasonable value to be added to the physical value of the property of the railway, in order to make said property an operating system.

Value Fixed at $5,375,000

In summary, the commission found that the fair value of the property of the railway undepreciated, was $5,375,000.

The company arrived at a condition per cent of the property averaging for the four bases of value presented of 86.02 per cent, while the city used 83.57 per cent. The commission found that the present condition precentage of the property was approximately 83 per cent and that this condition per cent of the property, in order to arrive at the present value, should be applied to the items including physical plant, less lands and plus the general overheads allowed.

The commission found that as of July 1, 1921, the fair value of the property was $4,593,000, summarized as follows:

Physical property undepreciated..	$3,940,000
Excluding land—	
General overheads	550,000
Power contract	110,000
	$4,600,000
Depreciated value..............	$3,818,000
Lands	140,000
Working capital, materials and supplies	135,000
Going concern	500,000
	$4,593,000

The company contended for a rate of return not less than 8 per cent upon the fair value of the property as found by the commission. This claim was based upon expert testimony as to the going rate of interest and cost of financing of utility properties during the year 1921 experience and immediately preceding years.

The opinion of the commission was that the current rate of interest had materially declined and that a return of 7½ per cent was reasonable and would produce sufficient revenue to finance the company properly.

In determination of a rate of fare to be charged the commission found that there was a large class of riders who were the daily patrons of the company and produced a very large portion of the revenue. The remaining patrons of the company were transients within the city or individuals who rode occasionally. It was the opinion of the commission that the daily patrons and supporters of the railway who find it necessary to patronize the company going from their home to their work, should have as low a fare as is possible and still maintain the company in a position to furnish reasonable service. The commission therefore found that a 6-cent cash fare, together with tickets or tokens to be sold five for 25 cents, were just, fair and reasonable rates and would yield only a reasonable return upon the fair value of the property. In conclusion the commission said:

> Therefore, it is ordered, That the commission finds that the fair value of the property of the Duluth Street Railway within the city of Duluth, used and useful in giving service as of Dec. 31, 1921, is $4,599,978.
>
> Second, That the Duluth Street Railway is hereby authorized to charge for its service in the transportation of passengers within the city of Duluth, 6 cents cash fare, and shall issue tickets or tokens good for rides on its said lines within the city of Duluth and charge therefor not to exceed 25 cents for five rides, effective Aug. 1, 1922.

Suspension of Increased Rates Ordered

The Public Service Commission has ordered a further suspension in the increased tariffs of passenger fares on the interurban and Niagara Falls and Lockport city lines of the International Railway, Buffalo, N. Y. The increases were to have gone into effect on Aug. 30. The tariffs thus further suspended provided for increasing the city fares in Niagara Falls and Lockport from 5 to 7 cents or four tokens for 25 cents; in Tonawanda and North Tonawanda to 10 cents, and the price of books for single-trip tickets between Niagara Falls and LaSalle would have been increased from $1 to $1.50.

Railway Transports Autos When Roads Are Bad

The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has discontinued for the time being the "automobile ferry" service on the Lake Shore highway between Whitehouse, N. Y., through Ripley to a point east of the Twenty Mile Creek hill. According to the company the roads are now passable, but whenever they get in bad shape the railway puts flat cars in service to transport autos. The service was made available to motorists by the traction company at the request of the Erie (Pa.) Automobile Club.

The haul is about 6 miles and the charge is $5 for each machine regardless of size. The service is performed each way every hour. The railway uses a motor work car with a flat car attached and can handle four autos at one time. As many as thirty-one autos have been handled in one day.

Weekly Pass on Pacific Electric Railway

The weekly transferable pass for street car rides has been approved by the California Railroad Commission. The first tryout of the plan in California will be in the cities of Riverside and Pomona. The new form of fare, popularly known as a pass, will cost $1 and will entitle the holder to an unlimited number of rides during the seven-day period for which it is issued. By an order of the commission, the Pacific Electric Railway Company, Los Angeles, was authorized on Aug. 21 to put into effect such a fare in the cities named. The pass will be good for each week beginning Monday and ending the following Sunday.

In approving the system for Riverside and Pomona, the commission said:

> During the past few years the local street car lines of the Pacific Electric in Riverside and Pomona have not been making operating expenses, taxes and depreciation and part of the time the service has been conducted at an operating loss. The fare originally was 5 cents; this was increased to 6 cents several years ago, and on Jan. 1, 1921, the single fare was increased to 10 cents, with a special book of seven tickets for 50 cents. Under none of these fare schemes has the street car line been a financial success. If the present scheme does not produce sufficient revenue to continue operation of the lines, it would seem apparent that relief must be secured from other than the car rider, or the lines will eventually be abandoned. The railroad hopes there will be enough purchasers of the $1 weekly ticket to secure revenue to pay at least the operating expenses, taxes and depreciation.

Five-Cent Fare Last Resort

The municipal railway of Miami, Fla,. on Sept. 1 replaced the 10-cent fare that has been in force with a 5-cent fare. The decision to this effect was reached by the City Commission at its meeting on Aug. 29. The system has been operated at a loss for some time, and a weekly pass for $1.25 good for rides all week failed to bolster up the revenue. Mayor Leffler estimates that the 5-cent fare will triple the traffic.

The Miami Beach Electric Company, operating the railway from Miami to Miami Beach and run at a loss for several months, was granted at the same time a rental reduction for the use of the system and rolling stock owned by the city of Miami, the reduction being from $500 a month to $1 a month. During the winter the Miami Beach cars are well patronized, but the summer season finds them empty. This rental reduction will run from June 1, 1922, to July 1, 1923. It was reported that the deficit for the past four months has been $9,000. In addition the company has damage suits totaling $75,000 against it the outcome of which is uncertain. The cars are expected to maintain a ten-minute schedule.

Various means were suggested to relieve the situation before the present fare reduction and rental reduction were agreed upon, one of them being a rebate on the rental to be based on the monthly loss. It was pointed out by City Attorney A. J. Rose that this would not be legal since it would carry with it liability in the case of accident. At the same meeting a jitney ordinance was framed which will prohibit jitneys from takng on or discharging passengers within 50 ft. of the six main busy downtown street intersections. It is hoped that this will eliminate some of the jitney competition.

Records Prove Trainmen Are Careful

Indicating that their minds are on their work, trainmen of the Pacific Electric Railway, Los Angeles, Cal., during July, 1922, were subjected to 2,998 "surprise signal tests" and records show that 99.4 per cent of the tests made were observed and proper safety action taken. These tests are made as a safety measure for the purpose of determining whether or not trainmen are living up to rules and regulations governing the safe operation of trains. Without warning a train crew is confronted with or hears a safety signal in the form of fuses, torpedo, flag, lantern, switch light or interlocking signal. Tests checking the speed over intersections and within restricted speed limits are also made. In the event of failure to comply with existing instructions, the crew member who is delinquent in his duty is disciplined by demerits against his record, or dismissal may follow.

Reports of these tests are compiled monthly and record of test on each individual conductor and motorman is kept to date. By announcing the record of each division monthly keen rivalry is created. The tests made by the Pacific Electric are similar to those made on railroads throughout the United States and have been made by the company on its lines in southern California with increasing regularity since August, 1911.

D. W. Pontius, vice-president and general manager of the railway, was very proud of his company's record. He stated that in 1921 a total of 105,000,000 passengers were handled by the Pacific Electric without a single fatility and that to date in 1922 this record had been maintained.

Accident on Hudson & Manhattan Road

A rear-end collision on the Hudson & Manhattan Railroad on the morning of Aug. 31 is reported to have resulted in the injury to twenty passengers. The accident occurred on the tracks of the Pennsylvania Railroad at a point about a mile east of Manhattan Transfer near Newark, N. J., and at the drawbridge across the Passaic River. The leading train was forced to stop due to the opening of drawbridge and in the heavy fog the motorman of the second train failed to see his danger until too close to prevent the accident.

The rear car of the leading train and the forward car of the rear train were reported badly twisted and buckled. The steel construction undoubtedly was responsible for the small number of injured persons as the accident occurred just at the close of the morning rush hour.

Transportation News Notes

Will Improve Service.—As a result of a request of the West Norristown Improvement Association the Reading (Pa.) Transit Company, has agreed to improve its trolley service to Jeffersonville. Trolleys will now run between Norristown to Jeffersonville only, in addition to the other service.

Hearing on Lower Fare Concluded.—The hearing on half fares for school children travelling on the lines of the Georgia Railway & Power Company, Atlanta, Ga., has been concluded. Both sides namely, the City Council with the Board of Education and the Georgia Railway have been allowed thirty days for the filing of briefs.

Railway and Bus Rates the Same.—The Union Traction Company has announced a reduction in fares between Noblesville and Indianapolis and Carmel and Indianapolis. The fare for the round trip between Noblesville and Indianapolis has been cut from $1.44 to 90 cents, and the fare for the round trip between Carmel and Indianapolis has been reduced from 90 cents to 50 cents. The fares on the interurban are now the same as those the bus lines are charging.

Towers Prove Successful.—Due to the excellent results that have been obtained in controlling traffic from street towers in the more congested districts of downtown Atlanta, Frank Lee Butler, general operating manager of the Georgia Railway & Power Company, conferred recently with Mayor James L. Key advocating the construction of traffic towers at all of the important street intersections in the business district of the city. In some places the signal light system is used but it is operated by policemen who stand on the sidewalk, and it is believed that the construction of traffic towers will serve to increase the efficiency in controlling the congestion at these points.

Rerouting Changes Partly Approved.—While the Cincinnati (Ohio) Traction Company has accepted the rerouting ordinances recently passed in that city, it does not favor the arrangement in regard to certain lines, according to W. Kelsey Schoepf, president, who also said that the traction company accepted the ordinances to simplify matters. In a letter to the Council, Mr. Schoepf said that he hoped that body would again study the rerouting situation and repeal the ordinance affecting the Avondale, Winton Place and Auburn Avenue lines. The rerouting of these three lines around the Government Building, Mr. Schoepf said, would undo all the good and outweigh the saving anticipated to be made by the rerouting program as originally contemplated.

Personal Mention

Railway Man and Financier as Author

"It is the greatest book on wealth ever written. Beside it Adam Smith's 'Wealth of Nations' is mud." These are the characterizations applied by C. W. Barron, publisher of the *Wall Street Journal*, to the volume "The Things that Are Caesar's," written by a man well known to electric railway operators everywhere, but particularly well known to operators in the Central West. Mr. Barron is not loath to use strong words in editorials when the occasion demands, but the work of the author must, indeed, possess unusual merit to provoke such commendation.

The author of "The Things that Are Caesar's" is Guy Morrison Walker. Mr. Walker's interest in utilities is at present mostly academic, but he will be remembered as an operator of unusual ability and a financier who won a national reputation for himself largely through his handling of the Everett-Moore reorganization as special counsel and for his work in connection with the reorganization of the Columbus, Delaware & Marion Railway, Detroit & Toledo Short Line, the Pittsburgh Railway & Light Company and other properties. He has been a frequent contributor in the past to magazines and other publications on financial and economic topics, drawing his lessons largely from a fund of personal experience that has covered nearly all branches of finance.

One may or may not agree with the comparison made by Mr. Barron between "The Wealth of Nations" and "The Things that Are Caesar's," but there can be no doubting that Mr. Walker's experience as financier and journalist has been such as to make it well within the realm of reason that Mr. Barron's estimate is correct that Mr. Walker's book is the "clearest elementary presentation that has ever been written concerning the progress of the world and uplift of labor by capital and its earnings and accumulations."

H. O. Marler, J. A. Birmingham and E. H. Sharpe Advanced

On Aug. 1 H. O. Marler was appointed to the newly created position of assistant to O. A. Smith, passenger traffic manager of the Pacific Electric Railway, Los Angeles, Cal. Mr. Marler retains his former supervision of service and solicitation and assumes supervision of the passenger traffic department in the absence of Mr. Smith. Mr. Marler had previously acted in the capacity of general agent of the passenger department of the company.

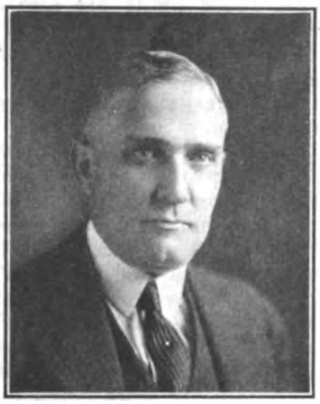
At the same time J. A. Birmingham, traveling passenger agent, was appointed manager of motor bus service. This is a newly created position for the direct supervision of the several motor bus feeder lines recently installed in various cities by the company.

E. H. Sharpe, general agent of the passenger department, has been appointed special representative, executive department. A "bureau of news" has also been created, of which Mr. Sharpe will have charge.

Walter Shroyer Succeeds W. H. Forse

Walter Shroyer has been appointed treasurer of the Union Traction Company of Indiana, Anderson, to succeed W. H. Forse, who resigned on June 1. Mr. Shroyer has been auditor of the company since 1906.

This new treasurer has already made a wide record, for while he has been auditor of the Union Traction Company he has held several posts in railway organizations. In 1912 he was president of the Central Electric Railway Accountants' Association. This association does invaluable work in keeping railway accounting up to date, and the president of it must be on the *qui vive* every moment to know what others are doing, and in addition, to work out new things for them to do.


WALTER SHROYER

Mr. Shroyer also was a member of the executive council of the American Electric Railway Association for one year and has served on several other committees of the organization.

Since 1899 Mr. Shroyer has been with the Union Traction Company. His first title was cashier of the Muncie station, but it took no time at all for him to change this for the next higher, and the next, until in 1906 he was auditor of the company. On Aug. 15 came his recent promotion to the position of secretary.

Charles Gail is now superintendent of equipment of the Hamburg (N. Y.) Railway.

Mr. Shryock Promoted

E. O. Shryock has been appointed manager of the Zanesville street railway lines and the Zanesville Light, Heat & Power Company, according to an announcement on Aug. 25 by General Manager John S. Bleecker of the Columbus, Newark & Zanesville Electric Railway, Columbus, Ohio, which owns the Zanesville property. Mr. Shryock succeeds B. S. Watters, who resigned effective Sept. 1.

Mr. Shryock has been superintendent since June of this year. At that time he resigned as superintendent of railways of the Northeastern Ohio Railway & Power Company, Oak Harbor, Ohio. He had been with that company since 1913.

I. D. Brown is now claim agent of the Wichita Falls (Tex.) Traction Company, filling the post formerly held by A. W. Allen.

A. J. Mello has been appointed purchasing agent of the San Diego & Arizona Railway, San Diego, Cal., to fill the position formerly held by S. P. Howard.

W. W. Arnett is now commercial engineer of the Monongahela Power & Railway Company, Fairmont, W. Va. F. McQuillan formerly held this position.

C. H. Smith has been made superintendent of the Jackson city lines of the Michigan United Railways. He fills the post held formerly by J. A. Rosenberger.

W. M. Birkett, who has been assistant general manager of the Washington Water Power Company, Spokane, Wash., has been made general manager. W. E. Coman was formerly general manager and a vice-president of the company. R. A. Willson succeeds Mr. Birkett as assistant general manager. He had previously been superintendent of railway. C. R. Stiles is superintendent.

Obituary

Millard F. Skouden, superintendent of motive power at Anderson, Ind., for the Union Traction Company of Indiana, died recently. He had been ill for several weeks. Mr. Skouden had been connected with the traction company about twenty years and his record had attracted much attention. He started as a car repairer and would assist in scrubbing cars to get them out of the shops on time. His friends and former fellow employees are recalling how closely he studied all work to which he was assigned and also took technical courses during leisure hours. He was steadily promoted through various departments to the general offices and then was made the motive power superintendent, in charge of the motive power on more than 400 miles of track.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Priorities Announcement Made

Action Taken at Washington Considered of Much Importance to All Utilities —Output Outlook Bettered Materially—Details of Interstate Commerce Commission Ruling

OFFICIAL action considered of far-reaching importance to the country's public utilities was taken on Aug. 29 when the Interstate Commerce Commission issued amendment No. 4 to service order No. 23, which restricts Class 1 priorities on coal to such extraordinary cases as may be designated from time to time by the commission. Coal intended for emergency uses generally is included in Class 2 priority. Owing to the limited time during which lake transportation will be available, shipments of certain coal for the Northwest to the lower lake ports will be made under Class 1 priorities. As amended service order No. 23 now provides for priorities as follows:

> That in the supply of cars to mines upon the lines of any coal-loading carrier, such carrier is hereby authorized and directed to place, furnish, and assign such coal mines with cars suitable for the loading and transportation of coal in succession as may be required for the following classes of purposes, and in the following order of classes:
>
> Class 1. For such special purposes as may from time to time be specially designated by the commission or its agent therefor. In designating special purposes under this reservation, the commission or its agent will designate the class of relative priority which such special purpose or particular shipment or shipments shall receive.
>
> Class 2. For fuel for railroads and other common carriers, and for bunkering ships and vessels; for public utilities which directly serve the general public under a franchise therefor, with street and interurban railways, electric power and light, gas, water and sewer works, ice plants which directly serve the public generally with ice, or supply refrigeration for human foodstuffs; hospitals; for the manufacture and production of foodstuffs and medicines, and for the manufacture of containers therefor; for the United States, state, county or municipal governments, and for their hospitals, schools, and other public institutions—all to the end that the foregoing may be kept supplied with coal for current use for such purposes, but not for storage, exchange or sale; for bituminous coal consigned to a pool or pools of lake cargo or bunkerage coal at any port upon Lake Erie for trans-shipment by water to ports above Lake Erie; bituminous or anthracite coal or coke for household use and for the heating of buildings. It is not intended by this paragraph to give any priority as between the classes of persons and uses mentioned herein.
>
> Class 3. Other purposes.
>
> No coal embraced in classes one or two shall be subject to reconsignment or diversion except for some purpose in the same class or a superior class in the order of priority herein prescribed.

The immediate administration of the priorities was vested in agents of the commission as follows: John C. Roth, E. H. Degroot, Frank C. Smith, S. J. Mayhood, B. S. Robertson, C. C. Semple, W. L. Barry, O. S. Reynolds, H. M. Priest, J. B. Ford, John T. Marchand, J. A. Emmart, W. L. Lloyd, A. R. Layman, Delvert Garman, F. F. Engles, L. P. Green, T. L. Stevens, C. J. Bailey, C. D. Thomas, W. S. Rice, W. D. Anderson, W. B. Moore, J. Patterson, J. F. Stewart, John E. Barr, William J. Kiniry, T. J. Davis, T. F. Sullivan. The three agents named first are the director, the assistant director and the chief inspector of the Bureau of Service of the Interstate Commerce Commission.

The issuance of this amendment brings the situation back to that which existed when J. W. Lieb issued his first circular to the public utilities. It is expected to correct the evils arising under federal fuel distribution which was cutting off a large number of public utilities from their regular fuel supply, leaving them in an emergency class and compelling them to buy coal at prices greatly in excess of their contracts.

Reports reaching Washington indicate that the public utilities are getting their share of the increased volume of coal being produced, but owing to the fact that reserves have been so generally used up, the situation of large number of public utilities will continue to be serious for some weeks to come, particularly since they are not allowed to build up stocks and because of the uncertainty of transportation.

Coal Age says that as production increases with mines opening under the Cleveland wage agreement more coal is beginning to flow in its accustomed grooves. Much of the output is still going on priority orders, but the heavier production has permitted contract shippers to again supply some of their regular trade. Additional production of mines opening up under the Cleveland agreement has caused a sharp upturn to the daily output. According to the Geological Survey, an output of at least 6,000,000 tons for last week (Aug. 21-26) is assured by early reports, and additional tonnage from other districts that are known to have signed the agreement may raise the total to 6,250,000 tons.

£509,258 Profit for British T-H. Company

The report of directors of the British Thomson-Houston Company for 1921 shows that the profits were £509,258. Dividends of 7 per cent on the preference shares and 6 per cent on the ordinary shares were declared. H. C. Levis, chairman of the company, stated at the annual meeting on May 30 that the output in 1921 was the greatest in the history of the company. Notwithstanding the general depression throughout the country, the volume of orders received by the company this year to date was over 37 per cent in excess of the orders received for the corresponding period of 1921. The company now has on hand orders to the value of over £2,250,000. A day or two after the meeting particulars were announced of an issue being placed privately of 7 per cent preference shares of the company.

ELECTRIC RAILWAY MATERIAL PRICES—AUGUST 29, 1922

Metals—New York

Copper, electrolytic, cents per lb	13.875
Lead, cents per lb	5.90
Nickel, cents per lb	39.00
Zinc, cents per lb	6.575
Tin, Straits, cents per lb	32.375
Aluminum, 98 to 99 per cent, cents per lb	19.10
Babbitt metal, warehouse, cents per lb.:	
Fair grade	24.50
Commercial	11.125

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$9.00
Somerset mine run, Boston	6.00
Pittsburgh mine run, Pittsburgh	....
Franklin, Ill., screenings, Chicago	4.25
Central, Ill., screenings, Chicago	4.45
Kansas Screenings, Kansas City	2.875

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$38.00
Standard open hearth rails, gross ton	$38.00
Railroad spikes, drive, Pittsburgh base, cents per lb	2.75
Tie plates (flat type), cents per lb	2.25
Angle bars, cents per lb	2.40
Rail bolts and nuts, Pittsburgh base, cents, lb.	3.625
Steel bars, cents per lb	2.625
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	1.35

Hardware—Pittsburgh

Wire nails, base per keg	2.50
Sheet iron, (24 gage), cents per lb	4.375
Sheet iron, galvanized, (24 gage), cents per lb	5.025
Galvanized barbed wire, cents per lb	3.10
Galvanized wire, ordinary, cents per lb	2.80

Waste—New York

Waste, wool, cents per lb	15.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	14.00
Colored	12.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	91.50
White lead, (100 lb. keg), cents per lb	12.50
Turpentine, (bbl. lots), per gal	$1.235
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength, all sizes, A quality), discount*	85.0%
Putty, 5 lb. tins, cents per lb	5.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	15.625
Rubber-covered wire, cents per lb	6.05
Weatherproof wire base, cents per lb	16.00

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd	$3.20
Common, per sq.yd	3.00
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.17
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	2.05
Gravel, ¾-in., cu.yd., N. Y	1.75
Sand, cu.yd., N. Y	1.00

Old Metals—New York

Heavy copper, cents per lb	9.37½
Light copper, cents per lb	9.25
Heavy brass, cents per lb	6.25
Zinc, old scrap, cents per lb	3.25
Yellow brass, cents per lb (heavy)	6.50
Lead, heavy, cents per lb	4.50
Steel car axles, Chicago, net ton	$18.75
Old car wheels, Chicago, gross ton	22.75
Rails (short), Chicago, gross ton	13.75
Rails (relaying), Chicago, gross ton	[illegible]
Machine turnings, Chicago, net ton	[illegible]

Some time ago the International General Electric Company, New York, accepted from the British Thomson-Houston Company 7 per cent (tax free) preference shares to the amount of £1,500,000 in settlement of outstanding liabilities in the form of notes, and it was 1,000,000 of these shares which were now being resold. They were placed privately on the basis of 19s. 6d. per share.

Nine-Story Addition to Ticket Plant

The Globe Ticket Company, Twelfth and Appletree Streets, Philadelphia, has purchased adjoining properties on Twelfth Street and Cherry Street and has had plans drawn for a nine-story addition to its present eight-story structure. It is expected ground will be broken in October.

The company reports the plant working at capacity, with an annual output of more than 5,000,000,000 theater and trolley tickets and transfers.

The company recently completed an order for 500,000,000 tickets for one trolley company, which immediately ordered an additional 50,000,000. Another public utility company receives three carloads of tickets from the Globe company each month. It is also working on an order for 100,000,000 transfers for a Mid-West electric railway.

Street railway and trolley tickets printed at the Philadelphia plant are used in virtually all countries of South America, in Porto Rica, the Philippine Islands, Cuba and the British West Indies. Recently an order for both classes of tickets was filled for Shanghai, China.

Track and Roadway

Shenango Valley Traction Company, Youngstown, Ohio, has about completed the laying of a double-track car line between Sharon and Farrell.

Rochester & Syracuse Railroad, Syracuse, N. Y., is preparing to lay new tracks along its route in Lyons, N. Y. New poles have already been put up.

Northern Texas Traction Company, Fort Worth, Tex., has begun work on the extension on Bowie Street from Hemphill to South Adams. Petition for an injunction to restrain the company from building this line was denied by Judge R. E. L. Ray.

New York, N. Y., Transit Commission has directed its chief engineer to prepare plans and form of contract for the construction of an extension of the Fourth Avenue subway in Brooklyn from its present terminus at Eighty-sixth Street to Fort Hamilton. The project, including the Brooklyn extension, the tunnel and a supplemental ferry run will cost about $20,000,000.

Cincinnati, Ohio.—Change in the plans for the Cincinnati extension of the Rushville line of the Indianapolis & Cincinnati Traction Company, which would give the line an entrance to Cincinnati by way of College Hill on the north instead of Miamitown on the west, as originally proposed, has been announced by C. L. Henry, president of the road. The new route, Mr. Henry says, will effect a big saving for the company, as an entrance through Miamitown would necessitate the building of a high grade crossing because of the nature of the territory in that section. The proposed extension is the major element in a $4,000,000 development project, which calls for the building of 64 miles of main line, in addition to the necessary spurs, between Rushville and College Hill and the equipment of the system for direct-current operation.

Rolling Stock

Wisconsin Public Service Company, Green Bay, Wis., recently ordered five interurban cars from the St. Louis Car Company. It was incorrectly stated in the Aug. 26 issue of these columns that the Eastern Wisconsin Electric Company had placed such an order. This company is considering the purchase of a like number of cars but has not yet placed its order.

The Dayton & Troy Electric Railway, Dayton, Ohio, has purchased from the City Railway of Dayton, ten single-truck cars which are being converted into one-man cars operating on the pay-as-you-enter and leave-by-rear-door method. The new material required for the rehabilitation of these cars has already been received and four of the cars are now being operated.

Chicago Surface Lines has placed an order with the General Electric Company for 366 type 275, 60 hp. motors. This is a new design which permits standardizing on one motor for both the one-man and the two-man motor cars now under construction in the shops of the railway company. The 45 double-truck, one-man safety cars will be equipped with two of these motors mounted on maximum traction trucks, giving 120 hp. per car. The 69 double-truck, two-man standard double-end "Chicago" cars will be equipped with four motors each, or 240 hp. per car. The original plan was to equip only four of these two-man cars with motor capacity sufficient for hauling trailers. The four G.E. 275 motors will now equip all 69 cars for hauling trailers in all-day service. This type of motor made this possible without increasing the cost or the weight. While only four are needed for hauling trailers now, the others will be available at any time for that duty by simply installing couplers. It is expected that the smaller number of slower speed motors on the safety cars will result in decreased maintenance cost. Although two of these motors are lighter than four of the smaller safety car motors, there will be no saving in gross weight on account of the heavier weight of the maximum traction trucks. The new motor is said to embody the latest developments and it weighs about 2,200 lb.

Power Houses, Shops and Buildings

Rochester & Syracuse Railroad, Syracuse, N. Y., will erect a new and up-to-date trolley station and freight office on Geneva Street, Lyons.

The South Covington & Cincinnati Street Railway, Newport, Ky., suffered damage to its emergency powerhouse by an explosion on Aug. 16, which was attributed to a "pocket" of gas under one of the boilers. The explosion was followed by fire. William H. Harton, general manager, said that the damage would not exceed $10,000. The operation of cars was not interrupted.

Olean, Bradford & Salamanca Railway, Olean, N. Y., is negotiating with the Niagara, Lockport & Ontario Power Company of Lockport, N. Y., for the purpose of contracting for sufficient power amply to provide for the needs of all its local lines. If the company is successful in its negotiations it will be possible either to supplement its present power supply or it may entirely shut down its own power station and purchase all the power to handle the heavy freight and passenger service which the railway company is now struggling to maintain with its own power sation.

Trade Notes

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received an order from the Union Electric Light & Power Company of Illinois for a 35,300-kva. turbine-generator unit for its new plant in St. Clair County. The plant, known as the Cahokia Power Plant, is being designed by McClellan & Junkersfeld, Inc., of New York City.

R. S. Frehse has been made assistant to Oscar A. Broten, Western representative of the National Pneumatic Company, Chicago. Mr. Frehse has been connected with the sales department of the Chicago Railway Signal Supply Company for the past five years. He is twenty-six years old and a graduate of the University of Wisconsin. The National Pneumatic Company has moved its Chicago office from the Edison Building to 940 McCormick Building.

New Advertising Literature

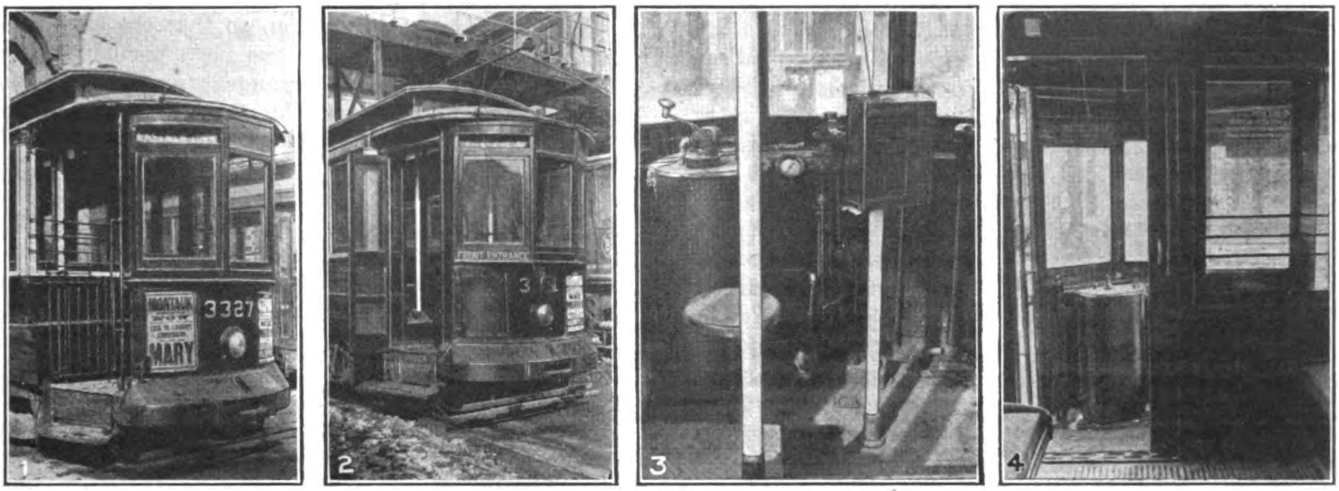
Roller-Smith Company, New York. N. Y., has issued Bulletin No. 250, describing and illustrating a new device known as the portable direct-current galvanometer Types LGD and KGD.

General Electric Company, Schenectady, N. Y., has issued a sixty-page bulletin No. 48,028 entitled "Electrically Operated Pumps." The bulletin shows the feasibility of applying electric motors for driving pumps of all kinds and contains a complete list of engineering tables compiled to help the installation of electrically operated pumps.

Brooklyn Remodels Double-Truck Cars for One-Man or Two-Man Operation

Full Safety Devices Are Installed and Platforms Remodeled to Provide for Efficient Handling of Passengers and Easy Operation by One Man—Work of Reconstructing and Remodeling Done Under Contract

ONE-MAN operation in Brooklyn has been further extended during the past few months by the placing in service of fifty remodeled double-truck cars. In addition contracts have been let for the remodeling and equipping of 175 cars arranged for either one-man or two-man operation. The work of reconstructing and remodeling the cars now in service was done by the National Safety Car & Equipment Company, under contract. A building suitable for carrying out the work of reconstruction was furnished by the railroad, but all equipment, other materials and the labor necessary for the reconstruction were furnished by the equipment company. The same procedure is being followed for the 175 cars now being remodeled.



Nos. 1 and 2—Platform Arrangement of Old and Remodeled Cars. No. 3—Arrangement of Equipment on Platform of Remodeled Car. No. 4—Accelerator Type Bulkhead

The cars already remodeled were some of an order purchased in 1902. They are 37 ft. 1 in. over bumpers, have a seating capacity, with longitudinal seats, of thirty-two and have Brill maximum traction trucks. The equipment consists of two Westinghouse 93 motors, K-11 controllers and Westinghouse air brakes. As can be seen in the view of one of this type of cars before remodeling, they originally had semi-inclosed vestibules and iron gates with permanent steps. The bulkhead was provided with a single sliding door at the left-hand side of the bulkhead. In the remodeling the bulkhead was entirely removed and the bulkhead door was used for inclosing the side of the car platform which was permanently closed. The front vestibule part of the car was not changed, but, of course, the entrance side was remodeled so as to provide for the installation of folding doors and steps.

By referring to the plan showing the platform arrangement, it will be noted that the arrangement of apparatus and other construction details conforms very closely to that used for the standard Birney safety cars. Four upright white enameled stanchions were added, two of these being in what was formerly the bulkhead, the other two being on the platform. Of these latter, one is at the right-hand side of the entrance steps and the other, near the center of the platform, is used for the fare box support. The doors and steps are of standard safety car design, arranged so that the doors open outward. With the car at a stop and the doors open these, of course, project outside of the car body. In an endeavor to reduce the number of accidents which occur from trucks running into these doors while they are open, a conspicuous stop sign, consisting of red letters on a white background, has been painted across the panel of the door. Additional signs used to direct passengers consist of a sign lettered on the side panel, just to the rear of the entrance, reading "Please Have Exact Fare Ready"; the upright part of the step is lettered "Watch Your Step," and on the right front end just underneath the window are the words "Front Entrance." The platform arrangements are the same at each end of the car as is necessary for the double-end operation which is used. Feralun anti-slip treads are used on the platform edges at the step and also at the entrance to the car body formerly occupied by the bulkhead.

The two pneumatic engines used for operating the doors are installed on the top flooring of the platform just ahead and to the left of the position formerly occupied by the bulkhead. They operate the doors and steps through connecting levers and rods installed under the car platform. A substantial wood housing covers the door engine; the top of this box is flush with the floor of the car body, so that in appearance it looks like an extension of the car flooring. A stool for the operator is located just to the front of this door engine housing. The position of the platform controller was changed by moving it closer to the left side of the platform and safety devices forming a part of the standard equipment were added.

The original circuit breaker located over the operator's head was continued in use. This is a General Electric type MQ. The necessary trip which constitutes a part of the standard safety car equipment was added.

These cars had air brake equipment before the remodeling was undertaken. This was not changed except as was necessary for the installation of the new air brake valve and emergency valve. Of course, the piping to the brake valve was changed and additional piping added as is necessary for this equipment. A foot valve for maintaining the circuit in parallel with the dead man's handle was also added. Additional foot switches for making contact for the electrical transfer registers were installed just to the right of the controller. The original location of the hand brake staff was changed. This was moved forward closer to the dash and slightly to the right to give additional platform space, and a drop type of handle was also added.

STOP
PLEASE
EXACT FARE
READY

"Stop" Sign Displayed When Doors Open

The curtain arrangement for inclosing the operator is essentially the same as that of the standard Birney safety cars but, of course, different size curtains were necessary. The view showing the curtains in their closed position gives a ready conception of their size and arrangement. The edges of the curtain, which come together at the fare box stanchion, overlap so as effectively to screen the operator from any light, but an opening is left of sufficient size so that he can see the doors and steps through this and also have a good view of the fare box. The bottom corner of the left-hand curtain is also cut off at the fare box location. The curtains are supported by rings which slide on ½-in. pipe construction at the top. The front curtain comes out at an angle from the corner post so as to give the operator a clear view through the window on the right-hand side of the vestibule.

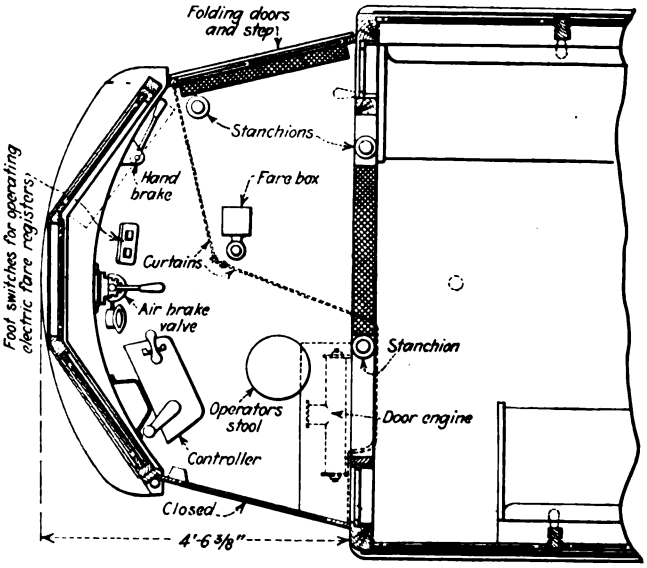
Originally these cars had but one trolley pole and were not provided with trolley catchers. With one-man operation trolley catchers were essential, and in order to provide for their efficient operation an additional trolley stand was installed. The only change made on the interior of the car body was to install push buttons for the operation of the Consolidated Car Heating Company buzzer system. Push buttons were installed on the window posts between each pair of windows and also at the end of the car alongside the last end window. This makes a total of twenty push buttons per car.

In the views showing the platform equipment, it will be noticed that a new type of fare box is shown. Several of the one-man remodeled cars were equipped with this type of fare box for trial and its operation is so satisfactory that its use will be extended to the one-man, two-man cars. A somewhat detailed description of this fare box, or coin switch as it is called, is given on page 356 of this issue. Electrically operated fare registers are used on all cars of the Brooklyn Rapid Transit Company and the Brooklyn City Railroad Company that have been purchased or rebuilt since 1912. The use of this coin switch relieves the operator from the duty of pushing a foot switch to register each fare, as the coin in passing through this new type of coin switch automatically makes the electrical contact, so that the fare is automatically registered on the International Fare Register as it is deposited by the passenger. The operator is also relieved from the added duty of having two totalizers to keep a record of in his report. In the equipment now in service, the operation of these coin switches is interlocked with the reverser on the controller, so that they are cut out of circuit and are rendered inoperative whenever the reverser drum is in its central position.

The operation of the cars reconstructed for one-man operation proved so successful that plans were made for remodeling additional cars. In this work of reconstruction, however, provision was made for either one-man or two-man double-end operation, so that the cars can be used with two men during the peak periods if found desirable. With the car arranged for one-man operation the operator controls the doors and steps at both front and rear of the car. This control is selective; that is, the door control devices and apparatus are such as to provide for any one or all of the following schemes of door control as may be selected by the operator:

First, the opening and closing of the doors at the operator's right at the forward end of the car. Second, the simultaneous opening and closing of the doors, both at the forward and rear ends of the car on the right-hand side, and third, the simultaneous opening and closing of the doors at all four corners of the car.

The operation of the doors for any of these schemes is accomplished by manipulating electric switches of the plunger or push-button type, so as to set up the desired combination of electric circuits, and by the movement of the motorman's brake valve handle to a position or positions that will by air pressure cause the operation of an electric switch, so as to close the circuit for the opening of the doors only with brakes applied and will open the circuit permitting the closing of the doors when the brakes are released.



Plan of Platform of One-Man Car

The door control devices also provide that when operated as a two-man car, the operation of the doors at both the right and left of the forward end of the car and the left-hand door at the rear of the car will be accomplished in the same manner as for one-man operation. The operation of the rear right-hand door only is controlled by a separate door-operating device, which is entirely independent of the operation of the controller and brake valve on the opposite end of the car, except in the event of an emergency application of the brakes. All doors when closed are held closed by air under compression in the door operators except when there is an emergency application of the brakes due to the movement of the emergency valve piston, at which time only atmospheric pressure is on the door-operating device.

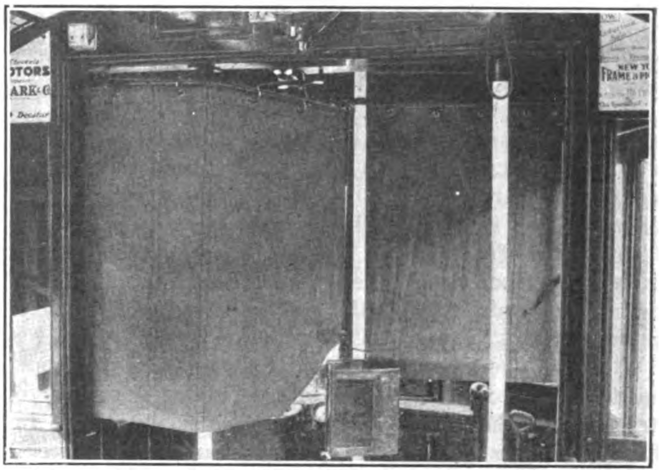
The 175 cars being reconstructed for one-man two-man operation are of several different types with variations in construction details. Some were originally provided with portable vestibules, others with permanent vestibules. Most of the cars have what is known as the accelerator type of body-end bulkhead; that is, with the door located at one side of the bulkhead. This necessitated the removal of the doors and that portion of the bulkhead containing the door pockets, leaving only the narrow frame bulkhead at each of the four corners.

An accompanying illustration shows the general plan on which the cars are reconstructed. Some of the essentials provided for are completely closed vestibules, folding doors and steps in all four corners of the car, a double pair of folding doors and steps provided at each end at the motorman's right, controlling the double passageways, and a single pair of folding doors and steps at the diagonally opposite corners.

To provide as much room as possible for the motorman and for entrance and exit passageways, each platform has been lengthened approximately 18 in. and is also extended in width. The folding doors and steps are operated by engines of the Consolidated Car Heating Company's differential type, located over the respective door headers.

The existing type K 11 controllers are used with the addition of Safety Car Devices Company's operating devices, which provide safety features so as to interlock the operation of the doors and the operation of the brakes and controller. The controllers are relocated. This also involves the moving and lengthening of the controller cables.

Existing hand-brake take-up devices are used, but these are moved forward to a new position. Hand-brake staffs are cut off at a point below the present brake-handle ratchets and a stub end with square wheel-fit and with thread and nut is welded onto the staff. A 12-in. horizontal hand-brake wheel is substituted for the existing lever type of handle.



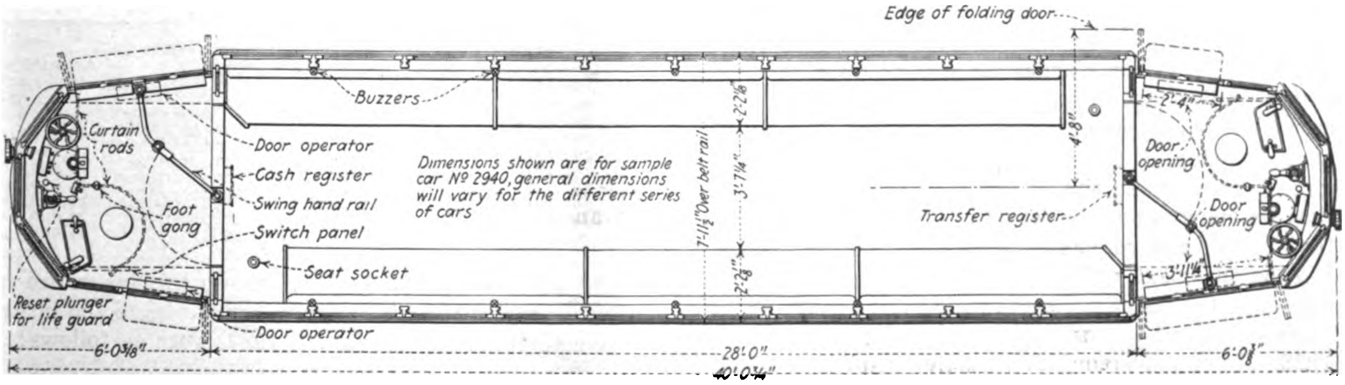
CURTAIN ARRANGEMENT ON RECONSTRUCTED CARS

The cars originally had but one trolley stand. This has been relocated and an additional trolley stand, base and pole complete, has been installed. Trolley catchers have also been added. The original equipment of Arthur power saving recorders and conductors' valves were relocated on account of the removal of certain portions of the bulkhead to which this equipment was attached.

As referred to in a previous part of this article, two electrically operated registers and coin switches are used. This equipment also includes toggle switches installed in controllers so as to interlock the register circuit with the operation of the reversers and foot switches for the operation of transfer registers, also key switches to transfer the control of register operation from the motorman to the conductor when the car is operated as a two-man car. A complete buzzer signal equipment with two buzzers and ten push buttons has also been added.

The conductor's signal to the motorman, used when cars are operated as two-man cars, is made by means of the existing bell and cord system except that the pull handles are relocated in positions convenient to the conductor. The corners of longitudinal seats at the diagonal corners of the car are cut off to provide greater space, and a finished paneling is also provided at the end of the seat. Stanchions and railings of 1-in. standard black pipe are provided as shown in the accompanying illustration. Motorman's curtains are also installed with provision so that these can be strapped back when not required as a screen.

Safety devices and door control equipment are provided to produce the following results: When operating as a one-man car all doors controlled by the operator



PLAN AND PLATFORM ARRANGEMENTS OF ONE-MAN TWO-MAN CAR FOR DOUBLE-END OPERATION close before the brakes are released. When operating as a two-man car all doors controlled from the forward end of the car close before the brakes are released. When the car is stopped through the normal operation of throwing off power and making an application of the brakes, the doors controlled from the forward end of the car open simultaneously and only with the brakes applied.

When an emergency application of the brakes is made due to a rupture or opening of the emergency pipe to atmosphere other than through the emergency port in the motorman's brake valve, power is automatically cut off by the opening of the circuit breaker through the action of an air cylinder and piston.

When an emergency application of the brake is made due to the functioning of the emergency valve, the closing cylinders of the door engines automatically open to atmosphere so that there will be only atmospheric pressure in both the opening and closing cylinders, thereby permitting the doors to be opened by hand. At the same time sand is applied to the rails automatically through the operation of air sander valves. The air supply for the operation of the sanders is obtained from a sander reservoir.

Provision is also made whereby if the electric current supply for the operation of the doors is for any reason interrupted and it is undesirable to make an emergency application of the brakes, the doors at both front and rear ends and at the right side of the car can be readily opened manually.

With the reconstruction of these 175 cars to permit one-man two-man operation, in addition to the 206 Birney type one-man cars and the fifty double-truck one-man cars now in operation, there will be a total of 431 one-man cars in use on the surface lines in Brooklyn.

Group Insurance as Used by Railway Companies

Twenty-one Thousand Electric Railway Employees Now Carry About Twenty-one Million Dollars of Group Life Insurance—Most Popular Forms of Policy Described

By William F. Chamberlin
Superintendent Group Department, Travelers' Insurance Company

THE need for life insurance and for accident and sickness compensation is universally felt by transportation employees as they generally lead lives of continual, though of safeguarded, hazard. Group life, accident and sickness insurance supplies the answer. It differs from association benefits in that the entire responsibility and detail work and service are shifted from the association or company so insuring to an insurance company. Other points of note are that it can be had at rates lower than any other form of insurance; that its benefits may be secured for employees only with the consent and co-operation of the employer, and that it wins the good will of employees through a policy of liberality that is at the same time one of good business.

As explained in the issue of this paper for Feb. 11, 1922, an employer must have fifty or more workers before he is eligible for group life insurance, or twenty-five employees before an old-line company will grant him a contract for group accident and sickness insurance. Group life requires no medical examination, and there is usually no limitation on age, but a probationary period, such as three or six months of service, is generally set before an employee may be included in the group covered. The smallest amount for which an individual worker may be insured is $500, and the largest amount is $5,000. Generally the amount of insurance per employee is based according to one of the following plans:

1. An unchanging amount of insurance, such as $1,000, for each employee.
2. An amount based upon wage or salary, such as 75 per cent or 100 per cent of salary.
3. A progressive amount depending upon length of service; for example: insurance of $500, at the end of three months service; $750 at the end of one year, $1,000 at the end of two years, and thereafter the amount increasing by $250 a year until a maximum of $1,500 or $2,000 has been attained.

For several reasons, group insurance is the cheapest form of indemnity. The premiums on each individual are collected as one. All records and correspondence go to and from the insurance company through one channel only, the employer, and the elimination of all personal medical examination further reduces the cost. Some railway employers pay 100 per cent of the premium; others only furnish the machinery for collecting the premiums from the employees. The following are instances of group insurance now in force on the several electric railways.

The Third Avenue Railway covers 3,301 individuals under its group contract. Each employee is protected with a flat amount of $1,000. The employees of the company contribute to the cost of the insurance. The Eastern Massachusetts Street Railway covers 413 employees and pays 100 per cent of the cost. The amount of insurance varies with the length of service, with a minimum of $300 and a maximum of $3,000. The Milwaukee Northern Railway Company has two classes, according to the employee's responsibility for dependents and contribution to the cost.

Of the twenty electric railways insured for group insurance in one insurance company, fourteen of the companies pay the entire cost and in thirteen the amount of policy varies.

The principal companies writing group insurance have at the present time approximately 21,000 electric railway employees insured for a total amount of about $21,000,000. Statistics of the insurance outstanding for the past nine years follow:

Year ended	Number of Electric Railway Employees Insured	Amount of Insurance
June 30, 1913	150	$ 150,000
June 30, 1914	3,500	3,500,000
June 30, 1915	5,000	5,000,000
June 30, 1916	9,500	9,500,000
June 30, 1917	9,500	9,500,000
June 30, 1918	14,000	13,500,000
June 30, 1919	20,000	19,000,000
June 30, 1920	22,000	21,000,000
June 30, 1921	21,000	21,000,000

The amounts of all kinds of group life insurance in force, as reported by the various companies to the insurance commissioners on Jan. 1, 1922, were as follows:

Travelers'	$424,443,627
Equitable	376,107,369
Aetna	318,085,180
Metropolitan	289,499,073
Connecticut General	73,206,546
Prudential	45,382,320
Missouri State	14,038,783

The average cost of group life insurance per $1,000 depends, of course, upon the ages of the individuals in the group. The annual rate per thousand would vary somewhere between $10 and $15 per thousand; favorable mortality experience, however, would tend to reduce the cost.

An advantage of group insurance, besides the protection afforded, is the inspection service usually given by the insurance. Often a railway company, because of years of familiarity, is blind to certain dangerous conditions around its properties, such as unguarded transformers, switchboards and high-tension apparatus; linemen working on high-tension lines with inadequate protection, etc. These hazards are much more easily recognized by an outside inspector from the insurance company which obviously has a keen interest in reducing all dangerous conditions to a minimum.

Group insurance has been regarded by many electric railway companies as a measure of undeniable justice and is regarded by them as one of the fair conditions of employment. The physical comfort of employees has for many years been the concern of management. Quite as important as physical comfort is the peace of mind that comes with a sense of security created by protection. More and more is economic security coming to be regarded as a necessity in the life of every individual. This is at least one of the functions of group insurance for employees. The fairness and justice of group insurance is its supreme and unanswerable argument.

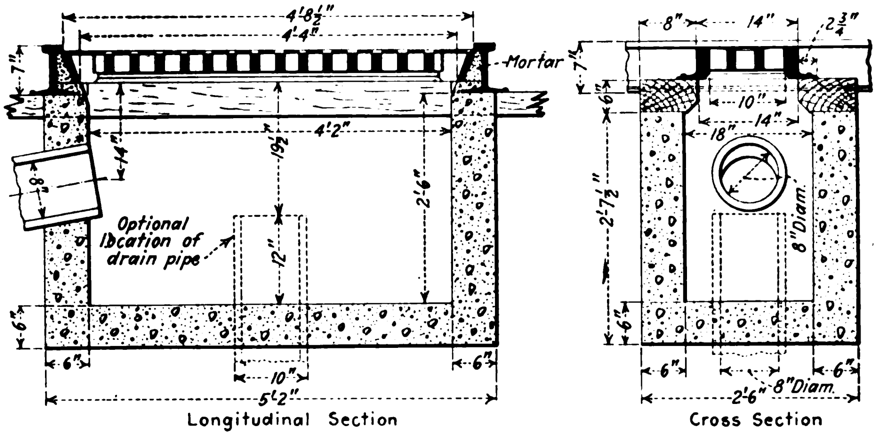
New Type of Track Drain

Has Brick or Concrete Catch Basin and Flat Street Surface —It Is Low in Cost and Can Be Cleaned With a Shovel—Other Features

By Leon R. Brown
Office and Field Engineer, New York State Railways, Rochester, N. Y.

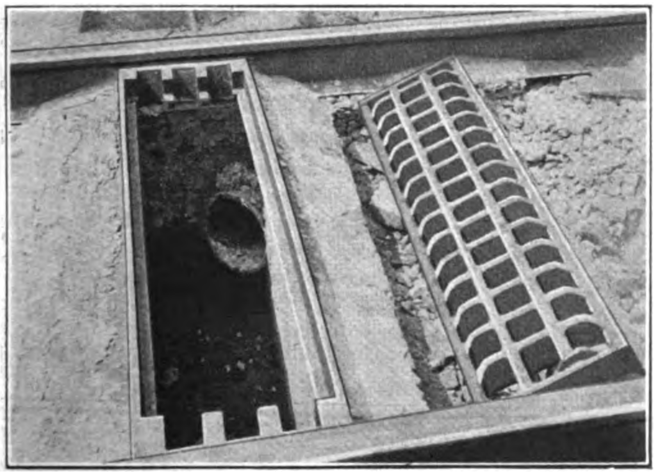
THE New York State Railways is trying out a new type of track drain. The principal features are the brick or concrete catch basin with a dirt chamber and the flat street surface with large openings. The drawing shows the details of the construction. The connections to the sewer consist of a 10-in. sewer pipe embedded in the brick or concrete walls of the catch basin. The pipe can come in from any direction or any angle but it is always so arranged that the bottom of the opening will be 1 ft. above the bottom of the chamber.

To avoid wide spacing of ties, it was necessary to set the framework of the cover on top of the ties where it is held in place by lag screws or track spikes. The ties are dapped at each end to form a table to support the casting and thus make the use of shims on top of the ties unnecessary. The cast frame and cover are stock material made by the Barbour-Stockwell Company for use with low T-rail, and this cover is used where the pavement is laid under the head of the T-rail. Other covers can be secured to fit any type of rail or pavement but the cover should always be flat, and the pavement should be sloped back for several feet on either side to meet the cover. This construction avoids bumps to vehicular traffic and leads all water into the proper drain.

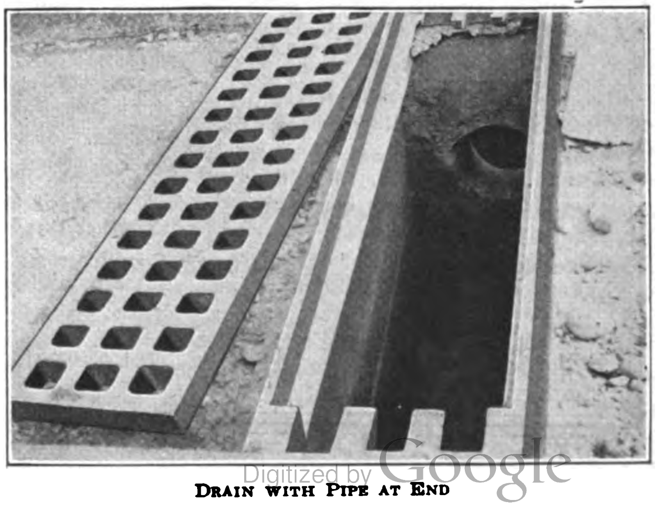


VERTICAL CROSS AND LONGITUDINAL SECTIONS OF DRAIN

This track drain costs only about one-half what the old standard cost, is easier to handle and install, will take more water from along the rail and is much less likely to become clogged both on the surface and under ground. The old standard drain consisted of a large funnel-shaped casting with no provision for trapping dirt, leaves, sticks, etc. The new catch basin can be cleaned with a shovel instead of having to be flushed. So far the drains have proved highly satisfactory on this property.



DRAIN WITH PIPE AT SIDE



DRAIN WITH PIPE AT END

Safety Epigrams

by

Cecil G. Rice

President American Electric Railway Claims Association

How long would a general manager retain a purchasing agent who considered his position on a basis of how much he bought a year, or a treasurer who rated his importance on a basis of how much he paid out? If a claims director pays out $1,000 the test should be—Could that for which the expenditure was made have been prevented?

If there are no accidents there are no claims. Accidents can be prevented.

Safety is part of the service for which the public pays.

The efficient manager does not need to be sold safety. He knows.

When traction lines paid only when at fault it was different. Now they have to pay often when not at fault. Safety becomes more important.

If a reasonable manager needs to be sold safety, it can be done simply by telling him the facts.

Once we all thought typhoid fever and consumption were part of civilization; now we know they are not. Neither are accidents.

It is not a man's record, but what he knows and the way he *thinks* that determine his fitness for safety work.

Using safety organizations for other than safety and welfare work is unfair and will prove disastrous.

There is a difference between systematic and persisitent accident prevention intelligently conducted and so-called "safety first."

Safety is human engineering. Anything that affects the individual has a bearing on accident prevention.

There is a vast difference between "I told him" and real education. Safety is 85 per cent education.

Intelligent accident prevention is an investment, not a speculation.

Failures in safety work have resulted from trying too much or too little without the guidance of one who knows.

Start right in safety. It is hard to revive after a failure.

Money is less necessary in safety than a heart and a will to do.

Claims men are logical prospects for safety directors.

Accident prevention is welfare, good business, civic obligation and religion all in one.

Safety has become an Engineering Standard.

C. G. RICE

Too direct action in safety imperils results. Doctors want all medicine. Attorneys want all law. Operating men want all discipline. The real aim is to secure future and immediate results beneficial to all departments.

Safety first is not enough—the objective must be safety always and in all ways.

Accident prevention is education and conservation, not expenditure.

The human element is more vital than material failure.

Mechanical devices are chiefly valuable in proving that the management is in earnest in its desire to protect employees and the public.

The objective sought is the prevention of accidents. The means are incidental.

The best means to safety is the development of a correct mental attitude.

Safety must be sold—not forced.

The facts in safety are the best sales arguments.

Every employee is a potential assistant in safety work. His cooperation must be secured.

Safety is a synthetic specialty composed of every interest affecting the company and its employees.

Safety means more to an electric railway than to any other branch of industry. Why should the manager hesitate?

Confidence is essential to success in everything. Safety demands confidence.

Search your heart regarding accident prevention. Then get to work.

Saving money is a mere byproduct of safety.

Consciousness of service, fundamental public sentiment, better morale of employees and improved service are direct benefits of safety.

Safety has passed the experimental stage. It affects all human relations.

What does safety save? Forget it. Is safety a duty of service? *Yes.*

Accident reduction is positive. Accident elimination is possible.

Education tending to a public conscience and sentiment is a valuable foundation which safety leads to.

Efforts which cause the individual to think of his own safety and that of those about him are constructive and fundamental.

Perfection in company safety is not essential before organizing community activity. The interest, understanding and sympathy of the public are more necessary. They are an asset that encourages and leads to greater safety among employees.

An experienced and efficient safety engineer is a rare and invaluable staff assistant who can develop dividends paid in co-operation, morale of employees, public sentiment, service and savings.

The executive is the power station. Safety must radiate from him down the line to the man on the job. The circuit is completed when safe acts return along the same line. Then the contact sparkles with life, love, service, satisfaction and success.

The mystery and overdevelopment of the legal aspect have encouraged claims. The common sense of accident prevention is claims prevention.

Fundamentally safety taught in the schools offers the biggest immediate and ultimate return for: It is the children who need to be protected.

Children in the schools are organized and readily reached.

They respond immediately.

Safety teachings vitalize their routine studies.

They carry the message to the others of their family.

They become the workers and passengers of tomorrow.

They will be the safe parents of the safe children of the future.

New Fare Box Has Many Unique Features

Motor Drive Gives Instantaneous Registration and Provides Conductor With Check on Honesty of Passengers and Helps Him in Performing His Duties Well

OPERATING men have long been waiting for a registering fare box that would accomplish as a unit what the present registering box used in conjunction with an overhead clock register does. The double check on fares collected has been a very efficient means of getting all the money into the treasury of the company. But it has also been a source of undesirable controversy between conductors and superintendents on a few street railways. Hence, among other things, the new box now placed on the market by the Johnson Fare Box Company, Ravenswood, Chicago, after years of developmental work, is said to solve this problem, as it automatically rings up each fare on a register that is mechanically an integral part of the box, but is elevated above it so as to be in plain view from platform and from within the car. In addition to giving a double check automatically, it further helps the conductor by providing him with a visible check on the passenger's deposit, which it is claimed should quite effectively eliminate controversies as to amount paid between conductor and passenger.

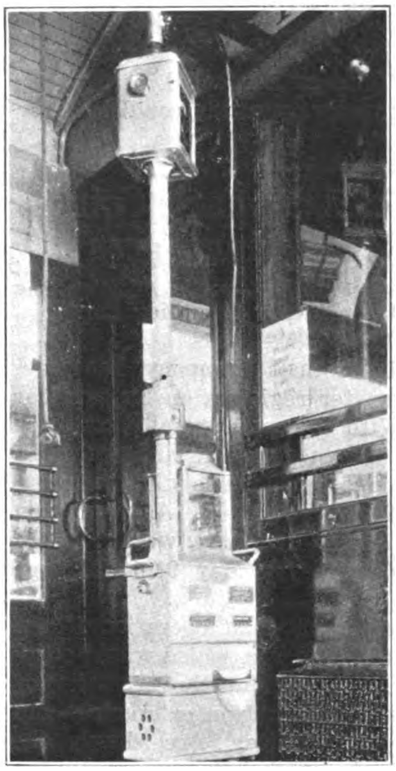
By virtue of a motor drive on the box, which happily relieves the conductor of grinding the fares through by hand, a practically instantaneous registration of each fare is secured. The great advantage of this is that dependence need no longer be placed entirely on the visual aptitude of the conductor in determining whether each passenger has dropped in the proper amount of money—a thing which becomes very difficult with multiple-coin fares at heavy loading points. There are three separate registering features. The usual dials on the side of the fare box proper analyze the receipts as to two classes of tickets and cash. A dial, part way up the rod which supports the upper register and about even with the conductor's eyes, shows the amount of money deposited per passenger. That is, for example, if the rate of fare is 7 cents, this dial quickly progresses from 0 to 7 and then starts again at 0 as the next cash fare is deposited. If a passenger short-changes the company and puts in only 6 cents, say, this middle dial moves around to 6 and the upper register does not ring up another fare. The omission of the bell and the visual indication of the amount paid give the conductor practically immediate warning that the correct amount has not been deposited.

INSPECTION PLATE NOT USED NORMALLY

Because of this plan, the usual plate whereon the coins stop for inspection until the conductor dumps them in is so mounted that in its normal position it permits the coins and tickets to go straight into the box without inspection. The plate is retained in the box so that the conductor, if suspicious of a passenger, can raise it in position to stop the fare for inspection, but normally the plate is not in use. If one passenger short-changes the box and subsequent passengers drop in their correct fares, the upper register records each full fare put in, but the middle register keeps showing up the one shortage, or the accumulated shortage, if more than one passenger puts in less than the required amount.

Fares that are paid with metal tokens are rung up on the upper register, but are not recorded on the middle dial, as there is no possibility of short-changing when the token is used.

The new box contains many other improvements. It can be arranged to handle six kinds of coins—nickels, pennies, dimes, Canadian nickels and two sizes of metal tickets. As the machine gages to both diameter and thickness, a dime flattened out to the size of a penny will still register as a dime. Mutilated coins register correctly usually, but in any event they will go through the machine and not clog it. It is claimed also that the machine can be very simply and quickly changed to meet the new requirements with a change in the rate of fare. The coin plate which counts the coins through the box is so designed that it will handle coins of any denomination at the same speed. Another feature is that the cyclometers are positively locked except as released when properly in gear. The mechanism for driving the overhead register is so arranged that the drive is direct from the motor, the coin simply throwing a trigger which engages a clutch on the overhead drive. By this means, the coin does not carry the load of the drive and danger of trouble is avoided.



NEW FARE BOX ON CHICAGO CAR

The usual fare analyzing dials and the new split fare recorder and upper register are clearly seen, also the motor box on which fare box rests.

Only one fare box is used on a double-end car, but the plan is to install a separate motor on the platform at each end. The motor is inclosed in a Duralumin box measuring 6½x10x6 in. The motor used is of about $\frac{1}{50}$ hp. at 550 volts. Resistance is used in the circuit, so that the voltage across the field is 12, while that across the armature is 270. The motor is a shunt series wound type, which requires about 275 watts—0.5 amp. at 550 volts. Each motor is given a ground test up to 2,250 volts to insure against any breakdown on a current surge.

The motor is connected up to a worm-driven transmission by means of flexible couplings and fiber gears, which produces a practically noiseless driving mechanism. When the fare box and overhead register is carried from one end to the other, taking it off the motor box at one end automatically shuts off the motor, and putting it in place at the opposite end automatically starts the motor. The motor in use runs continuously, although a switch is provided for cutting it off at night. The mechanism is all sealed, and should it clog in some way or the current be cut off, or if the motor should fail to operate for any reason, the fare box may then be hand operated as with the older box. On test, a motor was stalled for thirteen hours without giving any motor trouble.

An arrangement is provided for driving the motor at two speeds. When traffic is light, the motor is operated at the lower speed, as it consumes less current. But in heavier traffic, where quicker registration is desirable, it is planned to operate the motor at the higher speed.

The initial installation of these fare boxes was made on fifteen cars of the Chicago Surface Lines, where they have been tried out under operating conditions for the past ninety days.

Brooklyn Tries Automatic Coin Switch for Registering Fares

The Coin Switch Serves as a Fare Box, and in Addition Has a Mechanism for Automatically Operating the Electric Fare Register Used

THE Brooklyn Rapid Transit Company has used electric cash and transfer registers on its cars for the past eight years. With the usual installation these registers are located at the ends of cars and are operated from push buttons or foot switches by the conductor in any location at which he is stationed. A description of these electrically operated registers was given in the *Electric Railway Journal for* May 9, 1914, page 1047.

With the introduction of one-man operation it appeared desirable to have a fare box which would automatically register the fares without the necessity of having the operator push a foot button or crank a coin box to detract from other duties. Accordingly the automatic coin switch shown in the accompanying illustration was developed and patented by E. J. Kennedy, superintendent of the railway register department. Equipments for general sale are being manufactured by the Perey Machine Works, Brooklyn, N. Y. These combined fare boxes and coin switches are approximately 8 in. x 14 in. x 3 in., and provide for inspection of the fare deposited through glass windows. The case is made of $\frac{1}{32}$ in. sheet copper oxidized, and the frame is a brass casting. Glass $\frac{3}{8}$ in. thick reinforced with wire mesh is provided in the front and the end next to the operator. The fare is deposited in a slotted receptacle on top of the box. This slot will receive pennies, nickels or dimes. The depositing of a coin in the slot operates a mechanism which establishes electrical contact and thus operates the fare register. This registration of the fare takes place before the coin is released, after which it then drops to the inspection plate where it can be viewed by the car operator and passenger. No cranking is necessary on the part of the operator to release the coin. If a dime is deposited two fares are registered as soon as it enters the receptacle. The depositing of a nickel or penny registers one fare. In case a penny is used, of course, it is necessary for the operator to get the additional amount necessary to pay the passenger's fare. As at present arranged two boxes are used for each double-end one-man car. These are located on brackets attached to the center upright stanchion at the car entrance. The cost of the two boxes is no more than that of a single fare box of the usual type. Should it be necessary to make repairs to the coin switch this can be lifted off its supporting brackets and be replaced with another while repairs are being made. The opening in the fare slot is controlled by means of a key, so that the slot is closed except when the key is in position. The box can be cleared of fares with one hand by pushing down a small chute at the bottom of the box. Dimes and nickels have separate receptacles so that in clearing the box of fares, these can be placed in change carriers without the necessity for sorting, thus saving much time.

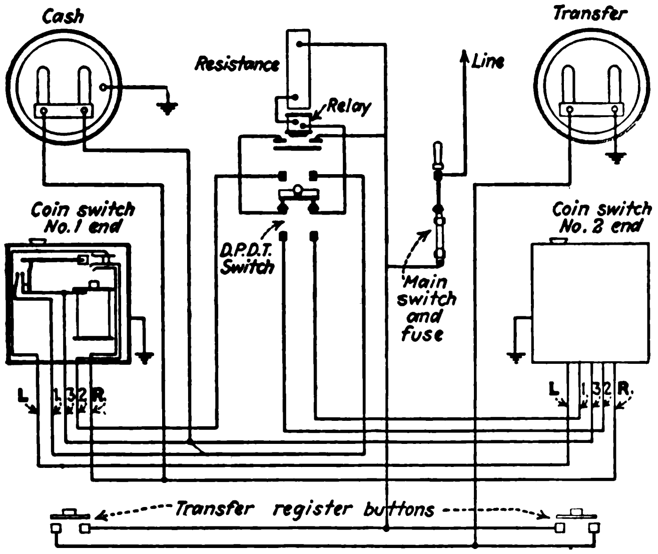
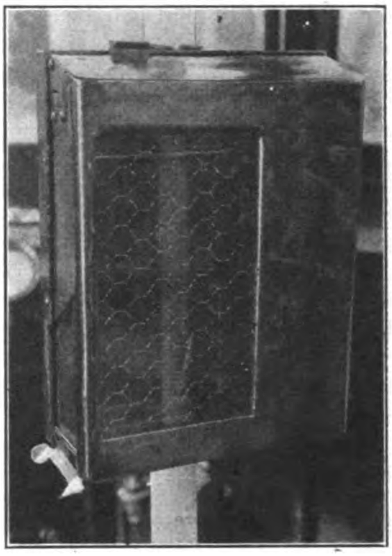


DIAGRAM OF COIN SWITCH INSTALLATION FOR DOUBLE END CAR



COIN SWITCH IN POSITION ON STANCHION

In the accompanying diagram of connections, a double-pole double-throw switch is shown for cutting out the register on the end of the car which is not in use and closing the circuit at the operating end. On some of the Brooklyn cars, this switch has been replaced by interlocks connected to the reverser in the controller, so that the coin box is automatically cut out whenever the reverse drum is centered. The main switch and fuse provides for cutting out the entire mechanism whenever necessary.

An outstanding feature of this coin switch when used in connection with an electrically-operated register is that there is but one totalizer to be checked. An instantaneous registration of each fare is obtained together with a double visible check of the passenger's deposit. All fares are also registered the instant they are deposited so that no time is lost when an inspector boards the cars through the necessity of having to wait until the fare box is cranked so as to register all fares deposited.

This type of coin switch has also been used for the past two years in connection with the automatic operation of turnstiles at several of the elevated stations of the Brooklyn Rapid Transit Company and a further extension of its use in this service is contemplated.

Is Freight Operation on Electric Railways a Paying Proposition?*

An Analysis of Various Methods by Which the Cost of Hauling Passengers and Freight on an Electric Railway Can Be Apportioned —Particulars of Livestock Traffic

By L. T. Hixson
Auditor Indiana & Eastern Traction Company, Anderson, Ind.

THIS question might well be classed with the Darwinian theory as to the origin of a man so far as the possibility of being answered satisfactorily to every one is concerned. However, this may be on account of our overlooking the fact that it has two distinct phases, and an affirmative answer to one angle does not necessarily mean an affirmative answer to the other; in fact it may be negative.

The difference of opinion arises largely on account of the following:

1. Does the question refer to the net income from freight operation, after charging all direct expense and apportioning overhead (see Exhibit F-b) or
2. Is the reference to the net income after deducting direct freight expense only, including depreciation on freight equipment; or as we commonly say, such expense as we would not have if we were not operating the freight business? (See Exhibit F-g).

It would appear that the logical method of estimating for a road about to engage in the freight business would be the latter plan or method as a preliminary step. If this estimate shows that the revenue will provide a small net over and above the additional expenses, including wear and tear on present property, the company would certainly be justified in going into this business, even though it could not pay its entire proportion of overhead as provided in plan (1). This conclusion is based on the well-known method employed in manufacturing or mercantile business. If any special line will make a slight profit over direct expense, it reduces the general overhead by that amount, and thus works out a net profit for the entire business.

However, the most sensible way after the business is in operation would appear to be to charge to freight operations all direct expense and also to apportion the overhead as in plan (1). If the business then shows a net profit, no matter how small, you may be very sure it is a paying proposition. If there is a deficit shown on method (1), it is high time to apportion on plan (2), direct expense. If this method shows a slight margin the freight is still a paying proposition, but if there is a deficit, you are facing a net loss, and the only hope is to increase the gross and decrease the direct operating cost.

When a company operates interurban passenger and freight city lines and electric light and power properties jointly, the problem of allocation of indirect expenses becomes more difficult. To illustrate some of the steps which are necessary the accompanying exhibits have been prepared, using as a basis the actual figures for the month of November, 1921. These apportion all expenses—direct and indirect.

Exhibit A—Car-miles, ton-miles and gross earnings, classified so as to provide a basis for apportioning indirect expenses.

Exhibit B—Apportionment of income and expenses to various departments.

Exhibit C—Condensed income account by departments.

Exhibit D—Railway statistics per car-mile, regardless of size, or kind of car. (Based on income account Exhibit C).

Exhibit E—Loaded weight ton-miles.

A convenient chart for comparing the various methods of allocating operating expenses is provided by:

Exhibit F—Railway statistics, showing gross, operating and net from operation in various forms. The columns in this table are worked out as follows:

(*a*) Operating expense, based on direct, dead weight, ton-mile, and gross earnings (same as Exhibit D and plan (1), as set forth in the second paragraph).

(*b*) Operating expense, based on direct, loaded weight, ton-mile, and gross earnings.

(*c*) Operating expense, based on direct, car-miles and gross earnings.

(*d*) Operating expense, based on car-miles.

(*e*) Operating expense, based on gross earnings.

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*Address presented at meeting of Central Electric Railway Accountants' Association, Michigan City, Ind., Aug. 25.

EXHIBIT A—TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

BASIS FOR APPORTIONING CITY CAR-MILES AND TON-MILES FOR NOVEMBER, 1921

	City					
	City Motor—Two Men			City Motor—One Man		
Division	Car-Miles	Tons	Ton-Miles	Car-Miles	Tons	Ton-Miles
Terre Haute	......	....	....	246,764	x 6	1,480,584
Northwestern	......	....	....	1,950	x 11	21,450
Eastern	33,698	x 15	505,470	....	....	....
Martinsville	......	....	....	....	....	....
Brazil	......	....	....	....	....	....
Danville	......	....	....	....	....	....
Crawfordsville	......	....	....	1,950	x 11	21,450
Total	33,697		505,470	250,664		1,523,484

BASIS FOR APPORTIONING INTERURBAN CAR-MILES AND TON-MILES FOR NOVEMBER, 1921

	Interurban Passenger						Interurban Freight					
	Interurban Pass. Motor			Interurban Pass. Trail			Interurban Frt. Motor			Interurban Frt. Trail		
Division	Car-Miles	Tons	Ton-Miles	Car-Miles	Tons	Ton-Miles	Car-Miles	Tons	Ton-Miles	Car-Miles	Tons	Ton-Miles
Terre Haute	66,740	x 35	2,335,900	.....	....	....	6,416	x 34	218,144	295	x 12	3,540
Northwestern	78,094	x 37	2,889,478	2,068	x 27	55,836	11,872	x 36	427,392	9,866	x 15	147,990
Eastern	72,503	x 37	2,682,611	830	x 27	22,410	11,254	x 36	405,144	17,864	x 15	267,960
Martinsville	27,348	x 37	1,011,876	.....	....	....	1,532	x 36	55,152	159	x 15	2,385
Brazil	69,492	x 37	2,571,204	3,207	x 27	86,589	6,422	x 36	231,192	9,848	x 15	147,720
Danville	15,238	x 37	563,806	39	x 27	1,053	1,053	x 36	37,908	108	x 15	1,620
Crawfordsville	42,026	x 37	1,554,962	2,881	x 27	77,787	7,842	x 36	282,312	11,410	x 15	171,150
Total	371,441		13,609,837	9,025		243,675	46,391		1,657,244	49,550		742,365

		Car-Miles	Ton-Miles	Per Cent	Per Cent
A	Interurban passenger				
	Motor	371,441	13,609,837	......	......
	Trail	9,025	243,675	......	......
	Total	380,466	13,853,512	85.24	75.78
B	Interurban freight				
	Motor	46,391	1,657,244	......	......
	Trail	49,550	742,365	......	......
	Total	95,941	2,399,609	14.76	13.12
C	Total interurban	476,407	16,253,121	100.00	......
D	City lines	284,362	2,028,954	......	11.10
E	Grand total	760,769	18,282,075	......	100.00
			Amount	Per Cent	
F	Gross earnings				
	Interurban passenger	....	$210,941.84	76.35	......
	City	....	65,322.59	23.65	......
	Total	....	$276,264.43	100.00	......

	Interurban passenger	Car-Miles	Ton-Miles	Per Cent	Per Cent
G	Gross earnings				
	Pass. interurban	....	$210,941.84	66.45	......
	Freight	....	41,191.16	12.97	......
	City	....	65,322.59	20.58	......
	Total	....	$317,455.59	100.00	......
H	Gross earnings				
	Pass. interurban	....	$210,941.84	83.66	......
	Freight	....	41,191.16	16.34	......
	Total	....	$252,133.00	100.00	......
I	Gross earnings, pass. int.	....	$210,941.84	51.95	......
	Freight	....	41,191.16	10.15	......
	City	....	65,322.59	16.09	......
	Light and power	....	88,552.91	21.81	......
	Total	....	$406,008.50	100.00	......

EXHIBIT B—TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

RAILWAY DEPARTMENT

INCOME ACCOUNT FOR MONTH OF NOVEMBER, 1921 (CENTS OMITTED)

	Revenue	System	Passenger	Freight	City	Memo Disp. Frt.*
	Revenue from transportation....	$311,156	$205,328	$41,144	$64,684	$10,890
	Other railway revenue	6,299	5,613	47	638	477
	Total......................	$317,455	$210,941	$41,191	$65,322	$11,367
	Expenses					
	Way and structures					
	Crossings and fences	$ 854	....	....	....	....
	Signal and interlocking..	925	....	....	....	....
	Telephone and telegraph...	1,789	....	....	....	....
	Bridges..................	1,517	....	....	....	....
	Stations and platforms....	4,514	....	....	....	....
	Sub total	9,601	$ 8,183	$ 1,417	....	....
E	Other way and struc. exp...	43,264	32,786	5,676	$ 4,802	....
	Total.................	$ 52,864	$ 40,969	$ 7,093	$ 4,802	$ 3,482
	Equipment					
X	Pass. and comb. cars......	$ 12,159	$ 8,942	....	$ 3,217	....
X	Freight cars.............	557	....	557	....	....
E	Depreciation.............	1,191	902	156	132	....
E	Other expenses...........	11,479	8,699	1,506	1,274	....
	Total.................	$ 25,386	$ 18,543	$ 2,219	$ 4,623	$15,76
	Power					
	T. H. transm. and transf...	$ 628	....	....	....	....
	Substation buildings.......	....	....	....	....	....
	Substation equipment.....	61	....	....	....	....
	Trans. system............	56	....	....	....	....
	Substation employees......	2,958	....	....	....	....
	Substation expenses	6	....	....	....	....
C	Subtotal................	3,708	$ 3,160	547	....	....
E	Other power expenses.....	39,438	29,818	5,162	4,367	....
	Total.................	$ 34,055	$ 32,978	$ 5,709	$ 4,367	$ 2,803
	Conducting Transportation					
X	Passenger conductors, etc..	$ 37,935	$ 20,654	....	$17,281.	$ 1,755
X	Freight..................	4,818	....	$ 4,818	....	....
C	Operators signal..........	769	656	114	....	55
C	Oper. tel. and telegraph...	180 72	153	26	....	13
X	Loss and damage..........	434	....	431	....	....
X	Station employees and exp.	7,133	1,487	4,457	195	1,405
C	Station employees and exp.	6,383	5,440	942	....	462
G	Other expenses............	15,369	10,213	1,993	3,163	868
	Total.................	$ 73,018	$ 39,603	$12,775	$20,639	$ 4,560
H	Traffic..................	$ 1,187	$ 993	$ 193	....	$ 84
	General and miscellaneous					
X	Rent of tracks............	$ 9,779	$ 7,979	$ 1,685	$ 114	$ 191
X	Rent of equipment........	314	....	314	....	....
G	Other general expenses....	23,009	15,289	2,984	4,735	1,299
	Total.................	$ 33,102	$ 23,268	$ 4,983	$ 4,849	$ 1,490
	Total operating expenses....	$228,613	$156,356	$32,975	$39,281	$13,997

BASIS OF APPORTIONING OPERATION EXPENSES

Key	
A	Interurban passenger ton-miles
B	Interurban freight ton-miles
C	Total interurban ton-miles
D	City lines ton-miles
E	Total ton-miles—city and interurban
F	City and interurban passenger ton-miles
G	Total gross earnings
H	Interurban gross earnings
X	Direct or actual.

*Dispatch freight represents freight carried on passenger cars and included in interurban passenger revenue and expenses. However, in the "Memo" column the amount of expense when not an actual apportionment is based on approximate space required in the car.

The baggage compartment is 17 per cent and the dispatch freight is taken as one-half or 8½ per cent of the total car.

EXHIBIT C—TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

INCOME ACCOUNT, NOVEMBER, 1921

		System	Interurban Passenger	Interurban Freight	City	Light and Power	Memo Disp. Frt.
X	Gross earnings....	$406,008	$210,941	$41,191	$65,322	$88,552	$11,367
R	Operating expenses	275,673	156,356	32,975	39,281	47,059	13,997
	Net from operation......	$130,335	$54,585	$8,216	$26,040	$41,493	$2,629
	Other income.....	28,400	14,754	2,882	4,569	6,194	1,254
	Total income.....	$158,736	$69,339	$11,098	$30,610	$47,687	$1,375
X-G	Taxes............	35,100	21,461	4,188	6,646	2,803	1,824
	Fixed charges and rentals.........	92,098	47,845	9,347	14,818	20,086	4,066
	Surplus.........	$31,538	$33.77		$9,144	$24,798	
	Deficit..........			$2,438			$7,266
	Sinking fund.....	17,444	9,062	1,770	2,806	3,804	770
	Surplus..........	$14,092	......	......	$6,338	$20,993	
	Deficit...........	......	$9,029	$4,208	......	......	$8,037

Key—X, direct. R, see railway income sheet for particulars. I, on basis of railway and light earnings. X-G, light and power taxes direct, railway based on interurban and city gross earnings. Interurban passenger includes dispatch freight.

EXHIBIT D—TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

RAILWAY DEPARTMENT STATISTICS, MONTH OF NOVEMBER, 1921

—	Railway System	Int. Pass	Int. Freight	Total Int.	City Lines
Gross per car-mile transporatation.	0.4090	0.5397	0.4289	0.5173	0.2275
Other........................	.0083	.0147	.0004	.0119	.0022
Total gross..................	.4173	.5544	.4293	.5292	.2297
Op. expenses per car-mile..........	.3005	.4109	.3437	.3974	.1381
Net revenue per car-mile..........	.1168	.1435	.0856	.1318	.0916
Other income...................	.0291	.0387	.0300	.0370	.0160
Total income....................	.1459	.1822	.1156	.1688	.1076
Taxes per car-mile...............	.0424	.0564	.0436	.0538	.0234
Fixed charges and rentals.........	.0947	.1257	.0974	.1200	.0521
Sinking fund....................	.0178	.0238	.0185	.0227	.0098
Surplus per car-mile.............	......	......	......	......	.0223
Deficit per car-mile...............	.0090	.0237	.0439	.0277	

Note:—The expenses apportioned to the various classes of business were based principally on the ton-miles (when not direct). However, the amount of such expenses determined as above stated are here shown on a car-mile basis regardless of the size or kind of car, whether interurban motor or trailer or city car; i.e., the total expenses were divided by the total car-miles.

EXHIBIT E—TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

LOADED TON-MILE, MONTH OF NOVEMBER, 1921

	Int. Pass.	Freight	City	Total
Dead weight...............	13,853,512	2,399,609	2,028,954	18,282,075
Load (as below)............	437,145	491,407	177,726	1,106,278
Loaded ton-mile...........	14,290,657	2,891,016	2,206,680	19,388,353

INTERURBAN PASSENGER LOAD TON-MILE

Interurban passenger revenue*..........................	$193,839.20	
Divided by 3 cents = approximate passenger-mile.......	6,461,307	
Based on 125 lb. per passenger, each passenger weighs 6¼ per cent of a ton.		
6¼ per cent of 6,461,307 = ton-miles....................		403,831
Dispatch freight ton-miles taken from way bills.........		16,657
Baggage arbitrarily same as dispatch freight...........		16,657
Total passenger carload in ton-miles..............		437,145

CITY CAR LOAD TON-MILE

Car-miles..	284,362	
Estimated ten passengers on car at all times = passenger miles..................................	2,843,620	
Average weight per passenger—125 lb. or	6¼% of a ton	
6¼ per cent of 2,843,620 = Load ton-miles...............		177,726

FREIGHT LOAD TON-MILE

Calculated from way bills and abstracts (see Exhibit G)	491,407

*Does not include revenue from transportation of dispatch freight, baggage, etc., on passenger cars.

EXHIBIT F—TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

PER CAR-MILE REVENUE AND EXPENSES, NOVEMBER, 1921

Operating expenses apportioning in various ways as set forth in "Key."

	(a) Direct and Dead Weight Ton-Mile	(b) Direct and Total Weight Ton-Mile	(c) Direct and Car Mile	(d) Car-Mile	(e) Gross Earnings	(f) Deead Weight Ton-Mile	(g) As (a) with Certain Items Eliminated
Interurban Passenger							
Gross earnings....	$0.5544	$0.5544	$0.5544	$0.5544	$0.5544	$0.5544	$0.5544
Operating expenses	0.4109	0.4046	0.3435	0.3005	0.3993	0.4553	0.4317
Net from operation	0.1435	0.1498	0.2109	0.2539	0.1551	0.0991	0.1224
Freight							
Gross earnings....	0.4293	0.4293	0.4293	0.4293	0.4293	0.4293	0.4293
Operating expenses	0.3437	0.3659	0.3502	0.3005	0.3091	0.3126	0.2472
Net from operation	0.0856	0.0634	0.0791	0.1288	0.1202	0.1167	0.1821
City Lines							
Gross earnings....	0.2297	0.2297	0.2297	0.2297	0.2297	0.2297	0.2297
Operating expenses	0.1381	0.1390	0.2261	0.3005	0.1654	0.0892	0.1429
Net from operation	0.0916	0.0907	0.0036	0.0708	0. 643	0.1405	0.0868

Key

(a) Operating based on direct expense when possible. Partially on dead weight ton-miles and gross earnings.

(b) Operating based on direct expense when possible. Partially on total weight ton-miles including load and gross earnings.

(c) Operating based on direct expense when possible. Partially on car-miles and gross earnings.

(d) Operating based on car-miles.

(e) Operating based on gross earnings.

(f) Operating based on dead weight ton-mile.

(g) Operating based on direct expense when possible. Partially on dead weight ton-miles and gross earnings. Eliminating from freight expense various items which would remain even if freight operations should be discontinued.

EXHIBIT I—TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

CARLOAD FREIGHT BY COMMODITIES, YEAR, 1921

Commodities	Car Loads	Pounds	Revenue
Livestock..........................	3,695	62,678,726	$87,009.64
Switching steam road cars to Indiana Boys' School..........................	126	11,222,150	1,799.89
Cement............................	187	9,299,525	7,415.79
Contractors' equipment..............	245	23,952,286	3,957.67
Road material......................	135	13,310,240	1,415.59
Polo ponies........................	22	484,000	2,686.20
Household goods....................	4	48,000	176.78
Iron pipe..........................	1	36,000	22.36
Washing machines..................	1	16,000	16.51
Lumber............................	1	36,000	37.80
Empty bottles......................	1	18,575	37.83
Gravel............................	4893	106,005,350	16,695.04
Total.........................	9,311	227,106,846	$121,271.10

Note:—No l. c. l. freight included.

EXHIBIT G—TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY
FREIGHT STATISTICS. MONTH OF NOVEMBER, 1921.

Commodity	No. Cars	Car-Miles—Loaded			Car-Miles—Empty			Total Car-Miles Loaded and Empty	Tons	Ton-Miles	Revenue			
												Per Car-Mile		
		Motor	Trail	Total Loaded	Motor	Trail	Total Empty				Amount	Loaded	Loaded and Empty	Per Ton-Mile
Car Load														
2—Cement	2	....	153.86	153.86	....	133.66	133.66	287.52	54.7	3,960	$50.62	$0.3290	$0.1760	$0.0128
3—Livestock	334	5,897.28	8,776.00	14,673.28	5,276.40	9,010.55	14,286.95	28,960.23	2,839.7	124,722	7,838.34	.5338	.2707	.0628
4—Gravel	172	1,449.90	4,867.10	6,317.00	1,297.00	4,593.70	5,890.70	12,207.70	3,087.0	92,610	796.85	.1261	.0652	.0086
5—Contractor's equipment	8	114.10	142.42	256.52	69.88	130.98	200.86	457.38	177.7	1,482	193.20	.7531	.4224	.0138
6—Road material	....	....	....	....	....	....	....	....	....	....	....	....	....	....
7—Boys' School	9	....	55.20	55.20	....	43.34	43.34	98.54	385.7	1,544	133.11	2.4114	1.3503	.0862
11—H. H. goods	11	....	133.11	133.11	....	71.88	71.88	204.99	6.0	846	60.84	.4570	.2967	.0719
13—Cinders sold	2	23.22	32.53	55.75	30.55	34.23	64.78	120.53	100.0	3,253	25.00	.4484	.2073	.0077
Total carload	528	7,484.50	14,160.22	21,644.72	6,673.83	14,018.34	20,692.17	42,336.89	6,650.8	228,417	$9,097.96	$0.4203	$0.2148	$0.0398
L. C. L. Classed as merchandise		32,042.05	21,075.92	53,117.97	4.00	482.14	486.14	53,604.11	5,352.1	262,990	32,046.20	.6033	.5978	.1218
Total		39,526.55	35,326.14	74,762.69	6,677.83	14,500.48	21,178.31	95,941.00	12,002.9	491,407	$41,144.16	$0.5503	$0.4288	$0.0837

(*f*) Operating expense, based on dead weight, ton-mile.

(*g*) Operating expense, based on direct, and on dead weight ton-mile and gross earnings after eliminating certain expense items which would not be canceled even if freight should be discontinued (same as plan 2), as set forth in the second paragraph.

This chart will show the fallacy of the car-mile basis for a mixed property. There is very little difference in the net for interurban passenger and city passenger, whether you use the direct and dead weight ton-mile, or direct and live weight ton-mile. However, there is a decided difference in the freight net between the two methods.

The commodity car load and l.c.l. statement, Exhibit G, will show some surprising figures. Eliminating commodity No. 7—Boys' School, which is really a switching movement of steam road cars to the Indiana Boys' School, the highest revenue we have is l.c.l merchandise, which you will notice is 39.78 cents per car-mile, loaded and empty, compared with the next highest, Contractor's Equipment, 42.24 cents per car-mile. Some of the latter is also a switching charge, so that for ordinary freight haul the revenue is less.

Thus, it will be seen that the l.c.l. business is the best paying branch of the freight and at present the backbone of the business, nothwithstanding the fact that it costs us more to handle at terminals. The greater portion of future growth, however, will probably have to come from car-load shipments.

The transportation of livestock is something new for interurban railroads and a great deal of this increased carload freight we are talking about will come from that source. From the nature of the business, however, the greater portion is one way, leaving too much light mileage. Some transportation and traffic genius may work out a schedule which will use the regular l.c.l. freight motor cars for the motive power of the stock cars, and at last save the dead mileage on the motor.

While live stock is loaded and unloaded very promptly, the minimum carload weight of 17,000 lb. is rarely exceeded. Therefore, there will be more net revenue in transporting a commodity of equal rate which will weigh 34,000 lb. to the car even if this latter commodity is not unloaded so promptly and ties up the equipment so that only half the number of carloads may be hauled, for the reason that half the mileage is saved.

There is a considerable amount of other carload freight, however, which is also one-way traffic, one example being cement shipments from Speeds, near Louisville, to points on the lines of the T. H., I. & E. Traction Company, between Indianapolis and Richmond, for national road improvements, and to Terre Haute, and more attention might be given to efforts toward procuring freight for the return trip to the terminals. This is where the special commodity rate good in one direction only will pay. If the return trip pays half rate only it will certainly be an improvement over no revenue whatever.

Referring again to the livestock business, I would like to call attention to a method of competing with trucks in transportating l.c.l. shipments by different owners at carload rates. The livestock superintendent of the Terre Haute, Indianapolis & Eastern Traction Company has worked out a plan whereby arrangements have been made with an organization to accept small lots of livestock from various owners and ship them at carload rates, adding a small charge to compensate for this service. This plan is set forth more clearly in Exhibit H. This exhibit printed is a postcard 5¼ in. x 9 in. and on the front is a space in which specific information, such as the carload rate per 100 lb. from the addressee's shipping point, may be shown.

In connection with the preparation of monthly reports and statistics, I wish to say just a few words relative to the amount of work involved. All of the exhibits shown require a great deal of labor, but Exhibit G is very difficult to prepare unless the Hollerith tabulating machine is used, and for the usual run of freight on interurban lines, the expense would be prohibitive. Therefore, a test statement once or twice each year with a monthly statement of revenue, should keep you on the right track.

As a matter of general information, although it does not give any figures as to whether the freight traffic pays, Exhibit I, setting forth carload freight for 1921, by commodities, is appended.

In conclusion I will say that the freight operation on electric railways as shown by the accompanying exhibits is decidedly a paying proposition and should be increased in every way possible. However, I wish to again state that from time to time a test check should be made.

DO YOU GET TOP PRICE FOR YOUR LIVE STOCK?

You should investigate the Service you can get by shipping to the INDIANAPOLIS MARKET

VIA

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION CO.

The Interurban Furnishes a Live Stock Transportation Service that cannot be Duplicated.

1. *Special train service delivery of stock to Indianapolis Yards in from three to four hours*
2. *Light shrinkage.*
3. *Top prices for all kinds of stock.*
4. *Carload service on less-than-carload shipments by various owners.*

HOW YOU GET THIS SPECIAL CARLOAD SERVICE ON SMALL LOTS

E. G. Crain, Manager of the Traction Shippers, will accept from you one or more head of live stock and the only additional expense to you other than the regular carload freight rate per one hundred pounds and the stock yards charges will be a small handling charge per hundred.

Mr. Crain marks each animal to designate the owner, accompanies the stock to market and places it to the commission man you choose. Therefore your shipment has personal attention from the time it is delivered to the interurban loading pens until it walks across the scales at the yards.

FOR FURTHER INFORMATION ADDRESS

F. B. ADAIR, Live Stock Superintendent,
T. H. I. & E. Traction Company,
209 Traction Terminal Bldg.
INDIANAPOLIS, INDIANA

E. G. CRAIN, Manager,
Rural Route No. 2.
THORNTOWN, INDIANA

EXHIBIT H—POST CARD SENT TO LIVESTOCK SHIPPERS

Freight Operation on Electric Railways*

Is It a Paying Proposition?

By R. S. Drew
Engineer Indiana Service Corporation, Fort Wayne, Ind.

MANY electric railway companies operate railway, light and power departments. Before an accurate judgment can be formed as to the net earnings of each their expenses must be segregated. Some can be allocated directly; others must be apportioned upon arbitrary bases. The cost of power is the most important major account which must be treated in this way.

The Indiana Service Corporation has made a very careful study of these problems, and the writer feels that the allocation of expenses based upon these studies is as accurate as can be obtained. The results of operation of its interurban passenger and freight departments for the twelve months ended May 31, 1922, are given in Table I. The bases used in the segregation of the various accounts involved are set down in Table II. The bases disclosed in this table are different from those used by Mr. Hixson. A discussion of some of these differences follows:

The writer believes that the weight of cars is an important factor in the amount of maintenance made necessary by the operation of them. But if the ton-mile basis is to be used it seems much more logical to use the loaded ton-mile rather than the deadweight ton-mile which Mr. Hixson used in his detailed apportionment.

It must be remembered that much of the cost of maintenance of track and roadway is occasioned by the slow ravages of the weather, with occasionally a heavy storm to increase this expense. It seems to the writer that in the general run of business of the two departments, passenger and freight, the car-mile basis quite accurately represents the relative use of the track and roadway, and the train-mile the use of the distribution system.

EQUIPMENT

The car-hour basis is suggested for the apportionment of equipment expenses which cannot be directly allocated. In most cases about 60 per cent of this account can be directly allocated, the balance being made up chiefly of depreciation and shop expenses. Among the several possible methods of apportioning this latter group are the use of:

The relative cost of rolling stock of each department,

The directly allocated expenses as a basis,

Car-hours, car-miles, or ton-miles.

Actual percentages for these bases, using the expenses of the Indiana Service Corporation for the year 1921, are as follows:

	Cost of Equipment, Per Cent	Direct Expense Basis Per Cent	Car-Hours, Per Cent	Car-Miles Per Cent	Ton-Miles, Per Cent
Passenger department	74	69	67	79	85
Freight department	26	31	33	21	15

It is to be noted how close the agreement is between the direct expense basis and the car-hour basis.

POWER

Obviously the logical basis for the apportionment of power expenses is that of kilowatt-hour consumption. Companies which do not use meters on cars must use approximate relative consumptions. A study of the meter records of this company for one year indicated:

	Kw.-hr. per Car-Mile
Passenger department consumption	2.60
Freight department consumption	2.31

This is a grand average using the sum of motor and trail car-miles, but is

TABLE I—INTERURBAN RAILWAY BUSINESS, INDIANA SERVICE CORPORATION, YEAR ENDED MAY 31, 1922

Accounts	Passenger Depart. Total	Passenger Depart. Cents per Car-Mile	Freight Depart. Total	Freight Depart. Per Car-Mile
Way and structures	$147,068	13.01	$37,495	11.62
Equipment	47,998	4.25	13,370	4.14
Power	125,497	11.11	31,853	9.87
Conducting transportation	143,174	12.67	78,006	24.17
Traffic	6,145	.54	1,747	.54
General and miscellaneous	87,192	7.71	22,262	6.90
Taxes	45,057	3.99	12,853	3.99
Total	602,131	53.28	$197,586	61.23
Miscellaneous revenue—credit	21,047	1.86	24,794	7.68
Total expenses	581,084	51.42	$172,792	53.55
Gross earnings	652,020	57.70	157,519	48.81
Net earnings	70,936	6.28	*$15,273	*4.74

SUMMARY

	Total	Per Car-Mile
Total expenses	$753,876	51.89
Gross earnings	809,539	55.73
Net earnings	$55,663	3.84

STATISTICS

Car-miles operated passenger	1,129,991
Car-miles operated freight	322,711

Freight Train	Kilowatt-Hours	Miles	Kilowatt-Hour Per Mile	Additional Kilowatt-Hour for Trailers	Additional Kilowatt-Hour Per Trailer	Total Energy Taken (Kilowatt-Hour-Miles)
Motor car only	1,027	502.4	2.045	....	....	....
Motor car and one trailer	2,394	910.4	2.632	.587	.587	534
two trailers	2,883	869.3	3.318	1.273	.636	553
three trailers	1,663	411.1	4.048	2.003	.668	274
four trailers	293	57.0	5.140	3.095	.774	44
five trailers	51	8.4	6.070	4.025	.805	7
Total		2,758.6				1,412
		502.4				
		2,256.2				

1,412 ÷ 2,256.2 = .626 kw.-hr. addtional energy per trailer (weighted).
.626 ÷ 2.045 = 30.6 per cent—ratio of additional power reouired for each trailer to that consumed by the motor car operated alone.

*Deficit.

TABLE II—APPORTIONMENT BASIS DETAILS FOR ITEMS IN TABLE I.

SUMMARY

Expenses	
Way and structures:	
Track and roadway accounts	Car-miles
Distribution system accounts	Train-miles
Passenger and freight stations	Direct
Other buildings, fixtures and grounds	Car-miles
Equipment:	
Passenger and freight cars and equipment	Direct
Other equipment accounts	Car-hours
Power	Kilowatt-hours
Conducting transportation:	
Conductors, motormen, trainmen, station employees and expenses	Direct
Other accounts	Car-miles
Traffic	Car-miles
General and miscellaneous:	
Rent of tracks, facilities, equipment	Car-miles
Other accounts	Gross operating revenue
Taxes	Car-miles
Earnings	
Non-operating revenue, credit	Direct and car-miles
Gross operating revenue	Direct

TABLE III—INTERURBAN FREIGHT BUSINESS, INDIANA SERVICE CORPORATION, YEAR ENDED MAY 31, 1922, USING DIRECT FREIGHT EXPENSES

Way and structures		
Estimated maintenance made necessary by freight business at 11 cents per car-mile		$35,498
Maintenance of freight stations		1,410
Equipment		
Maintenance of freight cars		4,280
Maintenance of electrical equipment		1,645
Power at 2.31 kw.-hr. per car-mile		31,853
Conducting transportation		
Freight trainmen		23,217
Station employees		39,952
Station expenses		1,769
Depreciation 4 per cent on $200,000		8,000
Taxes, estimated		2,000
Total		$149,624
Less miscellaneous revenue credit		24,794
Total expenses		$124,830
Gross earnings, freight department	$157,519	
Total expenses as above	124,830	
Net earnings	$32,689	

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*Abstract of discussion on paper of L. T. Hixson at meeting of Central Electric Railway Accountants' Association, Michigan City, Aug. 25-26.

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The News Element in Convention Exhibits

THE most attractive exhibits at the approaching Chicago convention will be those which feature the recent advances in their respective fields. In other words, the news value of an exhibit is a factor in its effectiveness. The exhibitors will want to make the most of this fact and to coach their representatives carefully as to the interesting features which are brought out in their exhibits. It is true that a determined effort will have to be made in many cases to bring out the elements of novelty, especially where it seems that only standard products can be shown. However, even in such cases there are advances in methods of manufacture, in details of design, in improvements in raw materials and in the finished output which may well be featured.

Some years ago it was suggested that prizes be offered for originality and instructiveness in convention exhibits. The practical difficulties in the way of making awards which would appear to all as fair prevented the carrying out of the idea. Prizes or no prizes, however, there is real competition among the exhibits for attention and, without going to extremes to attract this attention, exhibitors will do well to prepare to meet the competition.

A Good Example in Railway Shop Lighting and Ventilation

HIGH-CLASS work cannot be done continuously in a gloomy shop. The psychological effect of such a shop is depressing and in addition good workmanship requires proper illumination. Electric railways are not building many new shops at the present time, but programs for rehabilitation are going forward, and in these the value of additional windows and the arrangement of shop tools to secure efficient illumination should not be lost sight of.

A good example of the trend of modern shop building construction is afforded in the new repair shop of the Atchison, Topeka & Santa Fé Railroad at Albuquerque, N. M. The most conspicuous of the new features is the large amount of glass construction used. The sides of the building present the appearance of a solid sheet of glass. The glass is placed in a plane 4 in. beyond the face of the structural members, which simplifies the construction and protects the steel work from outside exposure. The folding doors through which the tracks pass for entrance of cars to the pits and overhauling section have glass for nearly their entire length. A ventilating sash is provided in each main section of steel sash. Illumination from the sides is supplemented by a large number of A-shaped skylights, the upper half of which are arranged to open and close mechanically. Ventilation and illumination in an unusual degree of excellence are thus afforded, and throughout the construction it is evident that the comfort and convenience of the workmen have been considered as most essential. This is certain to be reflected in better workmanship and greater efficiency. Many existing electric railway shops could very profitably be brightened up by substituting steel window sash and glass for much of the present brick in the walls.

Honest Differences of Opinion in Indiana

LED by Mayor Quick of Muncie and seconded by Mayor Shank of Indianapolis a drive is on among the Mayors and city attorneys of Indiana to obtain recruits in a campaign to secure amendments to the Public Service Commission law of the State at the coming legislative session. Not even the Mayors, or such of them as have expressed opinions, are agreed as to what they consider should be done to correct the grievances against the commission from which the cities are supposed to be suffering, but the camp does seem to be divided into two factions. One faction is for the repeal of the law and the return to home rule. The other is opposed to the repeal of the basic law, but is urging the need of amendments designed to open the way to a stronger presentation of the "case of the people" than under the present operation of the law. Stronger presentation of the case of the people would seem to be a matter for the exercise of talent rather than a subject for legislation, but that is neither here nor there now. So much for the political agitation.

This was a situation upon which the Indiana Public Utility Association was not inclined to look with equanimity. If organization meant strength to the politicians masquerading as mayors, then organization certainly meant strength to the association through its ability to reach investors who would likely suffer a shock to their confidence and perhaps a real loss in their investments if the commission act became the football of politics. In consequence a plea was addressed to investors in Indiana securities residing within the State to do what they could to discourage any tampering with the law that would tend to injure the future stability of the public service industry. This seemed only logical to the association. With it self-preservation was still the first law of nature.

Now come the bankers. They are no more prone to look feelingly upon the present political agitation as conducted by the Mayors than are the utility managers acting through their associations. The investment bankers hold to the opinion, however, that the action of the association in seeking support from security holders is not likely to accomplish the end which the association has in mind, but if persisted in is much more likely to do harm than good. Contrary to the general opinion that investors watch their investments carefully, the experience of the bankers has been that most investors buy on the representation of the issuing house and put the securities away and forget their ownership between interest or dividend periods. As the bankers see it, the only result of urging the investor to political action in his own behalf is to create distrust in the mind of the investor about the safety of his investment and to cause a dumping of securities on the market. Even where the investor does not sell, the opinion of the banker is that he becomes an increasingly hard prospect for the future. In short, as the banker sees it, the association is playing indirectly into the hands of the politician by its appeal.

The association must have felt that the political agitation over the commission was assuming serious proportions, but it is to be hoped that its proximity to the participants in the campaign makes the agitation appear to the association to be much more formidable than it really is. From a distance, the campaign would seem to be merely another cheap bid for political preferment that is not likely to manifest itself in any tangible form. This is the charitable view of the situation. It would, indeed, be a terrible commentary on the common sense of the people of Indiana if this should prove not to be so.

The Transfer as a "Necessary Evil" May Not Be Always Necessary

OPINIONS on transfers have gone through several cycles. The origin of the transfer in most cities, at least of the universal transfer, dates from the time of the consolidation of the lines into one urban system. It was often included in the franchise as one of the conditions exacted of the company for the consolidation, or was later added to the requirements by legislative enactment.

After the general adoption of the universal transfer, traffic rapidly increased, and much of this growth, due to many causes, was attributed to the transfer. The manager of one large electric railway system, writing in this paper during 1901, said: "The liberal system of transfers adopted and in force during the last eight or nine years has increased the earning power of the company more than any other one cause, the introduction of electricity as a motive power not excepted."

Latterly, the transfer has lost some of its pristine favor. In some cities where an adequate increase in fares could not be secured in any other way, a charge has been made for transfers, or they have been abolished altogether where this has been possible. Yet while not as popular as it once was, the transfer still has many defenders from the point of view that it simplifies questions of routing, particularly rerouting. Otherwise, where a change in routing meant an additional transfer, it would probably be opposed by those whose fares would be increased thereby. While there is some reason for this argument, no great difficulties have been experienced in those cities where a charge for transfers has been made. Now, where the pass is used, the transfer is going further into desuetude. In fact, one important advantage of the pass is that it makes the transfer unnecessary to those who use the pass, and this is an advantage to both passenger and company.

While much thought has been put on the design of transfer it remains a nuisance, retained only because no substitute has been found for it in fare collection systems other than the pass, and the use of that is limited. Should it ever be possible to abolish the universal free transfer entirely, it would go to its demise "unwept, unhonored and unsung."

Sixty-eight Years of Service to the Public

THE sixty-eighth annual report of the Brooklyn City Railroad Company, covering the fiscal year ended June 30, 1922, and recently issued, seems to merit more than casual attention in these days of Mayor Hylan's hectic statements concerning the obsolescence of street railways. It must be considered remarkable that a street railway has so long continued its corporate existence, dating its origin almost from the very beginning of rail transportation enterprises in New York City. From its record, who can doubt that the company has fulfilled and is continuing to serve a distinct public need, when such a record is at hand?

This company has passed through practically every phase of street railway construction and operating methods beginning with the bobtail horse cars on stringer rails and thence down to the present electric car running on standard girder rail tracks. It has had its share of strike troubles also, and the recent strike of 1920, which alone entailed a loss of $1,000,000, has not seriously affected its financial position. It may also be remarked that the Brooklyn City company is one of the few underlying companies forming a part of the Brooklyn Rapid Transit System which has not been forced into receivers' hands during the recent period of depression, although it has been obliged to discontinue the payment of dividends.

The financial statement above referred to indicates a substantial profit for the year reported upon, and there seems to be every reason to believe that this young-old company will continue many more years of faithful service to the residents of Brooklyn.

Sept. 9 Is a Significant Day in Power Circles

FORTY years ago today electric service was established from the Pearl Street station in New York City by Thomas A. Edison. The fortieth anniversary of this date is being utilized by the lighting and power interests to emphasize to the public the significance of this event and of the development which has since occurred.

Edison saw in the lighting field a ripe market for electrical power. He planted his first important station when the opportunity seemed greatest; that is, in downtown New York. When this plant was designed the high-speed steam engine was a crude affair. Edison wanted to get along without belting between the engines and the dynamos to save space on his expensive site. He required a satisfactory high-speed engine, and he got it. The building of this station, therefore, stimulated the development of the high-speed engine and the effect reached the boiler room also. The prospective electric railways benefited by this.

In the Pearl Street station there were also the so-called Edison "Jumbo dynamos," huge bipolar affairs, crude in design as judged by present-day standards, but sturdy and, for the time, reliable. They were of such capacity as to absorb the output of engines rated at 175 hp. each. These machines marked an advance in their field similar to that in the engines and boilers.

The Pearl Street station had nothing to do with electric railways, for these did not exist when it was started. But it paved the way for electric railways, because this development was not possible until cheap and plentiful electric power should become available.

TABLE IV—T. H., I. & E. REPORT FOR NOVEMBER, 1921, APPORTIONED ON TWO BASES

	Mr. Hixson's Apportionment				Apportionment on Proposed Basis			
	Basis	Passenger	Freight	Total	Basis	Passenger	Freight	Total
Way and structures	B	$40,969	$7,093	$48,062	D	$38,412	$9,650	$48,062
Equipment	A, B	18,544	2,219	20,763	A, F	16,726	4,037	20,763
Power	B	32,978	5,710	38,688	G	31,658	7,030	38,688
Conducting transportation	A, B, C	39,603	12,776	52,379	A, D	37,405	14,974	52,379
Traffic	C	993	194	1,187	D	949	238	1,187
General and miscellaneous	A, C	23,269	4,983	28,252	A, C	23,269	4,983	28,252
Total		156,356	32,975	189,331		148,419	40,912	189,331
Other income, credit		14,754	2,882	17,636		14,754	2,882	17,636
Total expenses		141,602	30,093	171,695		133,665	38,030	171,695
Gross earnings		210,942	41,191	252,133		210,942	41,191	252,133
Net earnings		69,340	11,098	80,438		77,277	3,161	80,438
Taxes	C	21,461	4,189	25,650	C	21,461	4,189	25,650
Net earnings after taxes		47,879	6,909	54,788		55,816	1,028*	54,788
	IN CENTS PER CAR-MILE							
Way and structures		10.75	7.39	10.05		10.05	10.05	10.05
Equipment		4.88	2.31	4.35		4.39	4.20	4.35
Power		8.67	5.95	8.12		8.32	7.33	8.12
Conducting transportation		10.41	13.33	10.99		9.84	15.60	10.99
Traffic		.26	.20	.25		.25	.25	.25
General and miscellaneous		6.12	5.19	5.93		6.12	5.19	5.93
Total		41.09	34.37	39.69		38.97	42.62	39.69
Other income, credit		3.88	3.00	3.71		3.88	3.00	3.71
Total expenses		38.21	31.37	35.98		35.09	39.62	35.98
Gross earnings		55.44	42.93	52.92		55.44	42.93	52.92
Net earnings		17.23	9.56	16.94		20.35	3.31	16.94
Taxes		5.64	4.36	5.38		5.64	4.36	5.38
Net earnings after taxes		11.59	5.20	11.56		14.71	1.05*	11.56

Bases of Apportionment: A. Direct or actual where possible. B. Ton-miles. C. Gross earnings. D. Car-miles. E. Train-miles. F. Car-hours. G. Kilowatt-hour consumption. * Deficit.

TABLE V—POWER CONSUMPTION OF TRAIL CARS IN MAY, 1922

Passenger Train	Kw.-Hr.	Miles	Kw.-Hr. Per Mile	Additional Energy Required For Trailer
Motor car only	14,186	5,283	2.68	....
Motor car and one trailer	1,920	463	4.14	1.46 Kw.-Hr.

1.46 divided by 2.68 = 54.5 per cent

to be used for comparative purposes only, as the meters do not register power consumed by the air compressor, lights or heating system. These figures are best used by weighting the car-miles operated by each department and using the resulting figures as a basis for the power apportionment.

Analysis of these records for a shorter period showed that each passenger trailer adds about 50 per cent to the power consumed by the motor car alone, and each freight trailer adds 30 per cent to the power consumed by the motor car alone. The calculations involved are to be found in Table V.

The writer believes that, in general, the car-mile is the best basis for those expenses of conducting transportation which cannot be directly allocated, also for traffic expenses. The gross earnings basis seems to be logical for the general and miscellaneous account, except that the car-mile basis should be used for rent of tracks, equipment and facilities.

In Table IV will be found an analysis of Mr. Hixson's figures using the several bases suggested in Table II. The freight department shows a net deficit for the month, after taxes, of $1,028.

The showing of the freight department of the Indiana Service Corporation for the same month, November, 1921, using the bases suggested in Table II, indicates a deficit after taxes of $2,588, which was the lowest point to which the earnings fell during the twelve months shown in Table I. Since that time the net earnings have steadily improved and May, 1922, shows a net profit after taxes of $397.

The results of operation for the

TABLE VI—ESTIMATED COST OF FREIGHT SERVICE, MOTOR CARS AND TRAILERS, BASED ON TABLE III, FOR TWELVE MONTHS ENDED MAY 31, 1922

A 100-mile run and average speed of 11 miles per hour are assumed.

Expenses for 100-mile trip	Motor Car Only	Motor Car and One Trailer	Motor Car and Two Trailers
Car-miles, 100-mile trip	100	200	300
Way and structures, at 11.6 cents per C.M.	$11.60	$23.20	$34.80
Equipment, maintenance of motor car	1.33	1.33	1.33
Maintenance of elec. equip	1.02	1.02	1.02
Maintenance of trailers	....	1.33	2.66
Depreciation—based on 1 cent per car-mile for motor car and 0.5 cents for each trailer	1.00	1.50	2.00
Power, average for year for freight was 9.87 cents per car-mile. Service consists of average train motor car and one trailer. Trailers consume 0.3 power of motor car alone, each. This gives 15 cents for motor car and 4.5 cents for each trail car per car-mile	15.00	19.50	24.00
Conducting Transportation			
Motor car requires two men; the addition of one or more trailers adds one man to the train crew. Time required for trip is 9.1 hours. Rate of pay: 48 cents per hour	8.74	13.11	13.11
Total	$38.69	$60.99	$78.92
Total per car-mile	.39	.30	.26
All other expenses, including station and general expenses and taxes, and deducting miscellaneous revenue credit	.24	.24	.24
Grand total, per car-mile	$.63	$.54	$.50

TABLE VII—REVENUE PER TON-MILE FOR MAY, 1922, INTERURBAN FREIGHT BUSINESS INDIANA SERVICE CORPORATION

Class	Tons Hauled	Ton-Miles	Revenue	Average Haul	Revenue per Ton-Mile
Local freight	1,185.86	48,107.93	$6,496.32	40.6 mi.	13.5 cents
Interline received	962.99	30,943.16	3,252.95	32.1	10.5
Interline forwarded	778.38	34,915.43	2,684.32	44.9	7.7
Interline overhead	608.78	23,606.77	1,444.81	38.8	6.1
Total	3,536.01	137,573.29	$13,878.40	38.9	10.1

REVENUE PER TON

		Tons Hauled	Revenue	Revenue per Ton
Local freight	L.C.L.	973	$6,251.82	$6.42
	C.L.	213	245.00	1.15
	Total	1,186	6,496.82	5.47
Interline received	L.C.L.	978	3,333.23	3.41
	C.L.	....	....	....
	Total	978	3,333.23	3.41
Interline forwarded	L.C.L.	730	2,592.79	3.55
	C.L.	34	96.62	2.84
	Total	764	2,689.41	3.52
Interline overhead	L.C.L.	566	1,436.84	2.54
	C.L.	.....	....	....
	Total	566	1,463.84	2.54
Total all classes	L.C.L.	3,247	$13,614.68	$4.19
	C.L.	247	341.62	1.38
	Total	3,494	$13,956.30	$3.99

Note: The differences to be noted between some of the corresponding totals of the two summaries above are due to deferred billing of interline business.

twelve months ended May 31, 1922, using only direct freight expenses, including depreciation and taxes, appear in Table III. The result of this analysis indicates an excellent margin of earnings over expenses, the net being $32,689, or 20.7 per cent of gross earnings.

In Table VI is to be found an estimate of the cost of service, using a motor car and one or two trailers, as compared to the cost of operating the motor car alone.

Summaries have been prepared which show the revenue per ton-mile and the revenue per ton for each of the several classes of freight. This exhibit appears in Table VII.

Paving in Streets with Track

A SPECIAL conference to discuss the design and construction of streets for street railway traffic has been called for Oct. 9 in Philadelphia. It will be held at the Engineers' Club in that city, with the co-operation of members of the American Society of Civil Engineers, American Electric Railway Engineering Association, American Society for Municipal Improvements, Society of Municipal Engineers, Federal Highway Council, and the Motor Truck Association of America. Invitations are being sent to engineers of cities and of railway companies. There will be morning, afternoon and evening sessions, with a subscription dinner at 6 p.m.

The general subject has been divided as follows: (a) Location of utilities in the street; (b) Design of the street railway structure; (c) Paving and drainage of streets for street railway traffic; (d) What should be the responsibilities of the street railway company as to cost of installation and maintenance of paving? (e) To what extent is paving affected by street railway tracks?

The members of the committee in charge of the meeting are: C. M. Pinckney, chief engineer, New York City; Col. R. Keith Compton, consulting engineer, Paving Commission, Baltimore, Md.; Major F. S. Besson, assistant to the engineer commissioner, Washington, D. C.; R. C. Cram, engineer of surface roadway, Brooklyn Rapid Transit Company; E. J. McIlraith, superintendent of rolling stock and buildings, Philadelphia Rapid Transit Company; Julius Adler, deputy chief, Bureau of Highways, Philadelphia; John Meigs, consulting engineer, Philadelphia, and Charles E. Billin, secretary, Engineers' Club of Philadelphia.

Accountants Discuss Freight Costs

AN ACTIVE discussion followed the presentation of a paper on the cost of handling freight, read at a meeting of the Central Electric Railway Accountants' Association, held in Michigan City, Ind., on Aug. 25-26. The paper was presented by L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, and was entitled "Is Freight Operation on Electric Railways a Paying Proposition?" A written discussion on this topic was presented by R. S. Drew, engineer Indiana Service Corporation. Both of these papers are published in abstract in this issue.

In the oral discussion of these papers emphasis was laid by several speakers on the need of meters on cars if there is to be a proper determining of freight costs. It was also agreed that there were other expenses, which could not definitely be segregated as applying to freight operation, which should be charged to it. Another point made was that the railways could handle freight in trail cars at a lower cost than in motor cars, and that it was cheaper to handle trail cars behind freight motor cars than behind passenger motor cars.

A special vote of thanks was voted to both Mr. Hixson and Mr. Drew for the valuable information they had presented, and the president was authorized to appoint a special committee on freight costs. The next regular meeting of the association will be held in Lima, Ohio, Jan. 26-27, 1923. A vote of thanks was also extended to Mr. Pantel for the care which he had taken of the members at the Michigan City meeting.

On the morning of Aug. 25 the executive committee held a meeting and passed on a number of subjects. The unit interline waybill was discussed and the size of 8½ in. x 5½ in. was adopted for one size and 8½ in. x 11 in. for the other. The use of this waybill is not mandatory but companies who can consistently use it are urged to do so as well as to use passing stamps of uniform design and size, to conform to the size that will be accommodated by the printing space for junction stamps on the waybill. A post card form for junction reports was also adopted.

Eleventh Annual Safety Congress

Addresses by Prominent Electric Railway Men Were a Feature—Concern Was Expressed Over Tendency Toward Increase in Accidents, but Safety Council Is Credited with Great Influence in Spreading Gospel of Accident Mitigation

UNDER the auspices of the National Safety Council, the eleventh annual safety congress was held at the Cass Technical High School, Detroit, Mich., Aug. 28 to Sept. 1. The program, in so far as it was of particular interest to electric railway men, was given in the Aug. 12 issue of this paper, page 238.

An abstract of the paper read on Wednesday, Aug. 30, before the electric railway section by Frank R. Coates was printed in the Sept. 2 issue, page 328.

INSTRUCTIVE DISCUSSION AT WEDNESDAY LUNCHEON

"The aim of safety work is the reduction of preventable accidents and illness that results in injury to the human body in order that something may be added to the sum total of human happiness," was the statement of Alex. Dow of the Detroit Edison Company in his opening words at the joint luncheon of the public utility and electric railway sections on Wednesday. He said that there was no room for discussion of aims, but that there was a wide field for the discussion of methods, warning his hearers that the fixation of methods in the form of law or codes can hinder rather than advance safety work. He expressed no patience with the man who balances life and limb against expense accounts and declared that industry must carry its own accident bill. In any movement the error of judgment and the benefit of the doubt must be in favor of human life and welfare. As a better remedy for the prevalence of carelessness of industry as to safety measures he advocated a stiff charge to cover the cost of compensation to those injured in accidents and a minimum of state interference in the form of codes and inspection. That such a charge would strike the man in the position to control safety work and be a more effective way of getting action was his expressed belief. The hope in the future for safety work he declared lies with the children, and they should be taught personal responsibility that would lead to more caution and respect for the rights and safety of others.

Arthur W. Brady of the Union Traction Company of Indiana at the same luncheon said that the street railways of the country come into more intimate contact with the public than any other industry and therefore are more interested in safety work than any other industry. They carry sixteen times as many passengers as the steam roads and exceed the estimated number of people carried in automobiles by 100 per cent. "The automobile has increased the hazards to the street railways," said Mr. Brady, and he classed the apparent indifference of the public to safety as one of the discouraging features of the efforts of the street railway companies to promote safety in their operation. He pointed out as an evidence of this carelessness and indifference the statistics that showed in the year 1920 20 per cent increase in fatalities due to the automobile as against a 13 per cent increase in the number of machines registered. As one of the hopeful elements in the situation he pointed to the 20 per cent decrease in the number of fatal accidents in the street railway field in the years 1920 and 1921. The activities of the Safety Council were given as another hopeful sign. Mr. Brady told his hearers that safety work must not be looked on as simply an adjunct of railway operation, but must be made a part of the business and lived in the every-day operation of the system.

In the separate session of the railway and utility sections, the membership reports showed that the electric railway membership of the National Safety Council had increased during the year from 109 to 113 and the public utility section from 120 to 142. The committees in making their reports called attention to the small portion of the total number of utility and railway companies represented in this organization.

In the general session on Monday Dr. R. M. Little, director of rehabilitation of the New York State Railways Department of Education, took to task some of the insurance companies' managers whom he classed as hard boiled in their handling of casualty cases. While he stated distinctly that for the present, at least, he did not believe the insurance companies could be eliminated from the handling of compensation insurance, he declared that court decisions had established compensation as a justifiable tax on industry and said that the insurance companies were handling insurance of this kind as a matter of courtesy, and not one of right. This condition he declared placed on such companies an obligation for service in the handling of claims to which they had not fully risen, even though many companies had done wonderful work. He cited the barring of insurance companies from seven states in this class of business and the agitation for similar action in others as a warning to the insurance companies that they must give service and not stand on technicalities in the settlement of claims.

OTHER CONTRIBUTIONS AT WEDNESDAY SESSION

A sum of $20 and a uniform for each of 350 men at the end of the first year of its organized safety work and a large reduction in accident and injury cases in the eighteen months in which the work has been organized, was the record submitted by H. M. Keyser, Washington Railway & Electric Company, Washington, D. C., in discussion of methods of promoting safety at the meeting of the electric railway section on Wednesday. In the period of eighteen months collisions have been reduced 68 per cent, no-report accidents 50 per cent, serious personal injuries and all other personal injuries 42 and 28 per cent respectively, claims 31 per cent and deaths 66 per cent. The plan used requires the organization of the men into teams. At the end of each three months each man with a clear record receives a prize of $5, with a new uniform at the end of a year of clear record. In the period of eighteen months accidents to other employees in the company have been reduced 52 per cent and damage costs, that in 1918 and 1919 totaled 7 per cent of the gross receipts of the company, have been reduced so that at the present they are running at the rate of 4¼ per cent for the current year. The safety work started with 280 cases in court and a total in litigation of $3,500,000, which has been reduced to thirty cases and a total of $250,000. In handling the work the teams organized a contest for a banner, which is awarded every three months to the team having the best record. In determining the awards to the individuals and teams each accident or injury case is carefully investigated and the personal responsibility of the men involved determined. An appeal and review of each decision is provided for.

B. D. Haskins, Chattanooga Railway & Light Company, outlined the system used there, in which all the employees of all departments interested are thrown together and captains, either elected or appointed, are permitted to choose team members in rotation to avoid unfair grouping of employees in the various teams. The departments participating cover the car and power house men, shop men and some of the track men. None of the foremen are allowed to participate. For two four-month periods each year, with a two-month intermission, the teams contest for fixed sums. Failure on the part of individuals to report accidents results in the individual losing half of his award for the first case and all for the second case. The team of which he is a member is also penalized for such failures. New captains are elected and new teams formed for each four-month period. The injury and damage costs on the system were said to have been reduced from 17 per cent of gross in 1917 to 3½ per cent at the present time.

In the discussion of educational methods in the public schools, copies of a course of study in safety were submitted that has been compiled by the Community Traction Company, the Toledo Edison Company and the Toledo Automobile Club for use in the public schools at Toledo, Ohio. The outline of subjects covers safety in the home, school, the street, public places and the entire range of probable conditions under which the child is liable to encounter accidents. It was also stated in the discussion by M. W. Bridges, safety engineer Chicago Elevated Railroads, that a similar course is being prepared for use in the Chicago schools. It came out in the discussion that a number of companies seeking to promote such studies have encountered objections from teachers that the courses are already full and to introduce the subject means upsetting the entire plan of work. H. O. Allison, Beaver Valley Traction Company, outlined a method used at Rochester, Pa., to overcome this objection. Once a week a specially prepared safety story is sent to each room in the school for the teacher to read to the children. In another case a specially prepared poster showing the ways in which accidents occur was prepared and, following talks to the children, the posters were distributed. The pupils were asked to make their own accident posters on the back of these prepared posters, enlisting the aid of parents or others, if they cared to, and using magazine clippings, drawings or any other means that produced results in the preparation of the posters. Out of 2,500 posters thus handed out, 1,500 were returned as the work of the school pupils. Mr. Allison said that his experience indicated that carefully prepared talks were most effective in reaching the children. One of the features of the electric railway section meeting was the presence, with Mr. Allison, of the entire safety committee of sixteen members of the Beaver Valley Traction Company. The entire committee appeared dressed in white.

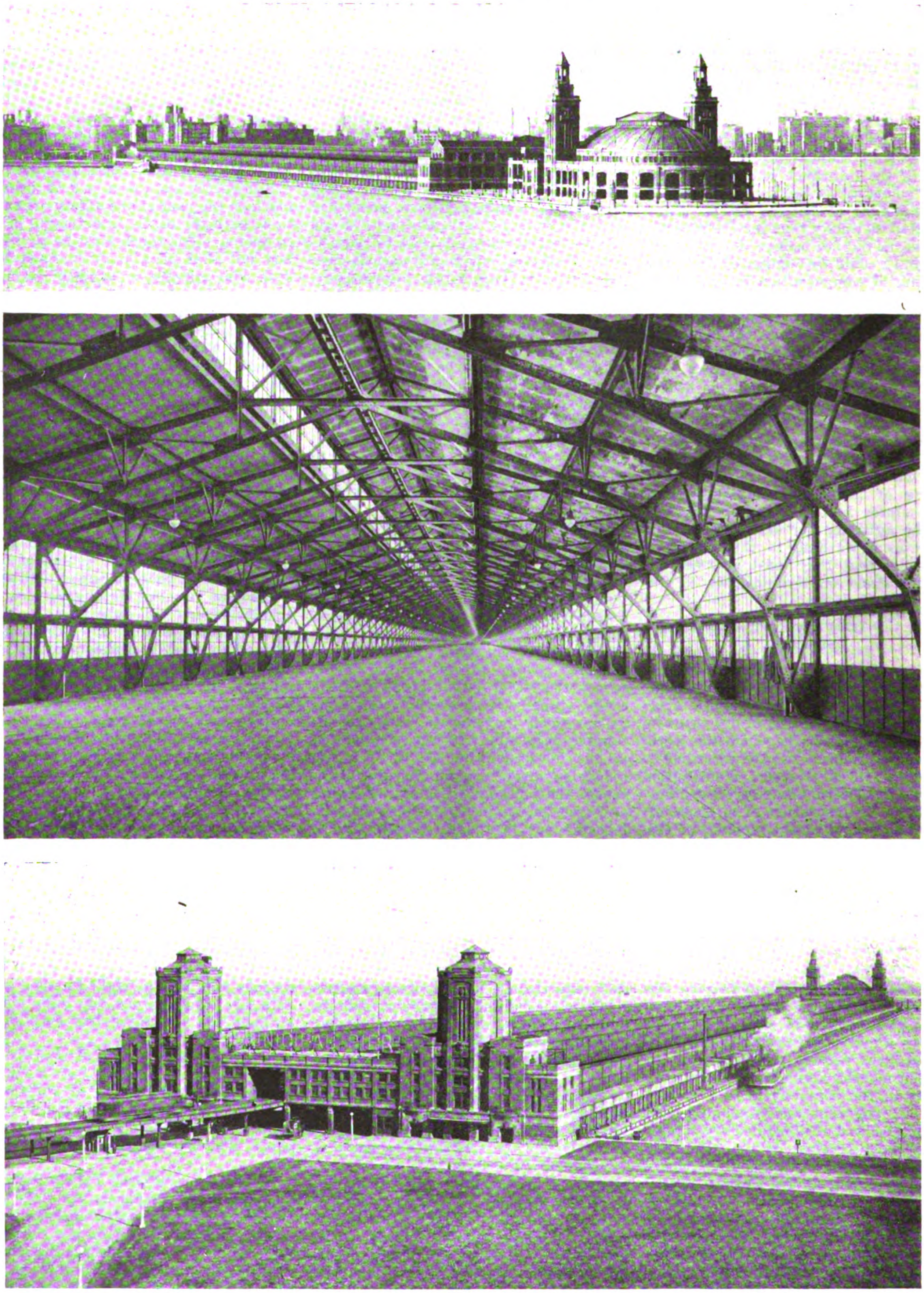
As essential to successful safety work, C. B. Scott of Chicago declared that conversion of the "boss" was the first. The second was an organized force. One man, he said, could not carry the entire burden, but must have enthusiastic assistance. In this connection he characterized the greatest evil in safety work as a lack of intimate touch on the part of the safety organizations with the other departments of the company. This touch must be personal, and not that of a man confined to a desk who has only an academic interest in the work of the employees. Sympathy for and understanding of the problems of the employees, he said, was the only way in which success could be gained. The third essential he gave as operation according to rules laid down, meaning by this the formulation of such safety rules as experience had shown necessary and strict adherence to them.

A lively discussion on the use of suggestions for safety or improvement of operating conditions took place and M. W. Bridges of Chicago outlined the method in use on the Elevated Railroads in Chicago, under which some 3,800 suggestions have been submitted and 68 per cent of them accepted and used. As soon as received the suggestions are acknowledged and submitted to committees representing the departments affected and then to division committees, and finally to the central safety committee. If finally accepted the employee who made the suggestion is notified and orders are at once placed for any needed material. The man who made the suggestion is kept advised of the progress of the work and on its completion is advised and asked to inspect the work. The object throughout is to make the employees feel that the suggestions are welcome and that there is no delay in handling or no inattention to the things suggested by reason of a feeling on the part of some one in the organization that they are of little or no importance. Every effort is made to encourage such suggestions. When disapproved the employee is given full reasons and has the right to come back with his own reasons for adoption if he feels that anything has been overlooked.

Asserting that a careful man is the best safety device, Britton I. Budd, president Chicago Elevated Railroads, declared that the only safe and careful man is the contented man. Mr. Budd's paper will be published in an early issue.

W. H. Boyce, Beaver Valley Traction Company, New Brighton, Pa., said that one trouble with the street railway business is the prevalence of low salaries. He took the position that the cheap man is expensive because he does not have the ability or the will to meet the problems put up to him. He criticised the class of executives who are deaf to the human side of the business and said

Recent Views of the Municipal Pier at Chicago, Where the Convention Is to Be Held



At Top, Convention Pier from the Lake. In Center, Interior View, Giving a Good Idea of the Immensity of the Pier. At Bottom, Shore End of the Pier that executives or others who do not exercise courtesy or self-control in dealing with those under them cannot expect their subordinates to be courteous or considerate of the public. Co-operation with employees to better conditions he said is the first essential to success in safety work. He advocated such measures of consideration for employees as lemonade on hot days, coffee on cold, for those called upon to work overtime or under trying conditions. A small loan sum for the accommodation of those who would otherwise fall into the hands of the loan shark was advocated, and he declared himself in favor of free life insurance, medical advice and also legal assistance in the methods of preparing family budgets, accident insurance and a strict observance of the golden rule in dealing with employees as the best means of promoting safety work.

The officers of the electric railway section for the coming year are: Chairman, John H. Truett, director of safety, United Railways & Electric Company, Baltimore; vice-chairman, G. T. Hellmuth, claim agent, Chicago, North Shore & Milwaukee Railroad, Chicago; secretary, M. W. Bridges, safety engineer, Chicago Elevated Railroads.

Overstorage of Coal Deprecated

UNDER date of Sept. 5, John Price Jackson, representative in Washington of the joint fuel committee of the national utilities associations, sent the following letter to J. W. Lieb of the New York Edison Company, chairman of the committee:

> Secretary Hoover today asked me to convey his request that the utilities of the country co-operate in the present emergency by refraining from obtaining more coal than is required for current needs, and only carry such storage as is essential for safe current operation.
>
> There is already a car shortage in certain districts of the country. Opening the anthracite mines, using up the large number of idle coal cars now available, and the increased demand which will be occasioned by longer nights and approaching cold weather will tend to continue the shortage or make it more acute.
>
> Secretary Hoover believes that only by care for the present, on the part of all, not to exceed current demands can the country be satisfactorily supplied with fuel.

Arkansas Utilities Association

THE executive committee of the Arkansas Utilities Association has selected Oct. 9 and 10, 1922, for holding the convention of the association. The headquarters will be the Eastman Hotel, Hot Springs, Ark.

Safety at Canadian National Exhibition

THE Ontario Safety League has been assigned 1,200 sq.ft. of space for a safety exhibit at the coming Canadian National Exhibition. H. H. Couzens, of the Toronto Transportation Commission, has had built especially for this exhibit a section of a passenger car to enable the league to demonstrate safety in connection with street car traffic. Another feature will be daily demonstrations by Boy Scouts of resuscitation from drowning.

American Association News

Transportation to the Chicago Convention

ARRANGEMENTS are being made by the transportation committees of the American Electric Railway Association in different parts of the country for special trains to the Chicago convention. Where there will not be a sufficient number of delegates to warrant a special train it is hoped that at least a special car or cars will be available to carry the delegates to Chicago.

There will be two special trains from New York. One will be on the Pennsylvania Railroad and will connect with cars from Baltimore and Washington. The other will be on the New York Central and will be met at Albany by the contingent from Boston. The Pennsylvania train will be known as the "Red Special" and will be run as a section of the Pennsylvania Limited, train No. 5. It will leave New York at 11:05 a.m. on Saturday, Sept. 30, and will reach Chicago at 9 a.m. Sunday, Oct. 1. Other leaving times for this train are: Philadelphia 1:16 p.m.; Harrisburg, 3:32 p.m., Pittsburgh, 10:15 p.m. The connecting cars from Washington and Baltimore will leave the former city at 11:45 a.m. and the latter city at 1 p.m. A circular will be issued explaining how tickets for this train may be purchased.

The New York Central train will leave New York about midday on Saturday, arriving in Chicago Sunday morning. A later announcement will give the exact times of leaving and arriving. Besides the provision for the passengers from Boston already mentioned, the train will make a number of stops in central New York to take delegates from those points.

William R. Alberger as chairman of the Pacific Coast transportation committee has arranged for a special car to be attached to the "Pacific Limited," leaving Oakland Pier on Sept. 28. It will travel via the Central and Union Pacific Railroads and the Chicago, Milwaukee & St. Paul Railway. Passengers en route can board the train at Ogden, Cheyenne and at several other points.

Delegates from the Southland will be served by the "Dixie Special," made up of special cars attached to the "Dixie Flyer." This train will leave Atlanta at 8:45 a.m. Saturday, arriving in Chicago Sunday at 7:45 a.m. It will go by way of Chattanooga and Evansville. It is in charge of Charles S. Banghart.

E. P. Meissner is planning for special cars to be run from St. Louis. The schedule for these will be announced later.

Entertainment at Chicago

PLANS for the entertainment of visitors to the annual association convention were completed at a meeting of the entertainment committee in the office of the Chicago Surface Lines on Aug. 30. Members present were: J. V. Sullivan, chairman; H. J. Kenfield, J. T. Jenks, W. J. Beattys, Thomas Finigan, Harry L. Brown, C. W. Register, John Benham, E. E. Kretschmer, F. E. Johnson, and J. E. Wilkie. J. W. Welsh and Labert St. Clair of association headquarters also were present.

The principal work of the meeting was the completion of entertainment for the ladies. It was decided to serve tea and have a musical entertainment on the Pier every afternoon of the convention. On Tuesday, Oct. 3, the ladies will be given a free automobile ride around the park system. On Wednesday visitors will be admitted to the Art Institute and on Thursday to the Field Museum without charge.

The special feature night committee, of which Mr. Johnson is chairman, reported that it had completed arrangements for the dinner and home talent show to be held at Marigold Garden on Wednesday night, Oct. 4. The special feature of this occasion will be the presentation of the musical comedy "An Interrupted Operation," or "Hortense Horsesense Saves the Day." This skit, which has been written by Mr. Wilkie, is declared to be one of the cleverest amateur offerings ever prepared for the edification of convention visitors. Men and women connected with the electric railway industry will take all the parts. The sketch will run about thirty minutes. Mr. Johnson reported that applications for tickets to the dinner and carnival already were being received in large numbers. The total cost will be $5 per plate. The dinner will start at 6:30 p.m. and the show will open at 8 o'clock. Informal dancing will follow the show. Marigold Garden, which is located at Broadway and Grace Streets, is particularly well suited for the dinner and carnival. The dining room in which the festival will be held has the greatest seating capacity of any in Chicago.

The reception will be held on Monday night at the Drake Hotel, and the annual ball will be held on Thursday at the same place. Benson's orchestra, one of the most famous in the United States, will furnish the music for all convention entertainment, both on the Pier and at the hotel.

Arrangements have been made with six golf clubs to extend their privileges to all convention visitors. It is hoped that additional clubs will extend their privileges.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Grant Before Stockholders

Louisville Franchise Will Go Into Force Upon Acceptance by Security Holders

The question of approval of the new franchise for the Louisville (Ky.) Railway will come before the stockholders of the company at a special meeting called for Sept. 11. The objects sought to be accomplished under the new grant are, perhaps, best covered by the preamble to the measure itself, which follows:

> An ordinance providing for an adjustment of the franchises of the Louisville Railway; recognizing the rights of said company to operate over certain streets now occupied by it; requiring a surrender of all other street rights; providing for uniform operation under regulation by the Board of Public Works with recourse to arbitration; protecting the rights under outstanding mortgages and rights of present and future owners of Louisville Railway securities; establishing fare schedules and method for their application; setting out general construction, maintenance and operating regulations; with penalties for disregarding the provisions of this ordinance.

GOOD WILL MAINTAINED DESPITE LONG-DRAWN-OUT CONTROVERSY

Thus the closing chapters would appear to be about to be written soon in a controversy that has extended over many months. Throughout it all, however, despite the appeal to the courts and the submission and resubmission of proposals by both sides, a spirit of good will has been preserved. As for the franchise itself it is exactly what the preamble states it to be, namely, an attempt to readjust franchise conditions. Until the measure has gone into effect, the need would not seem to exist to do more than touch upon some of the high spots of the ordinance. Acceptance cannot be accomplished until the stockholders have approved the grant and formal acknowledgment of it has been filed with the city by the company after due authentication.

The franchise of the constituent lines of the Louisville Railway differ in respect to operating rights and conditions. For this reason all these old grants are swept into limbo under the new proposal and in their place is substituted a grant with a uniform term of twenty years.

The company is now charging a 7-cent fare. The right to charge such rate is in dispute before the courts. Under public regulation as provided in the new grant the initial fare beginning with the enactment of the ordinance and ending with Dec. 31, 1923, will be 7 cents cash with five tickets for 30 cents. Thereafter the fare will be changed from time to time in accordance with the amount in the stabilizing fund, varying between 5 cents cash with six tickets for a quarter under schedule A to 7 cents cash with five tickets for 35 cents under schedule F. There will be a sliding return to the company varying between the limits of 5 per cent and 7 per cent.

The recognized capital of the company as to Jan. 1, 1923, is to be $20,542,600, consisting of $8,719,000 of bonds and notes, $3,500,000 of 5 per cent preferred stock and $8,323,600 of common stock. The initial contribution of the company to the barometer fund is to be $350,000.

All disputes arising under the terms of the grant are to be settled by a board of three arbitrators.

Increase of Three Cents an Hour Granted

A strike was averted recently on the lines of the Chicago, Aurora & Elgin Railroad, Aurora, Ill., when the management at virtually the last minute granted a wage increase of 3 cents an hour to trainmen, ticket agents, freight handlers and switchmen. The new wage scale will be 63 cents an hour for first year trainmen, 67 cents for second year men and 70 cents for third year men. The new pay is retroactive to July 1.

The trainmen had originally asked for a 30 per cent increase or 20 cents. After the company had refused this the men offered to compromise on 5 cents. This was also refused with General Manager McClure suggesting arbitration. Before the meeting of the employees at which a strike vote was to be taken members of the international executive committee of the Amalgamated and of the railway's executive committee conferred and decided on the agreement of 3 cents an hour increase.

Compensation Bill Up in District of Columbia

The District of Columbia workmen's compensation bill, which combines features found in similar laws of various states, probably will not come to a vote in the House until the December session of Congress, according to its author, Representative Roy G. Fitzgerald, Dayton, Ohio. Opposition to the bill has centered principally against its insurance features, which contemplate creation of a fund by the District of Columbia government, to be administered by the United States Employees' Compensation Commission, which has charge of compensation for Federal employees and public employees of the District, and against its broad scope. In effect, the bill is a compulsory insurance measure. Its provisions include all employers and employees in private industry and business within the District of Columbia, including public service corporations and bus lines, without regard to hazard of occupation.

Service-at-Cost Sustained

New York Commission Sees Nothing that Contravenes Law in New Rochester Grant

Under the authority conferred on it by Chapter 582 of the Laws of 1922, the Public Service Commission announced on Sept. 3, that it had approved, upon petition of the city of Rochester, the contract between the city and the New York State Railways for service-at-cost transportation. The existing contract has been in operation for two years and it was recently attacked, the principal objection stated being that through it the commission lost for all time and for all purposes supervision of the operating company.

This the commission contended was not so. It held that:

> In all respects and in all regards the Public Service Commission maintains the jurisdiction and exercise of its regulatory powers over all matters of extension, service, safety of appliances and equipment. improvements, facilities, capitalization and accounting, propriety of regulations, practices, as fully and as completely as heretofore, and that upon complaint of the municipality, the railway or any citizen or upon its own initiative it may institute a hearing and make a determination thereon under its delegated powers. Any and all acts of the commission or the company under the contract in these regards are subject to review.

Objections to approval were made by the Monroe Democratic Club, the chairman of the Monroe County Democratic committee and its laws committee and the Rochester *Times-Union*. In a memorandum Commissioner Van Voorhis says:

> The objection is that the Public Service Commission is without jurisdiction to approve the service-at-cost contract in so far as it permits a rate of fare above 5 cents for each person, or to permit any increase of fare above that rate. This raises a question of law which must be submitted to the proper tribunal for determination. This commission is without power or jurisdiction to determine the legality or validity of statute law. It must take the law as expressed in legislative enactments. The amendment to the Public Service Commission law expressly gives the Public Service Commission power to approve a service-at-cost contract as defined by the act or any agreement purporting to be such a contract. It may, however, be fit and proper for this commission to state that it knows of no rule of law which forbids parties to a contract, even though one be a municipal corporation, from modifying by mutual consent the terms of their contract.
>
> The amendment of the Public Service Commission law of 1921 empowered the commission to determine just and reasonable rates, notwithstanding a higher or lower rate had been theretofore prescribed by statute, grant, franchise or other agreement.

Commissioner Van Voorhis discusses street railway conditions in Rochester prior to the making of the contract, saying that for some time the railway and its operations were "in a chaotic condition." The service was bad and revenues were insufficient under a 5-cent fare to meet operating expenses and taxes and yield a fair return to investors. In the Quimby case the Public Service Commission, Second District, refused to order the railway to improve its service under a 5-cent fare, on the ground that such requirement would result in the confiscation of the company's property. It was there shown that the actual deficit for 1919 in the city 5-cent fare zone was $643,171.

The contract became effective on Aug. 1, 1920, to continue for ten years with option to the city to renew for a further period of ten years. Commissioner Voorhis says:

> One of the objections urged to the approval of the contract is that the Commissioner of Railways in Rochester is granted too much power, and in fact so much that he may abuse such power to the injury of the traveling public and bring about poor service or an unwarranted increase in fare or a continuance of a fare too large under the provisions of the contract. We see no merit in this objection.
>
> We believe the people of the city of Rochester, as occasion may arise, through their Mayor and Common Council, will select for Commissioner a man of ability and integrity whose sole aim will be the zealous purpose of discharging the duties of its office as they are defined by the contract and in the interests of the public of Rochester. If any mistake is made in such selection it can be remedied by removal of the commissioner.
>
> As provided by the contract the company's property was appraised by men experienced in making this class of valuations. They valued the property at $19,216,000, and there was no appeal.

Commissioner Van Voorhis says the contract provides that under a 7-cent fare the company is entitled to a 6 per cent, yearly return; under a 6-cent fare, 6½ per cent; at a 5-cent fare, 7 per cent; at a 4-cent fare, 7½ per cent, and under a 3-cent fare, 8 per cent. He then says:

> Under the provisions of the contract the rate of fare is flexible, within the limits of 3 and 10 cents. It automatically changes as the balancing fund therein is increased or decreased by excess of revenues over expenditures or expenditures over revenues. Without further reference to the provisions of this contract, it may be stated on the whole that it provides a reasonable, lawful and proper arrangement for the operation of the street railway system in the city of Rochester. All of the objections have been considered and there are but two other than those mentioned to which we deem it necessary to refer.
>
> In regard to the power of the commission over rates by approval of the contract we determine the rate fixed thereby and the automatic method of change as therein provided to be just and reasonable. The commission retains its supervisory powers of the accounting of the company and it may disallow or reject charges made improperly to any accounts; for instance, capital or operating expense.
>
> Objection is raised to the power granted to the commissioner to make a charge for transfers. This power we believe is subject to the provisions of the Railroad law and the Public Service Commission law. In that regard, and on complaint or on the commission's own motion, an investigation can be had concerning the propriety of any charge for a transfer.

Scale of Fifty-two Cents

The agreement entered into some time ago between the management and employees of the Pennsylvania-Ohio Electric Company, New Castle, Pa., will terminate on June 1, 1923. According to the provisions trainmen in the employ of the company more than one year will receive 52 cents an hour; those in the employ of the company less than one year and more than three months will receive 46 cents an hour, and trainmen in the company's employ less than three months will receive 43 cents an hour. Safety car operators will be paid 57, 51 and 48 cents an hour according to the length of service.

New Road Nearly Done

Texas Interurban Will Meet Changed Conditions Surrounding Electric Railway Operation

Announcement has been made by Richard Meriwether, vice-president and general manager, that the new interurban railway line between Dallas and Terrell will be ready for operation about Dec. 1 next. This line is being built by the Texas Construction Company under a contract to turn over a single-track interurban line complete and ready for operation between Dallas and Terrell.

Terrell is almost directly east of Dallas. The country is generally level and the line is almost straight. There is a tangent of 12 miles between Terrell and Forney and one of 6 miles between Dallas and Forney. The grade is not to exceed 2 per cent except where the line crosses the Texas & Pacific Railroad overhead.

LINE WILL RUN THIRTY-ONE MILES

The length of the line between the interurban station in Dallas and the station in Terrell is 31.5 miles. Between the city limits of Dallas and the city limits of Terrell it is 27 miles. The line passes through Mesquite, 12.1 miles east of Dallas, and Forney, 19.7 miles east of Dallas. The density of population along the line will average about 1,200 to the mile.

The track is laid in double-track position. It is of standard gage with 70-lb. steel rails laid on 6 x 8 x 8 oak ties spaced on 2-ft. centers. Specifications for the double track call for gravel ballast with at least 6 in. under the ties. There are 4,800 ft. of timber trestles and three steel span steel bridges between the city limits of Dallas and the city limits of Terrell. The right-of-way for the entire distance is 100 ft. wide.

Five passenger and two express interurban cars have been purchased.

It is planned to operate the cars as one-man cars except during periods of congested travel such as may require a conductor. These cars are to weigh not more than 30,000 lb. complete. With lightweight cars operated by one man and with power supplied by automatic substations the line should be operated with a minimum expense both for maintenance and train operation. Mr. Meriwether said:

> During these days of improved highways and bus lines a project of this kind is of more than passing interest, and the construction, design and proposed operating methods of this particular line meet, as far as possible, the changed conditions now surrounding the interurban railway business.

It is planned to make the run between Dallas and Terrell in one hour and twenty minutes, with ten minutes layover time at each end of the line. It will therefore require three cars to maintain an hourly schedule.

Construction as well as specifications and design of this railroad has been under the direction of Richard Meriwether, vice-president, and R. R. Brown, chief engineer, of the Texas Construction Company.

The new line is one of the two lines which the owners of the Dallas Railway agreed to build in a contract with the city of Dallas in 1917. Each of the two lines is to be not less than 30 miles in length. Terrell was decided upon as one of the routes and construction began last year.

Franchise Abolishing Tax Is Rumored

Repeal of the franchise of the Cincinnati (Ohio) Street Railway to operate in Cincinnati is the object of a petition drawn up by Attorney Robert S. Alcorn, asking for a special election to submit a repealing ordinance by referendum. The position will not be submitted to signers until it is determined what action Mayor George P. Carrel's street railway committee may take to solve the local traction difficulties, Mr. Alsorn said.

According to Attorney Alcorn there appeared to be a movement on foot to have the Mayor's committee recommend a new ordinance to the Council to abolish the franchise tax of $350,000 a year which the traction company must pay the city. He said that if the Council should pass an ordinance abolishing the franchise tax, he would include in the initiative ordinance a clause providing for the repeal of that ordinance. A denial that any such action in abolishing the tax was contemplated by the committee was issued by Mayor Carrel.

"What Is Accident Prevention" Answered

Seventeen answers to the question "What is Accident Prevention" featured an address on that theme, delivered recently by Garry S. Willis, assistant general manager of the Wheeling (W. Va.) Traction company.

Statistics on the needless and criminal waste of human life through disregard of the most ordinary precautions by individuals and concerns were offered by the speaker in his advocation of the safety first conditions, which included figures which show that while automobile accident fatalities have increased 89 per cent in the past five years, street car fatalities during the same period actually decreased 15 per cent, until street car travel is now the safest in the world.

Printing Transfers in Chicago

The Chicago Surface Lines conducts its own transfer printing shop. During the year ending Jan. 31, 1922, this shop printed, in addition to forms and notices used by the company, 1,588,350,000 transfers at a total cost of $147,732, or 9.3 cents per thousand, as compared to 12.57 cents per thousand for the previous year. Included in this year's transfers were 114,720 transfers costing $10,669 printed to comply with the order of the Federal Court requiring the giving of a transfer to each cash passenger for use as a rebate slip in case the 8-cent fare had not been sustained

Mr. Mitten on Buffalo

Says Buffalo Men, Misled by Arrogance, Are Facing Winter with Dull Prospect Ahead

Failure on the part of the municipal authorities to prevent the operation of jitneys in Buffalo in defiance of an injunction order and in contravention of the state law has forced the International Railway to bring about wholesale arrests of jitney drivers. The first cases, brought into court last week, were adjourned until after the decision of Justice Crosby on the application of the jitney owners to have the injunction vacated.

In a statement on the Buffalo situation made to the resident correspondent of the *Electric Railway Journal* in Buffalo, Thomas E. Mitten, chairman of the board of directors of the International, said:

> American laws make of America the land of greatest opportunity for the ordinary man, but American institutions cannot continue to exist unless American-made laws are respected and enforced.
>
> Unionism cannot continue, as a part of legitimate American industry, so long as it neither recognizes the rights of property nor the right of every man to decide for himself which course of action, or employment, will afford to him and his the greatest measure of happiness and prosperity.
>
> Unionism, of the kind that dynamited International street cars, is by us condemned—beyond the power of resurrection by arbitration or otherwise, and those so short-sighted as to lend their names to such endeavor surely misapprehend the enormity of this offense against the law and against humanity.
>
> Unionism run rampant, dictating to men and management alike, paralyzed Buffalo by striking during the war, and destroyed millions of International property values. Buffalo carmen, misled by arrogance, are facing the coming winter with neither money nor jobs.
>
> Mittenism—men and management—four-square for Americanism, supplied Philadelphia uninterrupted service during the war. P. R. T. men and management, co-operating for efficiency, have earned the respect of Philadelphians, saved P. R. T. from threatened receivership and rehabilitated it for its owners. P. R. T. employees saved their war-time wages, secured participation in the result of their extraordinary economic accomplishment and are today proud possessors of nearly $5,000,000 in saving fund securities and in the par value, 60,000 shares, of the property which they are helping to operate economically.
>
> Dynamiting outrages are cowardly crimes condemned by all good citizens.

Henry W. Killeen of Penney, Killeen & Nye, of counsel for the International, has taken an appeal from the decision of Justice Frederick W. Krause of the appellate division handed down at Olean on Aug. 14, holding that the city's action of appealing the mandamus order obtained by the railway against the Mayor directing him to enforce the law against jitneys automatically stayed the effectiveness of it. The International in taking its appeal to the New York State Court of Appeals contends that the Krause decision should not stay the mandamus order.

Because of the attitude of Mayor Schwab and other municipal authorities about 1,000 of the foremost business and professional men and women of Buffalo have organized a Law and Order League for the sole purpose of using its influence to maintain law and order in Buffalo.

There has been no local service in Niagara Falls since the strike became effective on July 1, but it is proposed to resume service about Sept. 13.

Department of Justice agents in Washington and Buffalo have been ordered to investigate the dynamite outrages on the high-speed line between Buffalo and Niagara Falls and are co-operating with the secret police of Mr. Mitten. The chairman of the board of arbitration and former president of the Central Labor Council of Buffalo and five striking employees of the International are under arrest on the charge of unlawful possession of dynamite.

Saginaw Considers Bus Proposals

Saginaw City Council, in an effort to solve the transportation problem which has been giving the Michigan city trouble since the Saginaw-Bay City Railway suspended service more than a year ago, is considering two proposals for bus transportation. One has been made by T. J. Fay, Rockford, Ill., and the other by the Saginaw United Transit Company, which is the outgrowth of the bus operators of the city.

Mr. Fay has presented an ordinance to the City Council which provides for a 6-cent cash fare, five tickets for 25 cents, universal transfers, and eight school tickets for 25 cents. The Saginaw United Transit Company, which is planning to incorporate for $250,000, proposes a 5-cent cash fare, six tickets for 25 cents, eight school tickets for 25 cents, and transfers for 2 cents.

Hearings Announced on Mayor's Plan

Mayor Hylan of New York on Sept. 6 presented his $600,000,000 subway plan to the Board of Estimate at a special meeting called for the purpose. After having the clerk of the board read the statement in full in which the plans were explained, the dates of hearings on individual routes were announced. The first one will be held on Sept. 15 and the last one probably on Oct. 10.

The Mayor took another fling at the Transit Commission, from which he said nothing could be expected in the way of transit relief. Pointing out the need for subway extensions, the statement said in part:

> The greatest congestion exists in the lower part of Manhattan Island because all subway lines from Harlem, the Bronx and Washington Heights converge there, and trains are crowded before they reach 125th Street southbound in the mornings and before they leave Fourteenth Street northbound in the evenings.
>
> The plan which I have will relieve transit congestion in Manhattan and will provide adequate rapid transit in all boroughs for many years to come.

The Mayor then reviewed the plan giving all the proposed routes as announced previously, and emphasizing its supposed advantages over the Transit Commission's plan.

At the first hearing the routes which are intended to serve the Harlem, Washington Heights and the Bronx districts in upper New York City will be considered.

Governor Urges Better Service Plan Put Into Effect

Governor Channing Cox of Massachusetts has conferred with the boards of public trustees of the Boston Elevated Railway and the Eastern Massachusetts Street Railway about leases or consolidations that would result in better railway service for Hyde Park, Chelsea and Revere. He has urged the two boards to come to an agreement under which the Boston Elevated could operate the lines in Hyde Park, in Chelsea and Revere, and on Aug. 31 he presented the matter to the Massachusetts Department of Public Utilities.

The proposition advanced is that the Boston Elevated should take over the lines of the Eastern Massachusetts both in Hyde Park and in Revere and operate them, either under a lease or a merger, so that the people in Hyde Park could have a single fare into Boston and the great bathing beach at Revere could come within the single fare zone of Greater Boston. It is understood that the railway trustees are not averse to the principle, but they cannot agree on terms. The Eastern Massachusetts has an abandoned power station in Hyde Park and it wants this figured into the value upon which to base the rental. Similarly in Revere, at the other end of the elevated, the Eastern Massachusetts would be willing to relinquish its property to the elevated if the poor lines were taken with the good ones at a satisfactory price. It all depends upon terms.

All parties are agreed that from the operating point of view the Boston Elevated should take over the service of the Eastern Massachusetts both at Hyde Park and at Revere, thus establishing a Metropolitan District Railway, to manage as a single unit all the electric railway lines in the district and at a single fare.

This has been urged so much and came so near being enacted into law during the year's session of the Legislature that it is firmly believed it will come eventually. Provisions for it were contained in the bill which was offered in the Legislature and submitted to the Department of Public Utilities. Governor Cox's intervention at this time is expected to expedite the negotiations.

Appreciation for Utilities Expressed

An indication of the attitude of the business people of Pine Bluff toward Pine Bluff Company and the Arkansas Light & Power Company was expressed in a double page spread in the *Daily Graphic* on Sept. 1. The occasion for the congratulations and felicitations was the expansion of the general offices of the companies in Main Street. The furniture company, the jeweler and the druggist took this opportunity to welcome the companies into their new spacious quarters and to show appreciation of the big part played by these utilities in the development of the city.

Agreement on Arbitration Terminates Strike

A strike which has tied up service on the lines of the Boston & Worcester Street Railway since Sept. 3 terminated on Sept. 6 when officials of the company and representatives of the union agreed to submit the wage question to arbitration. With the return of the 300 trainmen, trackmen and repairmen all lines have begun operating on regular schedule.

The men had been receiving 54 cents an hour and the company announced that at the expiration of the agreement on Sept. 1, a scale of 52 cents an hour would be put into effect. When the company refused to recede from its stand of 52 cents the men walked out after running the last cars into the Framingham and Hudson terminals of the company. Pending arbitration the men will receive the scale of wage in effect before the strike.

President Mahon of the Amalgamated Association was quoted by the daily papers as having denounced the calling of the strike and accordingly it was announced that the charter issued to the employees had been revoked with the subsequent penalty to the men of losing all strike benefits. It was denied by Patrick Mooney, president of the local, that he had received an official notice of loss of charter as is usual in such cases. No date has been set for the first meeting of the arbitration board.

Must Protect Employees

As a result of a decision of the Supreme Court of Utah, which held in substance that the railroads of the State do not conduct wholly an interstate business, and are therefore subject to the provisions of the state industrial act, the industrial commission of Utah has ordered the Bamberger Electric Railroad and the Salt Lake & Utah Railroad, both interurbans, with rails entirely within the State, to make proper provision, satisfactory to the commission, forthwith, to protect their employees under the workmen's compensation act. The decision of the Supreme Court upholds the section of the Utah law which provides that the Utah commission shall assume jurisdiction in all cases that do not come within the provisions of the federal employers' liability act.

Akron Viaduct Properly Designed

The Northern Ohio Traction & Light Company, Akron, Ohio, on Aug. 5 made public the report of William H. Adams, the consulting engineer of Detroit, employed for the purpose of making an examination as to the safety of the new North Hill Viaduct with reference to running cars across that structure.

Mr. Adams, in a letter to the company, says he has made "a complete examination of the structure and investigated the conditions which surrounded its construction." He reports that he has made a careful study of the daily and weekly reports of the engineers used in the building of the viaduct and also examined the reports of the tests of material used. He checked the design for the entire superstructure, all the foundations and several typical arch rings. He declares that it is his conclusion that as far as railway use is concerned, the viaduct is conservatively designed, properly constructed and amply safe for the loads which the street railway operations will involve.

"In a Street Car"

The Oregon *Daily Journal*, Portland, Ore., under date of Aug. 1 published the following editorial.

> So many things have been said about the joys of motoring that a word for the lumbering, rumbling old street car may not be construed as the voice of favoritism.
>
> On an interurban car three Portland men who own and are amply able to operate their own cars were talking. Said the first:
>
> "I don't drive my car to the office once a month. Whenever I drive it downtown and leave it parked on the street it is on my mind more or less all day. As I come and go on the interurban I get almost my only chance to read the papers. I meet and chat with my friends. I have a chauffeur, the motorman, and a general manager, the conductor. If I am hurt while driving my own machine the chances are I will get nothing. If I hurt somebody else I will pay heavy damages. But on the car I am responsible for the safety of no one, not even my own, for should I be killed on this car my heirs would be paid $10,000 in the form of accident insurance."
>
> The second of the three business men lost no time agreeing with what had been said. He, too, has lived in the suburbs a long time. But his testimony took the form of a quotation from a paint manufacturer, who had said to him:
>
> "The man who leaves his car on the street all day has no business owning a garage at home. Standing out in the sun and dust kills the paint and takes the life out of the rubber. One day on the street is far more injurious than a week standing out at night."
>
> This, it was argued, may show the economy of using the parking garages rather than leaving the cars on the streets, or at home. But the third man offered what he considered the clinching point.
>
> "They tell me that when I estimate the cost of operating my car at 10 cents a mile I am apt to be under rather than over the actual amount, including gasoline, oil, tires, repairs, repainting and depreciation. I live nine miles from the office. At that rate it costs me $1.80 a day merely to come and go. My commutation fare on the interurban, round trip, is less than 25 cents. I can do a lot with that $1.55 a day that I save if I ride on the street car."

News Notes

Mr. Witt Engaged by Toronto.—Peter Witt, Cleveland, has been brought to Toronto, Ont., by the Toronto Transportation Commission to make a thorough investigation into the operation of the Toronto municipal railway system, with a view to bringing down the fares.

Seventy-three Cents an Hour Accepted.—Train and shop men of The Chicago, North Shore & Milwaukee Railroad recently settled their wage differences with the road by accepting the company's final offer of the same wage now in effect, to stand for two years. Under the accepted settlement trainmen will receive 73 cents an hour.

Railway Men to Assist Police.—The receivers of the Memphis (Tenn.) Street Railway will be asked to request the employees of the company to co-operate with the city's officials in the matter of traffic violations by reporting such accidents and violations as come under their observation. Judge Ross of the Federal Court recently issued an order requesting this action.

Service Same as Usual.—Henry L. Doherty & Company report that the net earnings of its public utility division for July were especially good in view of the coal situation. Adequate supplies of coal were kept available so that service in no case was jeopardized. It was the company's policy at the beginning of the coal strike to carry enough fuel in storage to take care of its needs for a considerable period ahead.

Franchise Tabled.—The Board of Public Works of Fort Wayne, Ind., has decided to table indefinitely the proposed franchises to the Indiana Service Corporation which would grant the corporation the right to construct a one-way single track on a number of streets in the northwestern section of the city. It was stated that these franchises were tabled because of the many remonstrances received from residents in this section.

Cities Want to Control Utilities.—Commissioner Harry T. Hartwell of Mobile recently said that he already had been assured of support of a general law which will permit Mobile and all other incorporated cities to control their public utilities, such as street railway, gas and electric light companies, and water works. The control of the utilities would be taken from the Alabama Public Service Commission and vested again in city governments, with which the utilities negotiate for their valuable franchises.

Tells How Louisville Organized for Safety.—"Saving $150,000 Through Safety Work" is the title of an article in the September issue of the *National Safety News*, written by E. F. Kelley, the editor of *Trolley Topics*, official publication of the Louisville (Ky.) Railway. Mr. Kelley reviews the safety undertakings of the Louisville Railway and by means of a chart shows the plan of organization of the safety council of the railway. The story is complete with a cut of James P. Barnes, president of the railway.

Name of Commission Changed.—The Georgia State Railroad Commission ceased to exist the latter part of August and is succeeded by the Georgia Public Service Commission. The action changing the name of the body was taken at the annual meeting of the Georgia State Legislature and became effective upon the signing of the bill by Governor Hardwick. Along with the change in the name an appropriation of $70,000 a year is provided to take care of the commission's expenses. This is double the former annual appropriation, which was $35,000.

Financial and Corporate

Sale Being Negotiated

North American Company Makes Overtures for Purchase of East St. Louis Properties

The North American Company, New York, N. Y., has made arrangements with Dillon, Read & Company, bankers of New York, which may result in its acquisition of control of the East St. Louis & Suburban Company and its subsidiaries. Announcement to this effect was made in New York on Sept. 5. The arrangements for the purchase are, however, conditioned upon the acceptance of the offer which will be made by the holders of not less than 80 per cent of the preferred stock and 80 per cent of the common stock of the East St. Louis & Suburban Company. It is understood that the terms of the offer will be announced during the present week.

The Union Electric Light & Power Company, St. Louis, a subsidiary of the North American Company, has for some years supplied power to the East St. Louis & Suburban Company, and it is pointed out that the offer now being made is a logical step in the development of the utility service of Union Electric Light & Power Company.

LARGE CITY AND SUBURBAN SYSTEM

In reply to inquires made at St. Louis about the deal Louis H. Egan, president of the Union Electric, which with the United Railways, St. Louis, is controlled by the North American, stated that any announcement of the sale would have to come from New York. W. H. Sawyer, president of the East St. Louis & Suburban, also declined to make a statement regarding the negotiations.

Mr. Egan did, however, explain that the cities on the west and east bank of the Mississippi River were essentially one economically and industrially and that it was logical to presume that the apparent industrial growth in store for the east bank could be furthered better by singleness of interest in the public utilities serving both districts.

The Union Electric recently began the construction on the east bank of the river of a 60,000-kw. unit of a new power plant designed ultimately to develop 240,000 kw., or between two and three times the prime power capacity of the Keokuk dam.

In St. Louis it is considered possible that if the sale is consummated, the east side properties of the North American will be placed directly or indirectly under the administration that now conducts Union Electric. The United Railways is still in the hands of a receiver, and reorganization of this property is not expected until after the valuation case is adjudicated. That matter is now before the Missouri Public Service Commission.

The plant account of properties controlled by the East St. Louis & Suburban is $23,474,384, including electric power plants in East St. Louis and Alton, though the company purchases a large quantity of power from Keokuk dam and is connected with the power plants of the Union Company for emergency power.

The gross income of the East St. Louis & Suburban for 1921 was $4,910,414, and its net sufficient to yield 2.3 per cent on preferred stock of which there is $6,000,000 outstanding. The other securities of the company are $6,000,000 of common stock, $8,000,000 in 5 per cent collateral bonds and $2,000,000 in notes.

The East St. Louis & Suburban controls:

East St. Louis & Suburban Railway, which operates 68 miles of electric railways from East St. Louis to Belleville, Edwardsville, Lebanon, Venice, Collinsville and intermediate points.

East St. Louis Railway, which operates 36 miles of track in the city of East St. Louis.

St. Louis & Belleville Electric Railway, which operates 18 miles of coal carrying lines and to which the East St. Louis & Suburban also feeds coal.

The East St. Louis Light & Power Company, which serves East St. Louis with electricity for power and lighting.

Alton, Granite City & St. Louis Traction Company, which operates an electric line to Granite City and Alton from St. Louis.

Alton Gas & Electric Company, which operates the street railways and the electric and gas plants which supply Alton.

In addition, the East St. Louis & Suburban Company owns a half interest in 23,000 acres of coal land contiguous to Belleville.

The extension of North American public utility influences on the west bank of the Mississippi River is indicated by an increase in kilowatt-hours sold through the Union company from 97,060,635 in 1909 to 416,537,929 in 1921. The Union company now sends electricity to more than sixty-five communities in the vicinity of St. Louis in Missouri.

Balance of $226,588 on Municipal Railway in 1921

According to the annual report of the Seattle (Wash.) Municipal Railway, filed with the Department of Public Works, the number of passengers carried on the lines during 1921 showed a decrease in number of 20.92 per cent from the year 1920. In 1921 97,156,839 passengers were carried against 122,866,577 in 1920.

Operating revenues for 1921 were $6,295,564, and operating expenses $5,105,487, leaving operating income of $1,190,077. Non-operating revenue of $51,611 made the gross income $1,241,688. Deductions from gross income of $866,847 left the net income $374,841, from which after delayed gains and losses and other such credits and charges had been figured, a credit balance of $226,588 remained.

Prospects Greatly Improved

Interurban Hurt by Auto Competition Has Bright Prospect Following Reorganization

Finance and Industry, a weekly printed in Cleveland for the Fourth Federal Reserve District, published an editorial in one of its recent issues in which it ascribed the present difficulties of the Cleveland, Southwestern & Columbus Railway as undoubtedly due to the increase in the number of privately-owned automobiles and to competition on the part of bus lines. That paper said:

PROSPECTS AHEAD ARE BRIGHTER

The privately-owned automobile has kept the earnings of traction companies almost at a standstill for six or eight years, but it is the bus lines, which came into existence since the close of the war, that eventually determined the fate of the Southwestern and are seriously interfering with the earnings of many other interuban lines, as well as some railroads. Of course, a large number of these bus lines will cease doing business eventually, and if they were subject to the same regulation as are the interurban lines, the situation would very soon correct itself.

The bus lines are occupying the highways for revenue without compensation to the communities through which they pass, and it would seem that legislation to regulate the motor bus is very forcibly before us now, so that such injustices as the Southwestern has suffered will not continue until practically all interurbans are forced into receivership.

If the Southwestern obtains a fast terminal in Cleveland, as it expects to do, it will be in a position to eliminate most of its bus competition. The reorganization managers have provided $500,000 for the purpose of connecting the property with the interurban terminal that will run into the new Cleveland Union Station.

If the rehabilitation plan goes through at an early date, it is believed that the present management will be able to put the company in a very strong position.

With increased freight and passenger earnings, growing out of better terminal facilities, the development of light and power business, and the expected economies in operation, the new preferred stock should eventually establish itself in a strong position and the present general mortgage bondholders should eventually come out whole.

There can be no question but that the proposed plan puts the company in a position where it will be able to take care of its needs as far as can be seen for many years to come.

As indicated previously in the *Electric Railway Journal* the underlying bonds will be taken care of under the reorganization without any sacrifice, and $1,500,000 of new money provided, of which $1,000,000 is for new power facilities, new cars and for necessary working capital. It is believed that after these improvements are made, the company will be able to save $100,000 a year in operating expenses.

STOCKHOLDERS LOSE ALL

The company is relieved of the burden of $3,666,000 of 5 per cent general mortgage bonds, and these bondholders will take over the property, receiving preferred stock for their bonds and the equity of the property represented by common stock.

The present common and preferred stockholders receive no consideration in the proposed plan because there is not enough equity or earning power in the present property to take care of the general mortgage bonds, which are, of course, ahead of the stock issues.

Final Steps Taken

Way Prepared for Early Discharge of Receiver of the New Orleans Railway & Light Company

The three enabling ordinances introduced a couple of weeks ago by Commissioner Maloney of the Department of Public Utilities, looking to the reorganization of the New Orleans Railway & Light Company, New Orleans, La., were adopted on Sept. 3 by the Commission Council of New Orleans. Mayor McShane cast the only dissenting vote. The ordinances were adopted as originally introduced, carrying the option clause under which the city is privileged to acquire the public utilities by purchase at any time.

Judge Rufus E. Foster of the United States District Court for the Eastern District of Louisiana has signed the application for approval of the sale of the New Orleans property, as recently effected at public auction. Judge Foster, who is now away, is expected back within ten days, when the sale will be approved by the court, the application having been filed meanwhile, as approved by law. Thirty days after the approval of the sale, the receivership will be lifted, and the new company will assume charge.

Mr. Hecht, chairman of the reorganization committee, has announced that with the approval of the sale of the property a bond issue of $12,000,000 will be placed by the Chase National Bank, New York, representing the junior security holders. The railway has pledged itself to spend $15,000,000 within five years in financing the company and rehabilitating the properties. Of the $12,000,000, $4,500,000 will be disbursed among the security holders of the 4½ per cent bonds who have agreed to accept 25 per cent of the par value of the bonds in cash and 75 per cent in new securities ranking below the new organization bonds. Of this money, Mr. Hecht estimates that $3,000,000 will be distributed in New Orleans.

Two million five hundred thousand will be used in retiring receiver's certificates issued to cover the cost of the 100 new cars recently purchased and the new 20,000 kw. turbine and generator at the power house.

Urges Five-Year Extension of Bonds

Clark V. Wood, president of the Worcester (Mass.) Consolidated Street Railway, has requested the holders of the $500,000 Worcester & Southbridge Street Railway 4½ per cent mortgage bonds to consent to a five-year extension of maturity at 7 per cent per annum. The bonds are dated Sept. 1, 1902, and were due on Sept 1 last.

In his letter to the holders Mr. Wood says that these bonds now the legal obligation of the Worcester Consolidated Street Railway are also secured by a first mortgage on all the Worcester & Southbridge property under which there are outstanding, in addition to these $500,000 of bonds, only an issue of $200,000 due June 1, 1925.

The management in consultation with some of the largest holders of these bonds believes that in view of the recent difficult railway situation in Massachusetts resulting from increases in operating costs the time is not advantageous for such general refunding of the company's funded debt as it hopes in the near future to effect.

The Worcester Consolidated Street Railway had a clear dividend record for more than thirty years prior to 1918. Its annual reports show that from 1895 up to 1918 it had never paid less than 5 per cent per annum. During this year the company has resumed the payment of dividends upon its preferred stock.

The proposed extension has been approved by the Massachusetts Department of Public Utilities.

Transit Hearings Nearing Completion

The hearings before the New York Transit Commission on the statutory plan under which it is proposed that the city of New York take over the transit lines wholly within its borders have practically been completed and accountants for the commission are at work upon the commission's final offer to the companies and the plan that will be placed formally before the Board of Estimate for approval.

Toronto Interest Payment Arranged

The directors of the Toronto (Ont.) Railway announced on Aug. 26 that six months' interest on the bonds of the company would be paid on Aug. 31, 1922, at the rate of 6 per cent. A statement to bondholders by J. C. Grace, secretary and treasurer, said that interest will be paid by check upon presentation of the bonds at the Canadian Bank of Commerce, Toronto, the agency of the Canadian Bank of Commerce, New York, or at the Bank of Scotland, London, England. The principal of the bonds matured on Aug. 31.

Mr. Grace explained further that the arbitration with the city of Toronto to fix the price for the company's railway property taken over by the city was practically completed. The arbitration board will reconvene on Sept. 19, he said, and it was hoped the award will be announced during November. Mr. Grace said:

> The negotiations for the sale of the company's power, electric light and radial railway interests—other than the Toronto Railway—to the Hydro-Electric Power Commission of Ontario have been completed. The purchase consideration in bonds of the city of Toronto and of the Hydro-Electric Power Commission will be delivered to this company during October. As soon as possible thereafter steps will be taken to realize on these securities and to discharge the obligation of this company on its bonds.

The executive added that with the payment of interest due Aug. 31, 1922, the company had hoped to pay its matured bonds, but unavoidable delays made it necessary to ask bondholders for a "further indulgence of possibly three months."

Washington Merger Bill Passed by Senate

The Senate on Sept. 1 passed a bill to permit the merging of the Washington Railway & Electric Company and the Potomac Electric Power Company. The measure also provides that the railways operating wholly or partially within the District of Columbia may merge one with the other. That provision of the bill applies directly to the Capital Traction Company, the East Washington Heights Traction Railroad, the Washington & Maryland Railway, the Washington & Virginia Railway, the Washington & Old Dominion Railway, the Washington Railway & Electric Company, the Georgetown & Tennallytown Company, the Washington Interurban Railroad, the City & Suburban Railway of Washington and the Washington & Rockville Railway.

This legislation will be strongly opposed in the District of Columbia committee of the House of Representatives, because it would permit a merger of the Washington Railway & Electric Company with the Potomac Electric Power Company without compelling a merger of the consolidated corporations with the Capital Traction Company. The Senate committee's position, however, is that this merger is a prerequisite step toward bringing about the merger of the street railways in the capital. As this is written there is some talk of reconsidering the vote in the Senate.

Since the opposition in the House will have support, it is believed, from the Public Utilities Commission of the District and from the Capital Traction Company, the chances are against the final passage of the measure.

Will Sell Line at Auction

The complete property and equipment of the Manhattan City & Interurban Railway, Manhattan, Kan., with the exception of the four-wheel drive trucks now in operation on the company's lines, will be sold at public auction on Sept. 27. The order, coming from the United States District Court, states that no bid of less than $70,000 shall be received or considered.

It is thought that the Manhattan Gas & Electric Company may offer to take over the line and re-electrify it. The company recently went into bankruptcy. J. T. West, Manhattan, and W. A. Busch, St. Louis, are receivers for the company.

Revenue and Traffic Decrease

According to its comparative statement of earnings the Utah Light & Traction Company, Salt Lake City, Utah, finished the year 1921 with a deficit of $3,112, against a surplus in 1920 of $12,800. Gross earnings in 1921 were $2,048,978, and $2,069,482 in 1920. Operating expenses including taxes increased from $1,489,283 in 1920 to $1,595,291 in 1921. Traffic statistics show that there was a decrease in the number of passengers carried, 40,512,223 being the number in 1920 and 36,671,610 the number in 1921.

Financial News Notes

Change in Name Ordered.—A resolution has been adopted by the City Council of Seattle, Wash., ordering the Ballard Beach carline renamed the Sunset Heights Line.

Interests Sold.—H. C. Smither and Warren Smither, owners of the controlling stock of the Salina (Kan.) Street Railway, have sold their interests to J. J. Wiesendanger, Randolph, Kan.

Gold Notes Called.—The American Light & Traction Company, New York, N. Y., will redeem on Nov. 1 next $3,000,000 principal amount of its $6,000,000 five-year 6 per cent gold notes issued under date of May 1, 1920.

Deficit Decreased.—The net corporate deficit of the New York Railways for June, 1922, was $184,378 against a deficit for the same month a year ago of $202,625. Operating expenses totaled $694,401, a decrease of $53,016 over June, 1921.

$2,134,000 of Bonds Offered.—Harris, Forbes & Company, Boston, Mass., are offering $2,134,000 of the Springfield (Mass.) Street Railway's refunding and general mortgage 20-year 6 per cent gold bonds. The bonds are dated Sept. 1, 1920, and are due Sept. 1, 1940. The price is 96½ and accrued interest yielding more than 6.30 per cent.

Municipal Operation May Be Next Step.—It is reported that as a result of the suspension of service by the Aberdeen (S. D.) Railroad the city may take over the property and operate it. Certain legal requirements prevented any action by the City Commissioners, but business men predict that difficulties will be overcome and that the city will assume control of the lines in the near future.

Receivership Hearing Again Postponed.—Frank Hedley, president of the Interborough Rapid Transit Company, New York, N. Y., has announced that, with the approval of Judge Mayer, the hearing on the motion for a receivership had been adjourned to Sept. 12, with the expectation that by that date sufficient deposits of securities would be made to warrant the final adoption of the plan of readjustment.

Surplus for 1921 Reported.—The operation of the Alabama Traction, Light & Power Company, which controls the Alabama Power Company, for the year ended Dec. 31, 1921, resulted in a surplus of $221,426 against $241,444 for the previous year. The operating revenue increased $366,686 over the 1920 amount. The operating expenses, however, including taxes increased from $2,160,248 in 1920 to $2,268,884 in the year 1921.

Name Changed—Stock Increased.—An amendment to the charter of the Knoxville Railway & Light Company, Knoxville, Tenn., changing the name of the corporation to the Knoxville Power & Light Company, was filed recently with Secretary of State Ernest N. Haston. The amendment increases the capital stock of the company from $2,050,000 to $10,000,000.

Applies for Refunding Issue.—Claiming that it could not meet the issue of bonds due on July 1 and in order to accept an offer of the North American Company to underwrite an extension of time the United Railways St. Louis, Mo., recently applied to the Public Service Commission to authorize a bond issue of $1,640,000 for refunding. The North American Company has consented to underwrite an extension to Oct. 1, 1923.

Gold Notes To Be Retired.—Seven per cent gold notes of the Detroit (Mich.) United Railway due April 1 next, will be retired at 100½ and interest at date on Oct. 2, and $500,000 due Sept. 1, will be retired immediately. The notes are part of $4,000,000 issued last year, of which $2,000,000 was retired on June 5. This leaves $1,000,000 outstanding. The company has retired a total of $4,400,000 of bonds and note issues in the past year.

Buys Interest in South Bend Property.—Controlling interest in the Indiana & Michigan Electric Company of South Bend, Ind., has been sold by Homer C. Henry, K. Chapin and Lowell Chapin, of Chicago, to the American Gas & Electric Company. The sale figure is reported to be close to $10,000,000. Recently the Indiana & Michigan acquired the Benton Harbor & St. Joe Railroad & Light Company and now operates in South Bend, and smaller communities.

Reports on Year's Operation.—For the year ended June 30, 1922, the Louisville (Ky.) Railway reports earnings from operation amounting to $4,600,871 against $4,300,373. Operating expenses decreased from $3,370,601 to $3,175,100 for the year ended June of this year. The balance available for dividends was $567,362 for the year ended June, 1922, against $31,632 for the year ending June 30, 1921. The amount short of common dividend requirements in the 1922 period was $107,054 against $642,784 for the previous year.

Net Income of $1,310,949.—For the seven months ended July 31, 1922, the Philadelphia (Pa.) Rapid Transit Company reports a net income of $1,310,949, against $1,007,372 for the same period a year ago. The passenger revenue for the seven months amounted to $23,987,217 a decrease of $368,671 over the seven months period of 1921. The total passengers carried from January-July, 1922, were 487,908,602, against 490,844,102 for the same period in 1921.

Surplus Earnings Increase.—For the twelve months ended July 31, 1922, the United Light & Railways Company and subsidiary companies, Grand Rapids, Mich., report gross earnings from all sources of $11,303,088, against $11,930,751 for the twelve months ended July 31, 1921. The surplus earnings available for depreciation, debt discount and common stock dividends for the 1922 period were $942,438, against $761,085 for the twelve months ended July 31 of last year.

Stockholders Approve Preferred Stock Issue. — Stockholders of the Georgia Railway & Power Company, Atlanta, Ga., have voted favorably on the plan to increase the first preferred stock of the company by $500,000 through the issuance of $2,500,000 of 8 per cent new stock to retire the present $2,000,000 of outstanding first preferred stock. The Georgia Public Service Commission will be asked to ratify the action. At the same time it will be necessary for the company to amend its charter by-laws to permit the increase in the stock of the company and the increase in the interest rate.

Proceedings on Increased Stock Going On.—The Nova Scotia Public Utilities Commission is in open session at Halifax over the dispute on the valuation of the physical assets of the Halifax Tramways. The proceedings are on the company's request to increase its capital stock. This is opposed by the city. W. H. Covert, Halifax, represents the Halifax Tramways and with him is associated, L. A. Tucker, Boston. Deputy Attorney General Mathers of the province of Nova Scotia represents the commission in examination of witnesses. E. P. Allison, Halifax, represents the city of Halifax.

Service Suspended.—Electric railway service has been abandoned in Ardmore, Okla., by the Ardmore Railway because it was never a paying proposition. For some months now only a single one-man car has been operating, but the order to pave C Street Northwest, part of the burden of which would have fallen to the railway, forced the owners to suspend operation. The equipment has been purchased by John Ringling, millionaire showman and rail magnate, according to T. E. Smelson, receiver for the company. The franchise has been retained and was included, it is said, in the deal.

Further Sale Negotiations Promised.—J. J. Bodell of Bodell & Company, Providence, R. I., representing the security holders of the New Brunswick Power Company, St. John, N. B., has offered to confer with the representatives of the city in a further effort to sell the railway and other property of the company to the city. The proposal urged by Mayor McLellan, recently elected, to have the city buy the property for $4,900,000 was defeated by the Council by a vote of four to one, the Mayor being the only Council member to support the plan. The Mayor said he believed Mr. Bodell, had offered the property to the city at the lowest price he had been commissioned to name without referring the matter back to his constituents. At the present time the papers that were circulated urging Mr. McLellan's recall are being withdrawn. The recall election will likely be set for some time early in October.

Traffic and Transportation

Lower Fares in Hollywood

Decision by California Railroad Commission Reduces Rate to Eight Cents on Commutation Basis

Fares have been ordered reduced in Hollywood. This is the decision of the California Railroad Commission. The reduction is from 10 cents to 8 cents on a 60-ride commutation book over the Pacific Electric Railway. This book must be used within forty days from the date of its purchase.

These are the outstanding facts of a decision just rendered by the commission, but the fare issue in Hollywood, in which the ruling just made is the latest official step, really dates back in its most significant move to Jan. 1, 1922. On that date the commission granted an increase in local and interurban fares. The 6-cent fare between Los Angeles and Hollywood district, which is within the city limits of Los Angeles, was increased to 10 cents and two zones created. Other sections of the City of Los Angeles as served by the Pacific Electric local street car lines were also zoned and a 10-cent fare established by order of the commission.

The Hollywood Board of Trade, City of South Pasadena and the Rose Hill District of the City of Los Angeles protested the fares and asked for a rehearing of the case. The rehearing was held during February and continued in March. The recent ruling is the result of the rehearing.

ONE MANAGEMENT NEEDED IN LOS ANGELES

Rose Hill residents were awarded a fare reduction from 10 to 6 cents through the action of the commission in extending the limits of the inner zone on the company's Sierra Vista Line from its present terminus at Indian Village to Rose Hill Park. A satisfactory solution of Los Angeles' street car problems cannot be brought about until the two local systems, Los Angeles Railway Lines and Pacific Electric Local Lines, are joined under one management, the commission stated. Three methods were set forth by which this can be accomplished. They are: The Pacific Electric Lines shall take over the Los Angeles Railway Corporation's Lines or the Los Angeles Railway take over the Pacific Electric Local Lines, or the city of Los Angeles shall take over both of the local lines of the two systems under municipal ownership.

South Pasadena car riders were also included in the fare reduction to 8 cents through zones, which now enables commuters on this line to ride as far as Mission Road and Fair Oaks Avenue, which was formerly outside the limits of the outer 10-cent zone.

The complaint of the Hollywood Board of Trade to extend the lines of the Los Angeles Railway into Hollywood as exclusively served by the Pacific Electric local lines was dismissed by the commission on the ground that the jurisdictional issues involved must first be made the subject of a test case in the State Supreme Court.

Under the reduction in fares to the Hollywood District the commutation books will have sixty rides and will be good for forty days without limitation as to use in that period and sell for $4.80.

In discussing the Los Angeles situation the commission declared that unification of the two separately-owned systems in the city of Los Angeles is essential to meet the city's transportation needs, and unless one of the companies takes over the lines of the other, municipal ownership is pointed to as the only alternative solution.

COMMUTATION BOOK DESIRABLE

In regard to the interzone coupon fare, the commission said:

> With the results of operations on the Los Angeles local service of the Pacific Electric Lines before us for the first five months of 1922, we conclude that a modification of the inter-zone rate is justified and that the benefit of a lower fare may be given to the regular rider analogous to the reduced commutation fares in the interurban service.
>
> We believe it is practicable and desirable to establish a form of monthly commutation 60-ride coupon ticket without limitation as to use, good for 40 days from date of sale and good for a ride through two zones and with transfer privilege, the same as 10-cent cash fare, and that this form of ticket can be sold by the Company for $4.80, a reduction of $1.20 below the same number of single cash fares and the equivalent of 8 cents for a ride through two zones. We believe that such a ticket will not only prove a great convenience and benefit to the regular car rider in the outlying districts, but that the loss in revenue to the company will be offset, partially at the least, by an increase in traffic.

The commission also announced that it would institute a proceeding to bring about a universal transfer system in Los Angeles. The Pacific Electric Railway, as a condition in the present case, has consented to such a system. Referring to the additional equipment for the Hollywood service and the completion of the Hollywood subway, involving an expenditure of $3,000,000 and made conditions of the original decision, the commission said that there appeared to be no reason now, as soon as the necessary city franchises were granted, for any further delay in the consummation of the requirements referred to, and that the company would be expected to use all possible diligence in completing the Hollywood construction and service program in the matter of the tunnel and equipment, as well as in the matter of motor bus feeder lines.

Discussing the complaint of discrimination in different service and different rates on two street car systems serving the same city, the commission suggests a conference of the city, commission and the railways to consider unification.

After comparing the estimated return to the company, allowed in the original decision of Jan. 1, 1922, with the operating results for five months, the commission declared there was no justification for any change in the general rate structure of the Pacific Electric Lines, except the modifications made in the present order on rehearing. It is pointed out that the Pacific Electric Lines have not earned the estimated 5 to 5½ per cent, after making up deferred maintenance, and the commission concludes:

> We see no possibility of the company's being able to earn an excessive return. The adjustments required in this decision in local fares and in the zone arrangements will tend to reduce operating revenues and the recent reduction by the Interstate Commerce Commission of freight rates has already had, in a large amount, a similar effect.

Pass Has Increased Riding, but Decreased Revenues

According to figures given out by R. T. Sullivan, manager of the Tacoma Railway & Power Company, Tacoma, Wash., traffic in Tacoma has increased 11.7 per cent in the past four weeks, since the weekly pass went into effect but revenues have decreased 11.5 per cent. Mr. Sullivan on this point said:

> We have had the pass only four weeks. It has decidedly stimulated the use of the street cars, however. From my personal information, I know of people who are using the street cars now who have not done so for years. So far as the final results are concerned, it is difficult to estimate, because we had not had a fair trial. With the beginning of the pass system, we were hit by seasonal jitney competition. We will have to have several more weeks' figures before we know the financial results.

The first week the pass was tried out, 7,007 passes were sold. There was no jitney competition. The next week, with competition, the company's record shows 8,380 passes sold, the third, 8,250 and the fourth week, 8,400 passes. With no jitneys in operation, the company's books show that the 7,000 passes sold the first week were used for 187,784 rides, an average of 3.59 cents per ride. The second week 225,120 people rode on the pass, at an average cost of 3.58 cents each. The third week, 230,625 rides were obtained by pass holders, at a cost of 3.57 cents each. The fourth week saw 233,290 rides, at a cost of 3.58 cents each.

According to combined estimates for jitney operators in the city, between 9,000 and 10,000 persons are being carried daily by the twenty-five buses now in operation, on a 5-cent fare basis.

The Tacoma company filed its application with the State Public Service Corporation to try out the pass system for four months. Mayor A. V. Fawcett, who imported the jitneys, did so with the understanding that they would continue to operate until Jan. 1, 1923. He was elected on a promise of a 5-cent fare, and for that reason put the jitneys on different routes.

Rehearing on Paving Decision to Be Granted.—A rehearing on the decision of the Public Service Commission that the Indianapolis (Ind.) Street Railway is not required to pave between its tracks and on either side will be granted on the petition of the corporation counsel for the city.

Service Discontinuances and Fare Changes Sought

The Wheeling (W. Va.) Public Service Company and City Railway Company jointly have asked Public Service Commission for authority to discontinue certain service, and the Wheeling Public Service Company by itself has formally applied for permission to change its fares. In the first-mentioned case the applicants want to discontinue certain service on the East Wheeling loop division of the City Railway Company. It is represented in the application that the East Wheeling loop division is unprofitable to operate and that the same territory is served by the Wheeling Public Service Company. The specific portions of the north and the south divisions are also said to be unprofitable and to be receiving service from the Wheeling Traction Company.

The Wheeling Public Service Company proposes that it will serve East Wheeling territory at the same ticket rate and provide transfers to the City Railway Company. In the other application the Wheeling Public Service Company asks permission to sell four street car tickets for 25 cents for travel between Twelfth and Chapline and McCullough and Tenth Streets. The present single cash fare is 10 cents.

Puget Sound Company Orders Eight Buses

Eight motor buses have been purchased by the Puget Sound International Railway & Power Company for use in Everett, Wash. They will be the first unit of a fleet of buses which will be operated by the railway company in motorization of the city. The order was placed with the Fageol Company, Oakland, Calif., and provides for a shipment every fifteen days, beginning Oct. 14 and ending Dec. 1. A garage, 132x60 ft., with capacity of twenty-four cars, is now under construction. A machine shop for repair work will be maintained in conjunction with the garage.

A rival transportation company, John W. Hartman & Company, is now seeking a renewal of its franchise from Dec. 31, giving it permission to operate buses over certain streets. The railway by its amended franchise may operate a line parallel to that of the Hartman company, and maintains that it should be allowed a chance to develop its bus system, without a rival company operating in the city. The decision on the Hartman franchise will be held in abeyance until Dec. 25.

You Must Move Quickly in Dallas

The Dallas (Tex.) Railway is starting a campaign to speed up service on its lines. Upon approval of the Dallas Safety Council, the City of Dallas has authorized double-deck loading at all the principal downtown corners, and safety zones have been marked and traffic signal posts placed so as to allow two street cars to take on and discharge passengers at one corner at the same time. The safety zones have been extended the full length of two street cars.

In an effort to afford additional relief, George I. Plummer, superintendent of traffic of the Dallas Railway, has caused signs to be placed in all street cars asking passengers to move briskly and proceed promptly in boarding or leaving street cars. Extra men are being placed by the traction company at street intersections where boarding is heaviest during the rush hours, and boarding at both front and rear entrance is being permitted. The railway employees on the ground are equipped with portable fare boxes, and patrons are permitted to pay their fares and board cars from the front entrance as well as rear entrance.

Transportation News Notes

Hearing Scheduled.—A hearing in the matter of interchangeable mileage tickets will be held before the Interstate Commerce Commission in Washington on Sept. 26. Charles L. Henry expects to appear on behalf of the American Electric Railway Association.

Another Weekly Pass Plan.—The Pacific Power & Light Company, Astoria, Ore., has been granted permission by the Public Service Commission to put into effect the weekly dollar pass. The present fare is 7 cents, with books of fifty rides purchasable at $3, or 6 cents per ride.

May Extend One-Man Car Service.—Although no decision has been reached, the Morris County Traction Company, Morristown, N. J., is considering the extension of its one-man car service by replacing the larger type of car. The company has about twenty of the larger type cars in use. One-man cars are in operation on several local lines.

Orders Resumption of Rush Hour Service.—The Transit Commission has ordered the Interborough Rapid Transit Company, New York, N. Y., to resume rush hour service on all lines on Sept. 6. Reduction of 10 per cent in service was permitted in the rush hour period a few days ago until the commission could investigate the steaming qualities of British coal.

Will Petition for Lower Fare.—The Evanstown (Ill.) Street Railway will petition the Illinois Commerce Commission and the City Council for permission to reduce fares. Patrons are now paying 7 cents cash fare with a 6-cent ticket rate. The company proposes to cut the price of the tickets to 5½ cents when sold in lots of less than eleven. According to the plan eleven tickets will be sold for 55 cents.

Commission Must Answer Charge.—Corporation Counsel John P. O'Brien obtained from Supreme Court Justice Edward J. McGoldrick a writ of certiorari requiring the Transit Commission to certify to the Supreme Court its reason for authorizing the New York, Westchester & Boston Railway to charge 7 cents instead of 5 cents on its lines within the city limits. This increase, the city holds, was a violation of the Public Service law and contrary to the terms of the agreement made between the city and the company Aug. 2, 1904, when the railway obtained permission to use certain thoroughfares.

Collects a Seven-Cent Fare. — The Louisville (Ky.) Railway is collecting a 7-cent fare, as the recently passed ordinance, calling for a 6-cent ticket fare, and a 7-cent cash fare, doesn't become effective until the stockholders of the company meet and approve it. It will probably be Sept. 18 before the new rate becomes effective. Incidentally the company will not have to rebate any 7-cent fares collected during the period of approximately nineteen months, while the increase from 5 cents was in litigation.

Fare Case Before Master.—The case of the city of Fort Worth against the Northern Texas Traction Company over the matter of a reduced fare has been before Master in Chancery N. A. Dodge. The city is represented by Corporation Counsel Rinehart Rouer, Gillis Johnson and Raymond Buck with S. B. Cantey, Sr., and W. R. Tucker, Boston, as traction attorneys. The expert witnesses for the city are Joseph M. McShane for the traction company, H. P. Gillette of Chicago, editor of *Engineering and Contracting* and a well known cost expert. The case has not yet been decided.

Five-Cent Fare for Trial Period.—Announcement has been made by the Lafayette (Ind.) Street Railway that a 5-cent fare will be put into effect immediately. The present fare is 7 cents. Under its franchise, granted by the city and approved by the Public Service Commission, the company is authorized to charge 5 cents with 2 cents for transfers. However, the 2-cent transfer charge will not be made. The 5-cent fare will be tried six months. Recently the system was sold at a receiver's sale in Federal court and purchased by Lafayette capitalists. Improvements costing $250,000 have since been made.

Protests Bus Application.—The Rainier Valley Railway, Seattle, Wash., has entered strong protest with the public utility committee against the granting of the application of C. E. White for a jitney permit to operate over Rainier Avenue from Rainier Beach to Fourth Avenue and Stewart Street, on the ground that the competition would reduce revenues to such an extent that its present service could not be maintained. The railway submitted a proposition to operate a bus from Rainier Beach to the top of the hill, a route of about 1 mile, in conjunction with its railway and submitted a petition signed by approximately 5,000 residents.

New Publications

1921 Engineering Index

Published by the American Society of Mechanical Engineers, 29 West 39th Street, New York City.

This is the third volume of the Engineering Index to be published under the auspices of the A.S.M.E., which is endeavoring to make it as complete and accurate as the resources of the society permit. The 584 pages of the index proper contain over 14,000 items referring to articles in some 600 engineering and allied technical publications. In selecting the items, the engineering staff of the society has reviewed the 1,200-odd periodicals, reports and other publications regularly received during the year by the Engineering Societies Library.

This bound volume contains the accumulated references which appear month by month in *Mechanical Engineering*, the official publication of the A.S.M.E.

Naturally the Engineering Index contains a very large number of references to articles of interest to electric railway engineers in all departments because, while it is published by the Society of Mechanical Engineers, its field covers all phases of engineering.

Water Power Survey in the Netherlands East Indies, No. 2

A report published by the government hydro-electric service of the Netherlands East Indies, Bangdoeng, Java.

This supplements the report mentioned in the issue of this paper for Aug. 11, 1922.

Switching Equipment for Power Control

By Stephen Q. Hayes, Switchboard Project Engineer, Westinghouse Electric & Manufacturing Company. First edition. McGraw-Hill Book Company. 463 pages. Illustrated.

When one ponders over the title of Mr. Hayes' book he realizes what a task the author set for himself. However, as Mr. Hayes has been a practical specialist in this field for many years he has been able to make a good job of it. He states, and he ought to know, that his main object has been to furnish the actual switchboard operator the information that will enable him to keep the equipment in his care in the best operating condition, by explaining what should be expected of the apparatus and equipment, and further to assist him in selecting and installing new material.

The above explains the somewhat encyclopedic nature of the book, and also the scattering throughout the descriptions of practical hints which embody the author's own experience and observation.

It is a difficult thing for a man connected with one manufacturer to give appropriate treatment of the output of others in competing lines. Here, however, manufacturers' names other than Westinghouse are freely mentioned and examples of their products are given. Of course the author could not be expected to enthuse over the products of business rivals, but he states their features dispassionately as he does in the case of his own company.

Railroads and Government

By Frank Haigh Dixon, Ph. D. Charles Scribner's Sons, New York, 1922. 384 pages.

This is an account of the federal regulation of railroads in the United States from 1910 to the end of 1921. It will be admitted that this has been a critical period. The book is divided into three parts: Federal Regulations from 1910 to 1916, the War Period, and the Return to Private Operation. In a final chapter on the future, the author reaches briefly four conclusions: Private operation (which he recommends) requires a sufficient return to insure a constant stream of new capital in the industry, and this requires a return of at least 6 per cent on the investment. If this rate cannot be earned, government aid will have to be sought, and this means inevitably government ownership and probably government operation, though the former would be hazardous and the latter disastrous. Under existing conditions it is doubtful if 6 per cent can be earned continuously, and higher rates are inadvisable. Hence the increase must come through savings in operating expense. These savings cannot be obtained by minor economies frequently suggested, but must come through a program of efficient and economical operation on a national scale.

These suggestions are particularly pertinent in view of the present strike. The author declares that in such an essential industry as railroading both capital and labor should be required to accept service subject to a limitation upon their freedom of action in the settlement of their disputes.

New Overhead Crossing Specifications for Ohio

Rules, regulations and specifications for situations where electric lines cross or more or less parallel the line of a railroad, interurban railway, or other public utility. Published by the General Committee of Railroads and Public Utilities Operating in the State of Ohio. Distributed by the Ohio Committee on Public Utility Information, Illuminating Building, Cleveland, Ohio.

This complete treatise of 275 pages has been prepared for the Public Utilities Commission of Ohio by a large committee representative of the railroads and utilities, together with an eminent corps of advisers. The committee chairman is W. T. Teague, general superintendent of plant the Ohio Bell Telephone Company, and the secretary, H. W. Hough, research engineer the Cleveland Electric Illuminating Company. The code was prepared in pursuance of an act of the General Assembly, approved on June 7, 1921, revising the appropriate sections of the general code relating to wire line construction, maintenance and operation.

This new code goes into every detail of crossing construction and contains numerous tables of data and charts to enable crossings to be constructed without any possible misunderstanding as to what the intent of the rules is. The text goes so far as to give a complete example of crossing calculations, covering thirty-two pages and a folding plate.

No detailed analysis of the contents can be given here, but engineers and others interested can obtain copies at a nominal price through the committee mentioned. This code is of course in more detail than the National Electrical Safety Code, the corresponding part of which is under revision. It is also more elaborate than the Pennsylvania code, and has the advantage of having been prepared several years later.

Economics of Electrical Distribution

By P. O. Reyneau, Philadelphia Electric Company, and H. P. Seelye, Detroit Edison Company. First edition. McGraw-Hill Book Company. 209 pages. Illustrated.

While this book is primarily for the central station engineer, it can be useful also to electric railway power distribution men in a number of ways. In the first place it will stimulate them to look at their problems with an analytical rather than an empirical eye. Again, whether or not electric railway engineers find it necessary to follow the authors in all of the details of their reasoning, the arguments will be useful and excellent reference use can be made of the formulas, data and graphs which are liberally supplied.

Referring to the analysis mentioned above, it should be said that the authors do not claim overmuch for their theory, but they do try to lay a scientific foundation for the intelligent selection of such details as sizes of wire, types of insulators and the dozens of others which go into the making of a line. Of course all of this, as the title indicates, is with regard to costs.

The authors of this book are practical men in the sense that while they had excellent theoretical training they have been and are in daily contact with such situations as they cite in their illustrations. They naturally thus try to combine theory and practice in their treatment.

Giant We-the-People and Judge Landis' Award

By Henry K. Holsman and Ralph Parlette. Parlette-Padget Company, Chicago. 45 pages.

This booklet points out the foolishness and waste of contests between capital and labor. To illustrate this point the authors have used one of Aesop's fables and refer at length to Judge Landis' award in the building trades labor troubles in Chicago.

Personal Mention

The Wizard of Oshkosh

B. W. Arnold's Over-the-Top Tactics Extended to Several More Wisconsin Properties—Tenacious Manager of Railways Melts Opposition and Comes Up Smiling

Every one at the recent meeting of Wisconsin railway men knows that it was Bert Arnold who put across in magnificent shape the first separate convention of traction men in the State. In selecting Bert Arnold to prove that the railway men should convene as a separate unit the association made a wise appointment. However, it must be admitted that the Eastern Wisconsin Electric Company also recognizes executive ability, for the scope of Mr. Arnold's jurisdiction has recently been widened. He is now in charge of all the railway properties of the company. To the city property at Oshkosh and the interurban line between Neenah and Oshkosh, initially under his control, have been added the local lines at Fond du Lac and Sheboygan.

Why Bert Arnold was the logical successor to Harry R. Ellis, who recently became associated directly with Kelsey, Brewer & Company, is easy to understand. The Wisconsin men will recall that Bert made three points in his brief opening remarks. These were service, good public relations and economical operation. If he were not giving good service in Oshkosh, if he had not established almost ideal relations with the public of Oshkosh and if he were not producing transportation cheaply, he never would have recommended these ideas to others.

WINS SUPPORT

No citizen in Oshkosh is more firmly established as a force in the community than is Bert Arnold. He is not the Mayor or even a member of the City Council, but he does know everybody in town, from the editor of the local newspaper to the men who used to parallel his interurban with buses. The bus men don't duplicate Mr. Arnold's service any more because the City Council wouldn't let them, but Bert fixed the bus owners up with another route where there wasn't any other service. He invited them to use the railway stations for terminals and helps them settle their claims when they get in trouble.

When it came to getting the support of the local newspaper Bert Arnold was the forerunner of the present kindly co-operation that all Wisconsin utilities are receiving. When Bert first went to Oshkosh about five years ago no more bitter and sustained attacks nor sincere condemnation could be directed against any railway than was hurled at the local transportation system in that city by Col. John Hicks, a former United States Ambassador to Chile. His medium was the Oshkosh *Northwestern*. But Bert Arnold resolved immediately that this censure and ruinous criticism must cease and made repeated attempts to interview the gentleman, who invariably was "busy" writing an editorial and who so far as the electric company was concerned apparently had brought "Chile" with him from South America and set it down in Oshkosh. A showdown had to come and it arrived precipitately when the local manager omitted the customary formality of sending in his card, opened the door to the forbidden sanctum and thrust in his head. The editor snapped from his work and roared "Close that door!" The retort came back, "Yes, sir, just as soon as I'm in." From that day to this Bert's property has not been hounded with scathing editorials or colored news. This has held true even though Colonel Hicks died several years ago. Bert claims that all he demanded was a square deal and that the sins of former management be not held against him. If he fell down on the job the Colonel could renew his attacks. Bert never has, though!

It is doubtful whether many who saw the smiling face of the chairman at the recent Wisconsin meeting have heard that the manager at Oshkosh passed through more winter last year than Mark Sabre did in twenty. Bert's property was the victim of hell, high water and sleet, though in the reverse order. It was the most severe sleet storm ever experienced in that locality that laid low early this year nearly every overhead line and pole on the system. And then spring was so far behind that when it did come, it came all at once, with the result that a considerable portion of the roadway was inundated. As if it were not time for Bert's tribulations to cease, a fire visited and wiped out his carhouse, including a number of cars. But all's well in Oshkosh now. Safety cars glide up and down the streets and Bert is buying some new interurbans.

STARTED RAILWAY WORK IN 1899

As mentioned before, Mr. Arnold is in charge of all the railway properties of the Eastern Wisconsin Electric Company. M. H. Frank, formerly local manager at Fond du Lac of both the city railway and the power department, will now manage the power business only in Sheboygan and Fond du Lac. A. Kolste will be the superintendent of railways in Sheboygan, reporting to Mr. Arnold, who will continue his headquarters in Oshkosh. Formerly all the local managers reported to Mr. Ellis in Sheboygan, who was vice-president and general manager of the company.

Mr. Arnold has been in railway work since 1899, when he entered the services of the Wheeling & Lake Erie Railway. He was dispatcher of the Lake Shore Electric Railway, Cleveland, Ohio, and chief dispatcher of the Muncie, Hartford & Fort Wayne Railway, Muncie, Ind. In 1907 he became superintendent of the southern division of the Illinois Traction System, McKinley Lines. From his headquarters at Springfield he was transferred to Decatur as superintendent of all lines entering that city, and later was made chief clerk to the general superintendent of the system. In 1910 he was made superintendent of transportation of the Chicago, Ottawa & Peoria Railway. In 1917 he was appointed manager of the Eastern Wisconsin Electric Company.

D. J. Bromley Carries On Electrification Project

D. J. Bromley, who has been associated with the Illinois Central Railroad for some time, has taken over the work of the late A. S. Baldwin, vice-president, in regard to the electrification of that line. This project, which includes electrification of the suburban lines and ultimately of the main lines and switching service, has been an important one for a number of years and has been developed to a point where a speedy and successful end is in sight. The decision as to the adoption of alternating or direct current depended largely on the inspection which Mr. Baldwin made just before his death, on June 27, of heavy traction electrification in continental countries.

E. R. Smith Chief of New Monongahela Department

To offer systematically for sale light, power and electrical appliances, the Monongahela Power & Railway Company, Fairmont, W. Va., whose power lines serve large territories in West Virginia and Ohio, has establishel a commercial department under the direction and management of Earl R. Smith. His offices will be in the Bethlehem Building in Fairmont.

Mr. Smith is to surround himself with assistants who are experts in the electrical business and his duties will be to offer the current of the company to domestic and manufacturing customers in the most modern and approved manner.

Mr. Smith is particularly well fitted for the head of the new and important department. He came to the company several years ago as purchasing agent and in this capacity had an opportunity to meet with and deal with the public. Later he became manager of the investment department, which kept him in contact with the public in Fairmont, Clarksburg and Parkersburg. Officials believe he will make the new department immediately successful.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Large Equipment Orders Recorded

Unprecedented Purchases of Cars in First Six Months Reflected in Orders for Motors—G. E. Alone Has Orders for More than 1,700 Equipments —Equipment Orders an Index to Better Times

The record of cars ordered is very largely the index to the prosperity of the electric railway industry. Thus the compilation in the *Electric Railway Journal* for July 1, 1922, showing 122 more cars purchased between Jan. 1 and June 15, this year, than were purchased during the entire year of 1921 meant the starting of a cycle of orders for equipment that has been a happy augury of better times ahead for a considerable period.

Reduced to concrete terms that augury is measured to the tune of 1,016 cars. Moreover, there can be no complaint about either the geographical distribution of the orders for cars or about their kind, for every section of the country is well represented among the companies that placed the orders and the types of equipment are represented by 443 safety cars, 107 special-type one-man cars, 404 other types of city cars, 12 interurban cars and 50 elevated cars.

Then, too, the figures of cars ordered are a partial index to the status of the different classes of roads, for while it has been generally acknowledged that the interurban railways were among the hardest hit during the war-time period, the fact that such roads are again coming into the market for equipment is an indication of their rejuvenation. This figure of 1,016 cars previously mentioned is just the record for the United States alone. As for foreign orders they, too, have been very large as the sales records of the car manufacturers testify.

These are the general facts. They have been stated before more elaborately, but they are of interest now for their more remote bearings. These cannot be pursued at this time in all their ramifications, but to one manufacturer, the General Electric Company, they have meant that since the first of the year it has received orders for 482 safety car equipments which were distributed among thirty-seven operating companies. During this same period orders have been received for approximately 600 four-motor equipments distributed among eighteen operating companies. The total number of orders for equipments for light-weight car equipments in city and suburban service since Jan. 1 has been approximately 1,100. Some of the larger orders received during this period have been:

81 safety car equipments for the Stone & Webster properties.
95 safety car equipments for the properties of the Illinois Traction System.
50 safety car equipments for the Louisville Railway.
25 safety car equipments for the United Electric Railways, Providence, R. I.
25 equipments for Richmond and a similar number for Norfolk.

Some of the larger orders for four-motor light-weight equipments are:

200 for Detroit Municipal Railway.
100 for the Boston Elevated Railway.
150 for the United Electric Railways, Providence, R. I.
30 equipments for the City Railway, Dayton, Ohio.
20 equipments for the Georgia Railway & Power Company, Atlanta, Ga.

Two very important equipment contracts closed so far this year by the company were those for 114 equipments for the Chicago Surface Lines and 200 equipments for the Department of Street Railways in the city of Detroit.

The Chicago Surface Lines order has been referred to previously in the *Electric Railway Journal*. It is, however, particularly interesting as the same motor equipment was selected for two types of cars. Forty-five two-motor car equipments were purchased for use on double-truck, one-man cars, and sixty-nine four-motor car equipments for a larger motor car to handle a trail car. Air compressors and controllers, the latter to be furnished with aluminum castings, are included. This is the first installation of two-motor equipments on light-weight double-truck one-man cars. The car on which these equipments will be used was designed by H. H. Adams, superintendent of rolling stock and shops of the Chicago Surface Lines. It incorporates some new features in the operation of cars of this type.

The adoption of 28-in. wheels for both the four-motor and two-motor equipments enabled the Chicago railway to standardize the same motor wheels and axles for both types of cars. The G. E. 275 motor selected for this equipment is the one recently placed in manufacture by the General Electric Company for use on low-wheel trucks in heavy city and suburban service.

The largest single order for cars placed in the last few months was the one recently awarded by the city of Detroit for 200 light-weight city cars. The General Electric Company received the order for the electrical equipment, which will include a four-motor car equipment with K-35 control and CP-27 air compressor. The cars and electrical equipment are duplicates of fifty cars which have been in successful operation for more than one year. The G-E 265 motor selected for these cars is one which was placed on the market by the General Electric Company about two years ago.

These, in brief, are the important facts with respect to the cars and their motor equipment. There is more to the mere record of orders than this, however. As a matter of fact, the adoption of the light-weight equipment in Chicago and Detroit is interpreted as reflecting a growing use of the light-weight cars for both city and suburban service. Therein is the moral pointed for the future.

Spanish Railway Officials Inspect Westinghouse Plant

Senor Don José Moreno Ossorio, general manager of the Norte Railway in Spain, and several other Spanish railway experts who are working out plans for the proposed electrification of the Norte Railway recently made a tour of inspection through the East Pittsburgh Works of the Westinghouse Electric & Manufacturing Company.

The other members of the inspection party were Don Mario Viani Caballero, chief engineer of the motive power department, Norte Railway; Prof. Don José A. Perez Del Pulgar, professor of electrical engineering, Instituto Catolico de Artes e Industrias, and R. F. Hamilton, consulting engineer of the Sociedad Espanola de Construccion Naval, which represents the Westinghouse Electric International Company in Spain.

The initial electrification on the Norte system, which is one of the largest in Spain, will include about 40 miles of line running from Ujo through the mountainous Pajares section in the north. Three thousand volts direct current will be used in this section, and water power will be purchased from the Electra de Viesco Company in Asturias. More extensive electrification is planned for the future on the Madrid-Venta De Banos section of the railroad.

$158,000 on Track Construction Planned

On its Utica division which takes in the cities of Utica and Rome the New York State Railways plans on spending $158,500 on track construction work alone during the present year. The engineer's estimate for the Utica track laying jobs aggregates $96,000 for new rails on Columbia and Bleecker Street lines. In Rome $38,000 is being expended for new rails on West Dominick Street. All of the rails used in the construction work were purchased from the Lorain Steel Company. Three loops are to be built at the terminus of the North Utica, Blandina Street and Lincoln Avenue lines. The Lorain Steel Company submitted the low bid of $2,046 for the loop to be placed at the end of the Blandina Street line and the Buda Company was awarded the North Utica loop with its bid of $1,820. The contract for the other loop has not been placed. It will cost about $24,000 to install the loops.

Temporary Halt in Upward Coal Prices

Rapidly mounting production from the bituminous coal mines, as district after district has returned to work, has eased the market and put a soft pedal on high prices. *Coal Age* Index of spot prices of soft coal at the mines dropped 17 points this week, to 420 from 437 a week ago. The high point so far this year was reached the last week of July and since then the decline has been consistent, though unsteady. The average price on Tuesday of this week was $5.08, compared with $6.73 on July 31, the peak. In the West, prices now average under $5 and in the East from that figure up.

Prices are irregular and doubtless will continue so until the extent of the expected car shortage is fully developed. The big questions are: To what extent will the soft-coal mines be called on to replace normal anthracite requirements, and at what figure will bituminous coal output be halted by car shortage and transportation disability?

It is the present expectation that prices will decline even more for several weeks and then with cold weather and the full pressure of winter demand, plus the necessity for winter storage, to start up, slowly at first and then rapidly. What will happen then, it is predicted, will depend on the legislation passed by Congress. If that proves to be effective, provided it is passed, prices may be held in check; otherwise another ascension.

Production last week is estimated at a little short of 10,000,000 net tons, all soft coal. The gains each week are now from the union fields that were on strike, and of course nearest to markets that were shortest of coal.

Metal, Coal and Material Prices

Metals—New York	Sept. 5, 1922
Copper, electrolytic, cents per lb........	14.00
Copper wire base, cents per lb..........	15.75
Lead, cents per lb....................	5.90
Zinc, cents per lb....................	6.60
Tin, Straits, cents per lb..............	32.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons..............	$9.00
Somerset mine run, Boston, net tons.....	5.25
Pittsburgh mine run, Pittsburgh, net tons	......
Franklin, Ill., screenings, Chicago, net tons	4.25
Central, Ill., screenings, Chicago, net tons	4.325
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., cents per lb.	6.25
Weatherproof wire base, N.Y., cents per lb.	15.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	91.50
White lead, (100-lb. keg), N.Y., cents per lb.	12.50
Turpentine, (bbl. lots), N.Y., per gal.....	$1.23

Rolling Stock

Lincoln (Neb.) Traction Company has converted more than 95 per cent of its cars for one-man operation.

Metropolitan West Side Elevated Railway, Chicago, Ill., has purchased 140 Westinghouse 567-R-1 motors and 90 equipments of automatic battery line field control. These equipments will be used on the new cars being built by the Cincinnati Car Company for the Chicago line. The motors are duplicates of those now in service. The Westinghouse Automatic Battery Line Field Control, which will be a feature of the installation, is designed for multiple-unit operation with the G. E. type M control.

Dallas (Tex.) Railway has ordered five passenger and two express interurban cars from the American Car Company. These are to be lightweight cars built in accordance with designs and specifications supplied by the Texas Construction Company. They will be 45 ft. in length over all, 8 ft. 6 in. in width over all and have seats 37 in. wide and an aisle 27 in. wide. They will seat fifty-four passengers and are designed so that they may be operated by one man or two men. Wide aisles are a distinguishing feature of the passenger cars, permitting easy ingress and egress from either end. The seats will be upholstered in green plush, giving the cars a very attractive appearance. They are to be spaced 33 in. between centers, giving ample room. Grab handles and pipe stanchions are to be of white enamel. The rear vestibule is to be built with long windows and a low dash, affording an observation platform on which five comfortable armchairs are to be placed.

Track and Roadway

New York, N. Y.—The Transit Commission has sent plans for a crosstown Queens and Brooklyn subway to the Board of Estimate. The final cost is estimated at $68,000,000.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, has notified the city of Findlay that it will place new rails and ties between McManness and Carnahan Avenues.

Indianapolis (Ind.) Street Railway has been ordered by the Indianapolis board of public works to repair its tracks in Central Avenue between Nineteenth Street and Fall Creek.

Norton, Taunton & Attleboro Street Railway, Norton, Mass., must rebuild its roadbed along South Main Street in Mansfield. The expense to the company is limited to $1,000, the town to pay the remainder.

Kitchener, Ont., property owners have voted 421 to 62 to raise $70,000 to improve the street railway system by increased double trackage, construction of new carhouses and the purchase of three new cars.

New Brunswick Power Company, St. John, N. B., is laying 62-ft. rails on Prince William Street. These are more than double the length of the old rails. This will mean fewer joints and less damage to the new paving which is now being done on this thoroughfare.

The South Covington & Cincinnati Street Railway, Covington, Ky., will lay "T" rails instead of the grooved type on Thirty-fourth Street, Latonia, Ky. The substitution was made necessary by the railroad strike, as the traction company has been unable to obtain shipments of the heavier rails.

Power Houses, Shops and Buildings

Potomac Public Service Company, Hagerstown, Md., will install additional machinery at the power plant at Millville, W. Va.

Wheeling (W. Va.) Traction Company is installing an up-to-date freight station to handle freight in and out of Wheeling, at the corner of Main and Twenty-first Streets. Under the new arrangement freight will be received at the new station at any time during the day and way bills issued to any point on the Pan Handle and Moundsville Divisions. It will not be necessary to haul freight to this station at any particular time and there will be no congestion whatever.

Muskogee, Okla.—Construction has begun on the Oklahoma General Power Company's plant by the Byllesby Engineering & Management Corporation. The plant is on the Arkansas River, and will have an initial capacity of 10,000 hp. with a water consumption of 20,000,000 gallons daily. Transmission line connection will be made with the distribution systems of the Oklahoma Gas & Electric Company and the Fort Smith Light & Traction Company. The plant will be operated under a long-term lease by the Oklahoma Gas & Electric Company.

Trade Notes

National Carbon Company, Long Island City, has placed on the market a new electro-graphitic brush known as "259."

Hardwood Manufacturers' Institute, Chicago, Ill., has moved from the Memphis headquarters to offices at 1020 South Wabash Avenue, Chicago.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has become agent for the DeLaval transformer oil purifiers and dehydrators. This apparatus operates on the centrifugal principle and is designed to remove sludge from lubricating oil and to dehydrate and purify transformer and other insulating oils.

New Advertising Literature

Davis Boring Tool Company, St. Louis, Mo., has issued a leaflet describing the construction of its expansion reamers. Tables are given of the various dimensions, number of blades, etc.

Rail Welding & Bonding Company, Cleveland, Ohio, has published Bulletin No. 101, which fully describes RWB dynamotors, Type BB, for welding rail bonds, building up worn and cupped rails, repairing manganese special work and for general shop welding.

The Electric Furnace Company, Salem, Ohio, has issued circulars with illustrations showing some of the many types of electric enameling, annealing and heat-treating furnaces which it has installed in the last few years.

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Consolidation of Street Railway Journ al and Electric Railway Review

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Making the Most Out of the Convention

THE October convention is now but little more than two weeks off, and each individual who expects to attend should plan how he can contribute to the success of the meetings, both as regards himself and the meetings as a whole. One point has already been mentioned in these columns, namely, that the delegates should aim to be present at the scheduled time for opening so that each session can start promptly. A corollary of this plan is for each delegate to attend regularly the meetings of the association in which he is most interested, and a second corollary is that he should participate in the discussion so far as he is able.

The fundamental idea of any conference is the benefit which comes through the exchange of ideas and the new conceptions thereby brought out. A study of the programs for the various meetings shows many opportunities for constructive discussion, and unless advantage is taken of these opportunities the full benefit of the meetings will not be had. To understand the truth of this statement one has only to recollect the noteworthy information brought out on the floor of past meetings, notably, perhaps, of the Engineering Association, as well as the excellent discussion which followed the report last year of the committee on merchandising transportation of the Transportation & Traffic Association.

Executives of member companies will do well to impress upon their officers and staff the great advantages and benefits that will come from their attendance at and participation in the sessions of the various associations as they take place from day to day.

Now Is the Time to Settle the Coal Strike Permanently

THIS is the time to settle the coal strike, not the strike of this year, for that is over, but future strikes, with their great attendant loss to the public. These strikes occur so frequently as to indicate that the present system of settling them is not satisfactory, at least to the general public, which is vitally interested in having a continuous supply of coal. Consequently the discussion of this subject by Secretary Hoover at this week's chemical convention in New York is most timely.

In the Secretary's opinion, the present relationship of employer and employee in the coal industry constitutes a periodical national danger, as every quarrel threatens the welfare of 99 per cent of the community who are not parties to it. These quarrels center upon various rights claimed by employer and employee, but when these rights infringe upon the public right to a supply of a necessity like coal at a reasonable price, the dominant right is that of the public.

Much of the trouble will disappear, Mr. Hoover thinks, with more regular employment in the mines, and on this point he declares that our bituminous mines are operated much less continuously than those in England and Germany, and the public obviously pays the bill of this waste of labor and capital. He then points out that greater facilities of storage of coal among the larger users, particularly the railroads and the public utilities, would help greatly in overcoming seasonal fluctuations, while a co-operative system of marketing would get better car distribution, would decrease transportation, would enable the laying down of coal in storage at points of consumption, and would consequently give more regular operation with reduced working costs. The proposed coal commission has a great opportunity for constructive work in the interests of the public.

Mayor Couzens Scents a Conspiracy

JIM COUZENS, Detroit's Mayor, came up from the bottom. He ought to know labor. It is his proud boast that he has worked with his hands. That was a long time ago. He has had lots of time since then to forget many things. One of the things that he has forgotten is that labor by and large is ungrateful. Thus Mr. Couzens is found caterwauling about something that hasn't yet happened to him, but that may happen in the future. He is visibly perturbed. It is all about the trainmen in the employ of the Detroit Municipal Railway.

As Mayor he has treated the railway employees well. He says so himself. And the facts bear him out. He did not reduce wages when wages were generally reduced. He established a trial board to investigate all complaints against employees. All this and more he has done for labor. And now Mr. Couzens sees labor about to turn against him. The men on the municipal lines who were members of the Amalgamated when the Detroit United lines were taken over threaten to turn on Jim and bite the hand that has fed them. These same men bit the hand of the Detroit United on several occasions. Apparently, they did this because the Detroit United was a private corporation without a soul, that ground the men down so that the widows and orphans among its security holders might live in luxury. But that the men should want to do the same thing to Jim after he has done so much for them is too much. It can't possibly be so.

If it is so, then there is some deep mystery attached to it all. Is some agent of the lower regions surreptitiously at work among the men to stir them up? No. Is union labor preparing to repay a debt of human gratitude in the approved union way? No again! According to a public statement of the Mayor, a number of electric railways are in a conspiracy to stir up the men, embarrass his administration and discredit municipal ownership as a policy and if possible destroy it. Can you beat it? As Spoon River says, beware of the man who rises from one suspender.

Individual Railway Experiments with Joints Have Been Costly

APROPOS of the question of policy involved in the proposal that the American Electric Railway Association appropriate funds for financing the work of the committee on welded rail joints, it is being said, in opposition to the suggestion, that the industry or the companies as a whole are continually in actual service conditions making better experiments than the committee could make. In other words, the thought is expressed in some quarters that the companies should continue their individual efforts at testing joints in service in the manner which has long prevailed and which, so far, has resulted in this lack of knowledge in regard to the relative merits of the several types of welded rail joints which confronts the industry.

The individual experiment method has, more than any other single factor, been responsible for the lack of information which the committee on welded rail joints has disclosed through its preliminary study. So long as individuals experiment each for himself, without co-ordination of effort, just so long will there be a diversity of opinion as to the results of their experiments.

The co-ordination of such individual efforts has been one of the aims of the committee because it has been found that in no other way can the industry hope to learn the fundamental facts underlying the properties of each of the several joints which have more or less use today.

Even were such efforts co-ordinated through the committee, there remains the fact that years have been required to learn some facts about welded joints which proper and scientific tests, made beforehand, would have developed within a few months. No one would think of erecting an important building without testing the soil in advance, to be certain that the foundations will spread the load. But the electric railway industry has been blindly building tracks with joints of varying merit without any real advance knowledge of their ability to withstand the stresses which come upon them.

Surely, preliminary tests can and should be made to determine how welded rail joints may be expected to perform. That it is not possible, within reasonable cost, to make tests exactly under full service conditions is not a cause for rejecting the service test scheme as proposed by the committee, because some of the best scientific minds in the country have indicated their belief that tests which will give all necessary data can be made in the manner proposed.

Individual efforts have had their day and so far have principally caused expense entries on the debit side of the ledger account against rail joints. The records of one company show this clearly. A careful account of maintenance costs for 100 miles of modern track having an average age of four years gives significant information relative to the cost for joint maintenance as compared with total maintenance for the track, and also the cost for a particular joint which caused excessive expense. Had proper tests been made before this joint was adopted an expense of more than $100,000 could have been avoided. The records indicate that 65 per cent of the total maintenance expense for 100 miles of track was confined to 11 per cent of the mileage and all of the track producing this large proportion of the total expense was laid with a particular type of joint. No doubt similar records, if kept on other properties, would show similar results.

In any event, the way engineers know that their joint experiments, individually, have been costly affairs, and as a rule the engineers are rather reluctant to admit such facts for fear of adverse criticism. And small companies, of which the industry is mainly composed, cannot afford to make costly individual experiments. This throws upon the larger companies the burden of the experiments that are made individually.

It is believed that the problems requiring solution are not such that individual experiments, by the several large railway companies only, will solve them, at least within a reasonable period of time. If the problems are to be solved in time to avoid another decade of costly individual experimentation it seems clear that the efforts toward solution must be made by the research methods proposed by the committee and the industry as a whole should at once get behind the work as a matter of policy.

Can Wheel-Tread and Rail-Head Contours Be Co-ordinated?

A LIVE question before equipment and way engineers relates to the possibility of so designing wheel treads and rail heads that they will fit together when new and thus eliminate the ironing-out process. The use of rail heads with curved contours has been ardently advocated, and the Engineering Association has thought well enough of the idea to incorporate the curved head in the standards, as has also the British Engineering Standards Committee. Australia has the curved-head rail, too. The curvature of the head in these cases was selected to fit a partly worn wheel. On the other hand the French rails illustrated elsewhere in this issue in an abstract of the report of a paper by M. Gagné, of the Paris unified transportation system, have a plane head surface which he says is best because the cylinder is the best form for the wheel rolling surface. The action of the French Light Railways Association in adopting this feature was discussed editorially in the Nov. 27, 1920, issue of this paper, page 1106.

The curved-head rail is comparatively new, but the weight of the argument seems to be in its favor. It can easily be had if desired on a large scale, as its manufacture involves no complication in rolling. It is an open question at present as to whether the same arguments apply to the wheel. Some way engineers would like to get co-operation in this matter from equipment men in the form of a wheel tread with an enlarged fillet that would more nearly conform to the contour of the rail head. They believe that wheels as well as rails would wear longer if this could be done. Equipment men are reluctant to try out this innovation on a large scale as they believe that the results would not justify the bother and expense involved. They believe that the effect of curving the contour would be only transient. However, if some road or roads would try the plan on a large scale the experiment would yield valuable data.

At a recent Engineering Association committee meeting the opinion was expressed that the subject of interrelation of wheel and rail contact surfaces has never been scientifically studied. The suggestion which followed to the effect that a comprehensive committee be appointed next year to make an all-round study of the subject is commendable. Here is a chance for engineers within one industry to get together to settle a practical matter in a practical way. The committee ought to be appointed in due course.

St. Paul Utilities Co-operate on Stray Current Control

Results of Survey Conducted by Co-operative Committee of Utilities to Determine Results of Applying Remedial Measures Suggested by Bureau of Standards — Committee Also Studied Effects of Changes in the Distribution System and Elimination of Competitive Drainage in Underground Structures

BY O. J. LENMARK
Power and Equipment Department, Twin City Rapid Transit Company, Minneapolis, Minn.

IN 1917 the utilities owning underground structures in St. Paul, Minn., met to discuss electrolysis problems. As a result, the advice and co-operation of the Bureau of Standards was sought, and a joint investigation of return railway circuit conditions was made by the engineers of the several utilities under the supervision of E. R. Shepard, of the bureau. Later the bureau submitted recommendations looking toward improvement in the situation.

However, little was done in carrying out the bureau's recommendations until 1921, due to the unsettled condition incident to the war. In that year a working subcommittee, consisting of a technical man from each of the interested utilities, was appointed to carry out these recommendations and to determine the results.

The method of co-operating followed in St. Paul has proved very successful. Obviously, the problem of electrolysis is one that requires co-operation of all interested utilities. It is an engineering problem that is susceptible to analysis if constructive work is done by all of the parties concerned. The members composing this committee are technical men in the several operating organizations who are in constant touch with the changes in their systems which may affect the electrolysis situation. The problems are met fairly and squarely on the basis of facts, and opinions are formed from an unbiased standpoint. Any changes made on the various systems which result in a general improvement are approved by all the members of the committee before they are made permanent.

ST. PAUL'S ELECTRIC RAILWAY DISTRIBUTION SYSTEM

The St. Paul City Railway lines comprise approximately 170 miles of single track. The four principal sources of power supply are (see Fig. 2) the College Avenue substation, located at College Avenue and Wabasha Street; the Snelling substation, located at Snelling and University Avenues; the Hope Street substation, located at Hope and East Seventh Streets, and the Concord substation, located at Concord and Isabel Streets. The Concord substation was not in operation when the 1917 investigation was made.

Insulated negative feeders are installed in all of the substation districts, the system in the College Avenue district being unusually extensive. Complete data as to size, length, voltage drop, and current carried on the various feeders are given in the table, and the layout is shown in Fig. 2. This system of insulated negative feeders was installed to minimize electrolysis and it was highly commended by the bureau engineers at the time of the investigation.

In its 1917 report the Bureau of Standards stated that the St. Paul City Railway had installed a rather extensive insulated negative return system, used welded rail joints on a large part of its track and had generally good bonding on other sections. It was found that a number of failures on water and gas main service pipes and lead sheaths of cables, many of which had been attributed to electrolysis, had resulted from damage done prior to the installation of the four substations then in operation and were easily traced to conditions which had existed for a number of years previous. Many failures had occurred on University Avenue near Dale Street in the old substation district, where potential differences of 12 to 15 volts between water pipes and tracks had existed.

On the other hand, it was learned that practically no failures had occurred in some regions where conditions appeared to be most favorable for electrolytic corrosion, particularly in the Snelling substation district. Most of the failures which had occurred there were due to conditions which at that time no longer existed. In some cases where serious corrosion had taken place on pipes and the cause of such corrosion had been removed the pipe failed later under abnormal strain, or due to natural rusting of the weakened pipe. Galvanic action may also have taken place as a secondary action following electrolysis from stray currents. Some of the failures reported on gas service pipes were obviously due to their proximitiy to lead cable systems which, being drained, were strongly negative to the gas pipes. Others were in regions where the corrosion could not possibly have been explained by the action of stray currents.

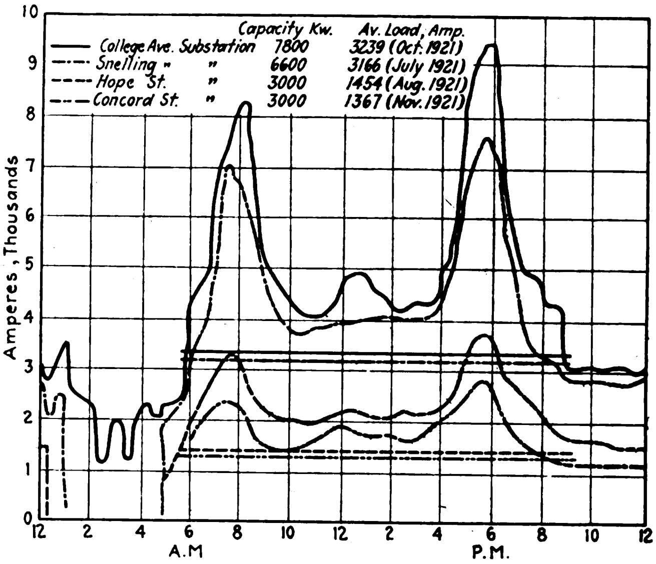


FIG. 1—SUBSTATION LOAD CURVES OF ST. PAUL CITY RAILWAY

The rails at Rice and Rondo Streets were found to be at unusually low potential, with the water mains strongly positive to them. To correct this condition it was recommended that more current be drawn from the tracks at the substation by decreasing the resistance between rail and negative bus, and that the negative feeder be moved from Rice and Rondo Streets to Tenth and St. Peter Streets, or that a tie be made on Tenth Street between the Rondo line and the tracks on Wabasha Street. The current on the Rondo Line could then be limited to give the best voltage conditions. The purpose of this change was to raise the potential of the Rondo Street tracks at Rice Street, where there existed a "potential sinkhole." This change would also divert more current to the Selby Street and University Avenue tracks, but should not change conditions appreciably along these lines.

It was also recommended, in order to reduce the potential gradient on University Avenue east of Hamline Avenue, that the 2,000,000-circ.mil cable on Chatsworth Street between University Avenue and Rondo Street be moved to the end of the Rondo Street line. The effect of this change would be to load that portion of the Rondo Street line west of Chatsworth Street then practically idle and correspondingly reduce the load on University Avenue. As this change would have only a minor effect on the potential gradient along University Avenue, it would not justify any great outlay of capital, particularly as the positive condition of the pipe on University Avenue can be reduced by other means.

The Bureau of Standards stated that it had consistently maintained that pipe drainage as a principal means of electrolysis mitigation is objectionable, the reasons for this being fully set forth in Technologic Paper No. 52. However, it had frequently recommended restricted pipe drainage to take care of residual effects which are always present, even where elaborate measures have been applied to reduce potential gradients on the tracks to a practical minimum. The potential differences found between the water mains and tracks in the Snelling Avenue district, though apparently not resulting in any failures up to this date, were stated to be too high to ignore and the suggestion was made that they could best be reduced by bonding the mains to the negative return system.

It had been found on the various cable systems that some were being overdrained, while there was insufficient drainage on other systems. To eliminate this hazard, the bureau recommended that means be provided to control and measure the current, and to equalize the potential between the various structures.

The Bureau of Standards' recommendations were made to cover conditions existing in 1917. After that year, however, several changes in the system have been made, such as the installation of the new Concord substation, some track extensions and a few minor changes in the cable and pipe systems. By 1921, when the work was taken up again, much preliminary testing became necessary to determine whether the changes recommended in 1917 still held. The committee then carried out on all the structures the suggested methods of mitigation, conforming to the general intent of the recommendations of the Bureau of Standards. A complete survey was then conducted along the lines of the bureau's survey of 1917.

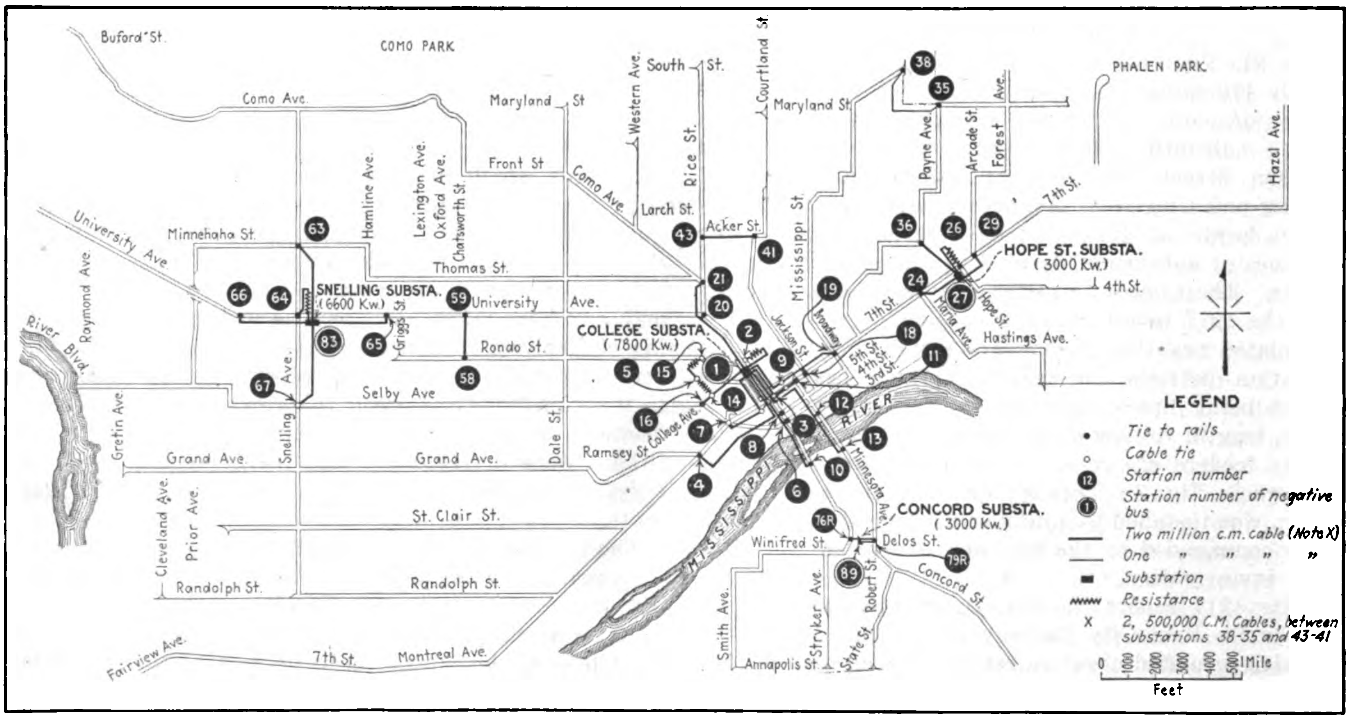
The work consisted chiefly of the following items: (1) Preparation of load curves over a twenty-four hour period for the four substations, and determination of (2) potential drop and current flow in the negative return feeders, (3) potential gradients on tracks, (4) potential difference measurements; (5) current flow on gas pipes at numerous locations; (6) current flow in drainage cables connected between the various underground structures and the railway negative return system over a twenty-four hour period.

The loads on the Snelling and Hope Street substations were found to be about the same as in 1917, while the College Avenue substation load was considerably lighter due to the addition of Concord substation.

Of the eighty-four gradients which have been calculated, 25 per cent exceed 0.5 volt per thousand feet; and 6 or 7 per cent equal or exceed 1 volt per thousand feet. In 1917, they were 35 and 9 per cent respectively.

A few high gradients were found in the Hope Street district, where track repairs were being made when these measurements were taken, and it is believed that this temporary condition was the direct cause of these high readings. See Fig. 3.

As the raising of the potential at Rice and Rondo Streets would require the laying of one block of conduit



Buford St.
COMO PARK
Como Ave.
Maryland St
South St.
Courtland St
Maryland St
PHALEN PARK
Western Ave.
Rice St.
Front St
Como Ave.
Larch St.
Acker St.
Payne Ave.
Arcade St.
Forest Ave.
Hazel Ave.
7th St.
University Ave.
Minnehaha St.
Hamline Ave.
Lexington Ave.
Oxford Ave.
Chatsworth St.
Thomas St.
Mississippi St.
HOPE ST. SUBSTA. (3000 Kw.)
4th St.
SNELLING SUBSTA. (6600 Kw.)
University Ave.
Raymond Ave.
River Blvd.
Griggs
Rondo St.
COLLEGE SUBSTA. (7800 Kw.)
Jackson St.
Broadway
7th St.
5th St.
4th St.
3rd St.
Hope St.
Hastings Ave.
Selby Ave
Snelling Ave.
Gretin Ave.
RIVER
Grand Ave.
Grand Ave.
Dale St.
Ramsey St.
College Ave.
Minnesota Ave.
MISSISSIPPI
St. Clair St.
Cleveland Ave.
Prior Ave.
CONCORD SUBSTA. (3000 Kw.)
Winifred St.
Delos St.
Concord St.
Randolph St.
Randolph St.
Smith Ave.
Stryker Ave.
Robert St.
State St.
Annapolis St.
Fairview Ave.
7th St.
Montreal Ave.
63
66
64
59
83
65
58
67
43
41
21
20
2
9
1
5
15
14
16
7
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3
4
6
10
12
13
19
18
11
24
27
36
26
29
38
35
16R
79R
89
LEGEND
● Tie to rails
○ Cable tie
⓬ Station number
① Station number of negative bus
Two million c.m. cable (Note X)
One " " " "
Substation
Resistance
X 2, 500,000 C.M. Cables, between substations 38-35 and 43-41
0 1000 2000 3000 4000 5000 1 Mile
Feet

FIG. 2—DIAGRAM OF NEGATIVE FEEDER LAYOUT AND LOCATION OF PILOT WIRES WHICH TERMINATE IN COLLEGE AVENUE SUBSTATION

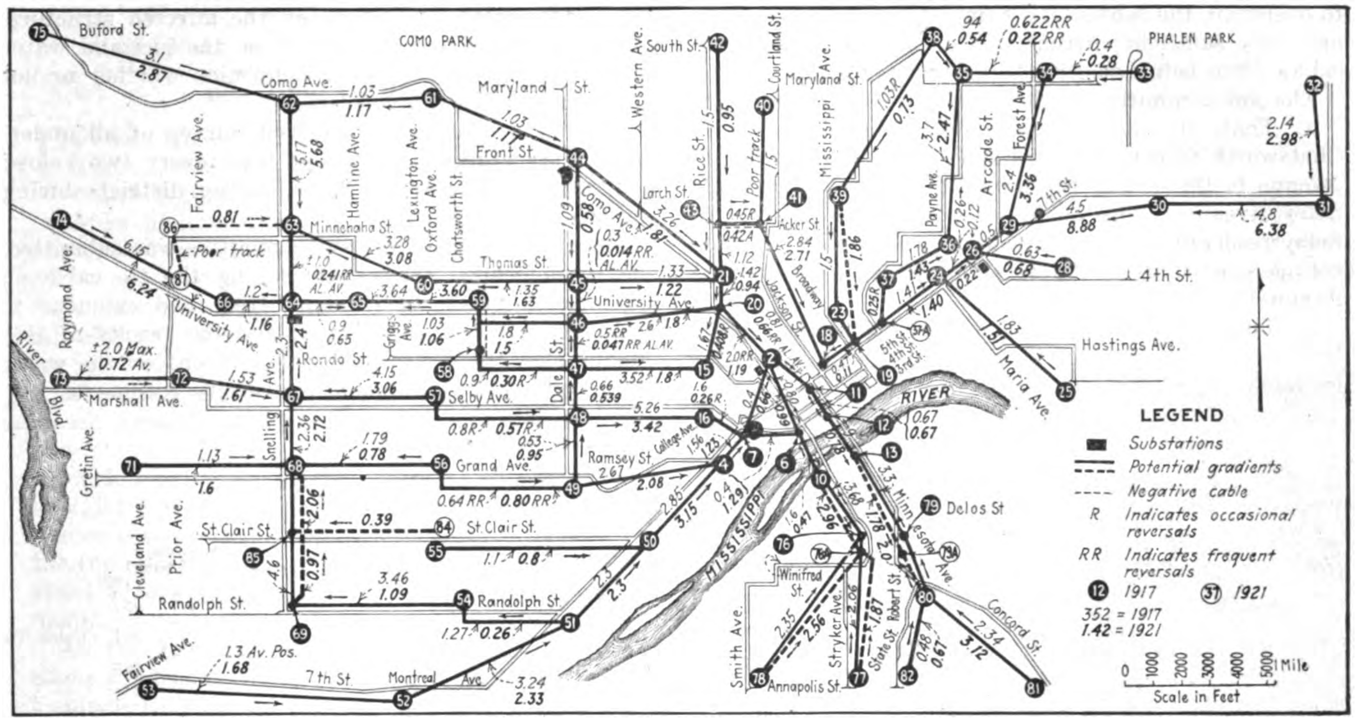

COMO PARK
PHALEN PARK
Buford St.
Como Ave.
Maryland St.
Front St.
Minnehaha St.
Thomas St.
University Ave.
Rondo St.
Selby Ave.
Marshall Ave.
Grand Ave.
Ramsey St.
St. Clair St.
Randolph St.
7th St.
Montreal Ave.
Fairview Ave.
Snelling Ave.
Hamline Ave.
Lexington Ave.
Oxford Ave.
Chatsworth St.
Dale St.
Western Ave.
Rice St.
Mississippi Ave.
Arcade St.
Forest Ave.
Payne Ave.
Hastings Ave.
4th St.
Maria Ave.
Delos St.
Concord St.
Annapolis St.
Smith Ave.
Stryker Ave.
Robert St.
Winifred St.
RIVER
MISSISSIPPI
River Blvd.
Raymond Ave.
Cleveland Ave.
Prior Ave.
Gretin Ave.
Poor track
LEGEND
Substations
Potential gradients
Negative cable
R Indicates occasional reversals
RR Indicates frequent reversals
1917
1921
352 = 1917
1.42 = 1921
Scale in Feet
1 Mile

FIG. 3—TRACK POTENTIAL GRADIENTS

in a paved street and a 2,000,000-circ.mil cable, results essentially the same have been obtained by lowering the resistance in the feeder at College and Wabasha Streets to rails, and inserting additional resistance in the Rice and Rondo Streets feeder. At Snelling and University Avenues, the resistance in the feeder was reduced to lower the potential at this point in order better to balance the feeders.

In analyzing conditions from Fig. 4, it is seen that the feeders at University and Rice Streets, Rondo and Rice Streets and College and Selby Avenues are well balanced in good shape and that the water-main potentials are considerably improved.

As recommended by the Bureau of Standards, three drainage connections to water mains were installed in the Snelling substation district. These drainage connections have greatly reduced the positive potential differences between water main and rails. However, until it is determined whether or not joint corrosion is taking place, it will not be possible to regard conditions in this district as satisfactory. In order to determine whether or not joint corrosion is taking place, it will be advisable to make periodic inspection of the joints in the water main near the drainage points.

A complete electrolysis survey was made on the water mains in the Snelling Avenue and Hope Street districts. A number of measurements were also made in the vicinity of Rice and Rondo Streets. These are the districts where the pipes were known to be in danger. A comparison of the survey with that of the Bureau of Standards shows considerable improvement. This is due to pipe drainage installed in the Snelling Avenue district, and improved balancing of the negative feeders in the vicinity of Rice and Rondo Streets. A study of conditions in the Hope Street district revealed the existance of a positive area along the Hope Street and Maria Avenue car lines. This condition is unquestionably due to the high potential gradient on the East Seventh Street line and no doubt will be removed after track repairs are completed on this line.

As a result of the efforts made by the St. Paul City Railway and the various interested utility companies, the electrolysis conditions on the water system have been greatly improved. Since 1917, only three failures due to electrolysis have occurred. Of these three, one, in the Snelling Avenue district, was due to present conditions; one, in the College Avenue district, was due to the breaking down of the insulation of the negative-return system; and the third, in the College Avenue district, was due, undoubtedly, to conditions which no longer exist. Pipe failures, due to electrolysis, are now less frequent than formerly, and should become still less frequent in the future.

No attempt has been made to drain the distribution gas mains. However, a 16-in. cast-iron, high-pressure gas main which is not connected to the distribution mains is drained at University Avenue and Dunlap Street, as the potential difference of rails at this location was considered too high for safety.

In this connection, the possibility of using cement joints on a new 6-in. cast-iron gas main, which is to replace a 3-in. cast-iron main in the College Avenue district, was brought up before the sub-committee. The committee felt that the insulating cement joint, which preserves a high resistance over a long period of time, would improve electrolysis conditions on the gas mains in this vicinity very materially. Special precaution, however, would be needed in making these joints to prevent metal-to-metal contact between bell and spigot ends in the joint due to expansion.

It was further suggested that the service pipes in this insulated section be prevented from making electrical contact with other systems by the use of insulating joints within the premises served, as stray currents could enter from the water system through gas water heaters and other appliances with which it comes in contact, and injury would result to both the service and the section of the main to which it connects. In this specific case, it will be necessary to install a few cement joints on the cross mains which connect the insulated sections so as not to concentrate the potential at the insulated sections. On the cable systems care was taken not to overdrain the cables. To eliminate competitive drainage, only sufficient current was drained to prevent the cables from being positive to ground for a long period.

The sub-committee in its findings recommends:

1. That, in addition to moving the tie cable on Chatsworth Street between Rondo Street and University Avenue to the end of the Rondo line, it be extended to Selby Avenue. This would balance the University and Selby feeders in better shape and would greatly improve voltage conditions on the water mains on the University Avenue line.

2. That periodic current and potential measurements be taken at all drainage locations so that a check may be made of any change which might happen; and to investigate cause of change on the affected structure.

3. That close watch be made on the gas and water mains at drainage points to determine whether or not joint corrosion is taking place.

4. That a complete electrolysis survey of all underground structures be made at least every two years; and that tests be made in the substation districts during the intervening years.

Since the report of the sub-committee was submitted, the recommended change of moving the tie cable on Chatsworth Street to Dunlap Street and extended to Selby Avenue has been made; and the results of this change show improved voltage conditions on the water mains very materially along University Avenue.

POTENTIAL DROP AND CURRENT FLOW IN NEGATIVE CABLES

St. Paul, 1917–1921

All cables are 2,000,000-circ.mil unless otherwise noted. For location of the cables, see map.
Roman type = 1917 readings. *Italic type = 1921 readings.*

From Station Number	To Station Number	Cables Number	Distance (In Feet)	Volts 1917	Volts 1921	Amperes, All-Day Average 1917	Amperes, All-Day Average 1921	
	(a) College Avenue Substation District:							
2	1 Neg. Bus	15–109	134.5	8.3	*5.8*	156 (A)	*365*	
3	1 Neg. Bus	15–101 15–103 15–104	1,634	5.0	*2.94*	1,690	*991*	Cable Tie
4	1 Neg. Bus	15–102 (B)	5,265	8.9	*6.58*	336	*265*	
6	1 Neg. Bus	......	.....	8.8	*4.48*	.....	.....	
7	1 Neg. Bus	......	.....	8.6	*5.77*	.....	.....	
8	1 Neg. Bus	......	.....	8.0	*4.39*	.....	.....	
9	1 Neg. Bus	15–107	2,325	7.2	*3.4*	568	*277*	Cable Tie
10	1 Neg. Bus	......	.....	10.0	*4.7*	.....	.....	
11	1 Neg. Bus	......	.....	9.4	*4.78*	.....	.....	
12	1 Neg. Bus	15–105	4,422	9.5	*4.4*	395	*175*	
13	1 Neg. Bus	......	.....	9.2	*4.89*	.....	.....	
14 Neg. side of res.	Neg. Bus	15–106	1,161	4.82	*3.51*	760	*560*	
15	1 Neg. Bus	......	.....	9.0	*7.19*	.....	.....	
16	1 Neg. Bus	......	.....	7.2	*6.64*	.....	.....	
18	1 Neg. Bus	......	.....	8.8	*5.72*	.....	.....	
19	1 Neg. Bus	......	.....	8.8	*5.84*	.....	.....	
20	1 Neg. Bus	15–108	2.792	9.65	*7.79*	630	*520*	
21	1 Neg. Bus	......	.....	10.3	*9.39*	.....	.....	
7	3 Neg. Bus	15–101	1,962	3.6	*2.5*	336	*237*	
8	3 Neg. Bus	15–103	717	3.0	*1.75*	770	*453*	
9	3 Neg. Bus	15–104	689	2.2	*0.95*	590	*257*	
6	8 Neg. Bus	15–103	350	0.55	*0.098*	290	*51.9*	
10	6 Neg. Bus	15–103	1,933	1.46	.....	140	.....	
6	*10 Neg. Bus*	*15–103*	*1,933*	....	*0.479*	.....	*46.1*	
11	9 Neg Bus	15–104	505	1.7	*1.24*	630	*455*	
18	9 Neg. Bus	15–107	930	2.47	*1.29*	488	*257*	
19	18 Neg. Bus	15–107	1,441	0.39	*0.117*	50	*14*	*(Al. Av.)*
13	12 Neg. Bus	15–105	1,613	0.88	.....	100	.....	
12	*13 Neg. Bus*	*15–105*	*1,613*	.....	*0.78*	.....	*89*	
16	14 Neg. Bus	15–106	1,272	2.08	*2.79*	300	*406*	
15	5 Neg. Bus	15–106	1,278	1.9	.....	273	.....	
15	*14 Neg. Bus*	*15–106*	*1,278*	.....	*3.5*	.....	*178*	
21	20 Neg. Bus	15–108	1,142	1.36	*0.94*	220	*152*	
38	35 Neg. Bus	Tie	2,600 (C)	0.9	*0.54*	35	*19.2*	
43	41 Neg. Bus	Tie	2,550 (C)	0.37 (R)	*0.42 (R)*	15	*14.02*	
58	59 Neg. Bus	Tie	1,600	0.88	*1.06*	110	*120.6*	
79	76 Neg. Bus	Tie *(This tie removed)*	900	1.5	.....	110	.....	
	Drainage current from Tri-State cables						30	
	Drainage current from Tri-State cables						*18.43*	
	Drainage current from street railway cables						*18.9*	
	All-day average station load						4,567	
	All-day average station load						*3,239*	
	(b) Hope Street Substation District:							
24	27 Neg. Bus	29–103	1,879	2.98	*2.72*	292	*269*	
26	27 Neg. Bus	29–102	80	2.10	*2.85*	510 (A)	*306*	
29	27 Neg. Bus	29–104	854	2.55	*3.49*	550	*760*	
36	27 Neg. Bus	29–101	2,277	2.9	*1.7*	234	*139*	
	All-day average station load						1,586	
	All-day average station load						*1,454*	
	(c) Snelling Avenue Substation District:							
63	83 Neg. Bus	16–101	2,954	12.0	*14.6*	745	*920*	
64	83 Neg. Bus	16–105	100.5	11.1	*11.5*	165 (A)	*138*	
65	83 Neg. Bus	16–103	2,676	10.3	*9.94*	710	*647*	
66	83 Neg. Bus	16–104	2,541	10.4	*7.8*	750	*691*	
67	83 Neg. Bus	16–102	3,460	13.0	*18.03*	690	*968*	
	N. W. Telephone Company's cables						32	(A)
	N. W. Telephone Company's cables						*35*	
	Street Railway Company's cables						55	(A)
	Street Railway Company's cables						*22*	
	All-day average station load						3,149	
	All-day average station load						*3,166*	
Resistance in 16–105 was decreased at substation to balance feeders in better shape.								
	(c-1) Snelling Avenue Substation District:							
63	*83 Neg. Bus*	*16–101*	*2,954*	.....	*12.04*	.....	*760*	
64	*83 Neg. Bus*	*16–105*	*100.5*	.....	*10.58*	.....	*158*	
65	*83 Neg. Bus*	*16–103*	*2,676*	.....	*11.84*	.....	*768*	
66	*83 Neg. Bus*	*16–104*	*2,541*	.....	*9.65*	.....	*756*	
67	*83 Neg. Bus*	*16–102*	*3,460*	.....	*17.4*	.....	*893*	
	Northwestern Telephone Company's cables						*35*	
	Street Railway Company's cables						*22*	
	All-day average station load						*3,392*	
	(d) *Concord Substation District (in service since Jan. 29, 1918):*							
76-A	*88 Neg. Bus*	*33–101*	*816*	.....	*2.93*	.....	*667*	
79-A	*88 Neg. Bus*	*33–102*	*756*	.....	*1.42*	.....	*350*	
79-A	*88 Neg. Bus*	*33–103*	*739*	.....	*1.39*	.....	*350*	
	All-day average station load						*1,367*	

(A) = Measured at substation. (B) = Cables vary in size. (C) = 1,000,000 circ.mil cables.

Shop Notes from Quebec

While Local Maintenance Equipment Follows Standard Lines, the Practices Which Have Been Developed Show Originality and Adaptability

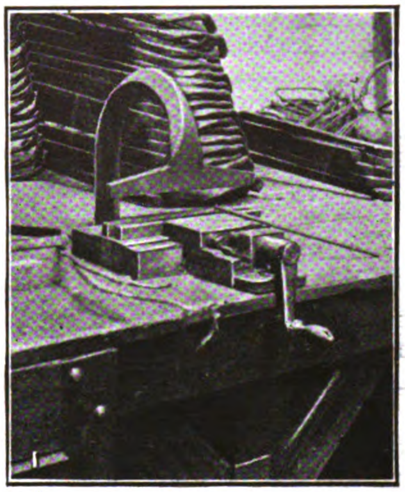
PETER QUINN, who is master mechanic of the Quebec Railway, Light & Power Company, has developed his shop with a view to the minimizing of labor in maintenance. His equipment is neither new nor elaborate, but what he has available he uses to good purpose. The general features of the Quebec system were outlined in an article in the issue of this paper for May 27, 1922. Some further items with particular reference to the shop follow:

Mr. Quinn uses a home-made armature coil press which gives good results. (See illustrations.) It consists of a crank-operated bench vise with liners by means of which pressure can be applied to the straight coil side while hot from the varnish. To insure compactness of the coil and smoothness of the top and bottom surfaces a pressure bar is provided with a pedal mechanism for pulling it down firmly above the vise.

Another handy device is a rotating field-coil bench clamp for use in taping field coils. It is carried on a spindle which drops into a socket in the bench top. Still another device is a screw press for pressing motor bearings into and out of housings. The accompanying illustrations tell the story in these two cases.

One of the greatest conveniences in the shop is a liberal use of trolley bar for the transportation of armatures, etc., from point to point. Two of the accompanying pictures were taken particularly to show the bar.

The bar is of cross-shaped section, the wheels of the trolley rolling on the horizontal surfaces, the upper limb being used for attachment of the supporting clamps. Switches in the bar permit shifting of the trolley from one bar to another. There are, of course, several successful commercial types of trolley bar which are suitable for this purpose.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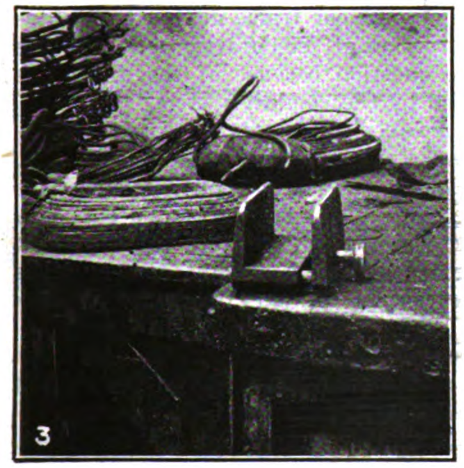
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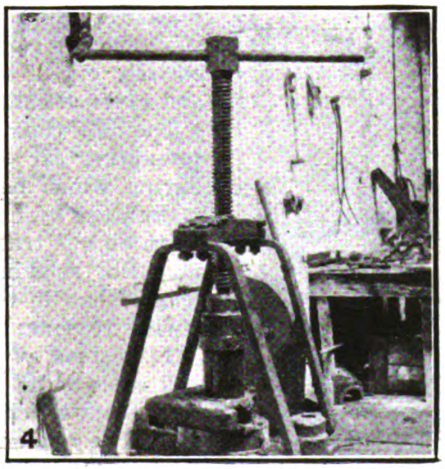
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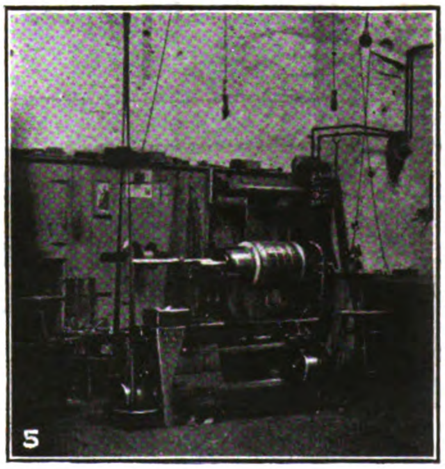
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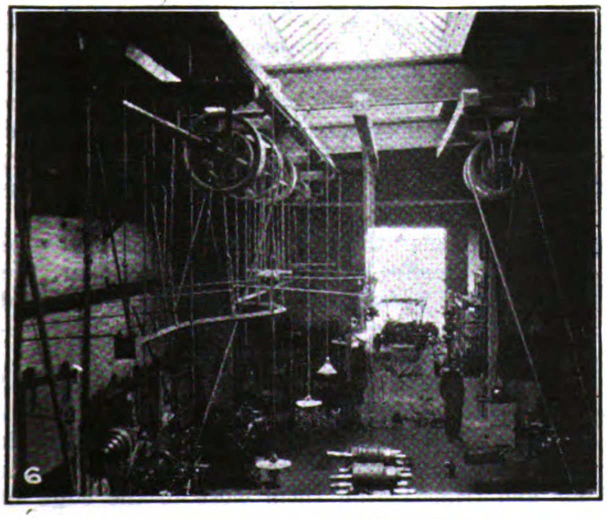
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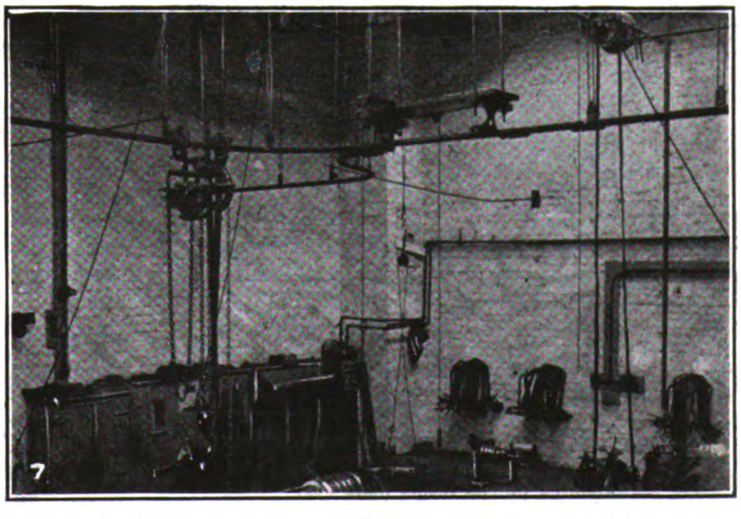
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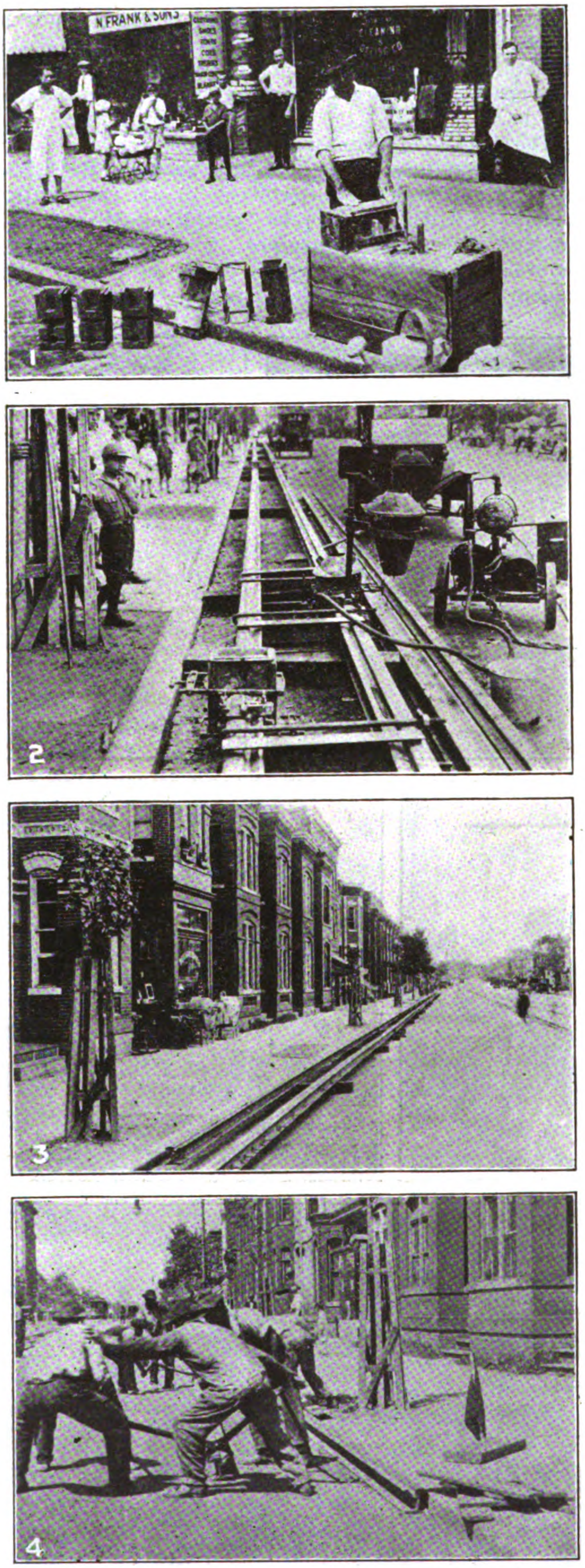
THE EDITORIAL CAMERA INVADES THE QUEBEC SHOPS

Nos. 1 and 2. This coil press turns out a smooth, compact coil.
No. 3. A rotating field coil vise facilitates taping.
No. 4. Press for inserting bearings in housings and removing them.
No. 5. Armature banding corner in the Quebec shops showing convenient belting connection.
Nos. 6 and 7. The trolley bar is a useful adjunct in the machine shop (left) and armature shop (right).

Track Relaying Accelerated by Installing Pre-Welded Rails

Rails Were Welded at Side of Street and Transported to Position Alongside Track During Daytime, Then Installed in Permanent Location at Night

By C. S. Kimball
Engineer Way & Structures, Washington Railway & Electric Company, Washington, D. C.



HANDLING AND WELDING RAIL SECTIONS IN WASHINGTON

No. 1—Ramming up self-luting mold box.
No. 2—Rails lined up parallel to each other on side of street preparatory to welding. One rail is being pre-heated.
No. 3—Two lengths of seven rails each at side of street after being welded. Each length 420 ft. long.
No. 4—Lifting seven lengths of welded rails into position alongside track.

During the course of some track relaying work the Washington Railway & Electric Company, Washington, D. C., recently adopted an economical method of installing and Thermit-welding new rails. This resulted in a considerable saving in time and cost as compared with the usual method of procedure and was accomplished without interruption to traffic.

The replacement consisted of 7,000 ft. of fourteen-year-old double track on H Street between North Capitol and Fifteenth Streets, N.E., with new 6-in. L.S. Co. 120-513 Trilby rail, a special rolled section, which is a modified A.E.R.E.A. rail made to conform to the special requirements of the conduit current distribution system installed in Washington. Normally three to four minute headways are maintained over this line, with one to two minute headways, lasting about two and one-half hours, during the morning and evening rush-hour periods. In addition to this service the heavy interurban cars of the Washington, Baltimore & Annapolis Electric Railway also operate over these tracks. It was, therefore, important that this frequent car operation be not interrupted. There were no adjacent parallel lines over which to reroute car traffic during rehabilitation, and the construction of temporary crossovers was entirely out of the question because of the difficulties and expense entailed by the conduit system.

The only time for carrying on this work without interrupting car traffic was between 1:30 and 5 a.m., during which period a half-hourly "owl" service was maintained by one car, which could be routed back and forth on one track, while the other track could be torn up. But relaying track over a conduit system takes longer than in the case of ordinary track for the following reasons:

1. Instead of simply spiking the rail to ties each rail must be bolted with four hook-bolts to the conduit yoke seats which support the rails at 5-ft. intervals
2. The yoke seats allow less room than ties for lateral adjustment of the rail.
3. The rails of a conduit system have to be surfaced much more carefully, by inserting steel filler plates between yoke seat and rail base (rather than tamping material under the ties, as in ordinary track) in order not to cause misalignment of the plow contact shoe, and hence possible breakage of the porcelain and cement insulations from which the conductor rails are suspended.

For these reasons, therefore, also because of the short, costly and ineffective periods of night labor, the work threatened to become unduly expensive and would have failed to keep pace with the progress of the preparatory work of removing the pavement.

Night labor costs, however, were greatly reduced and the speed of the work accelerated by laying the rails to be installed along the side of the street, parallel to the track, welding several lengths together during the day time and transporting them close to the edge of the track, then, during the early hours of the morning, removing the old rails and installing the new, welded lengths. If there was not time to weld the free ends of the welded rail lengths to the ends of the rails already installed, these joints were temporarily bolted, and Thermit-welded on another night. The new rails were temporarily bolted to every fifth yoke seat, or at intervals of 25 ft. Except where especially low joints occurred, surface plates were not inserted until later during a day period, when the temporary bolts were removed, the base of the rail wedged, plates inserted and the rail base bolted permanently to the yoke seat.

The number of rails per unit to be first welded together at the side of the street depended on the length of space uninterrupted by cross-streets along the curb adjacent to the place of installation. In most cases these welded rail lengths included three or four 60-ft. rails. In one case, on H Street between Twelfth and Thirteenth Streets, a pair of rail lengths was each comprised of seven rails making continuous lengths of 420 ft. each.

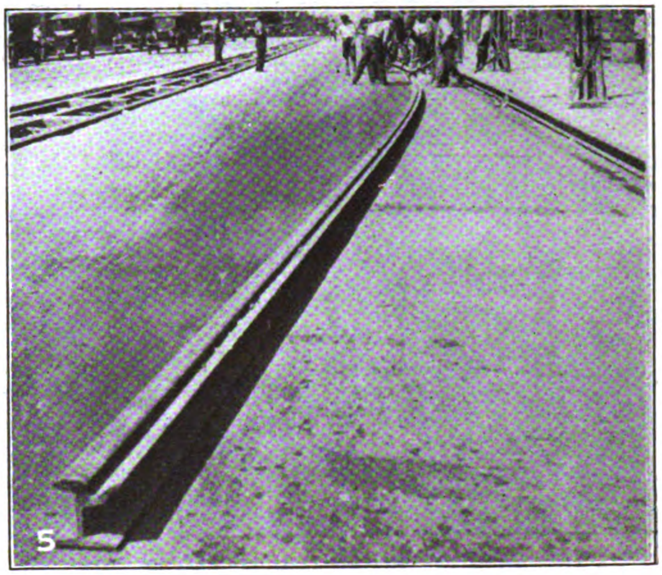
Before welding the rails at the side of the street each set of rail lengths were mounted on wooden cross ties cut in half, lined up parallel to each other and carefully surfaced by placing shims under the joints to be welded. The rails to be welded were kept in accurate lateral alignment by spacing the parallel rails evenly by means of three sections of I-beams, as shown in an accompanying illustration, which were cut to similar size. The rails were clamped together with eight bolts, four of which were clamped around the rail heads and four around the rail bases. Welding was then performed by means of the Thermit insert welding process. After the welds were made the welded rails were removed from the blocks and replaced by a set of unwelded rails.

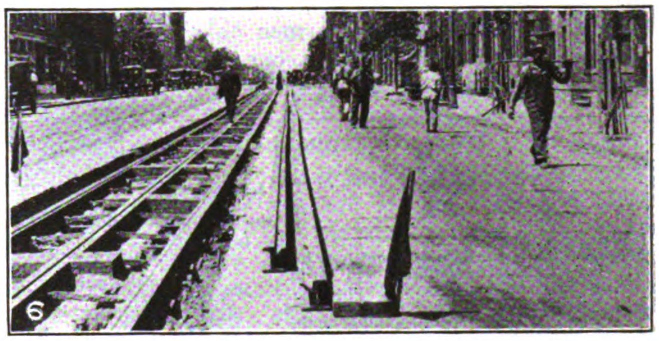
When the time came to transport the welded rails to the edge of the track gangs working on four-men rail tongs lifted them over. In the case of the seven-rail lengths, twenty men on five rail tongs were used, with five men prying the rail with slot bars, making twenty-five men in all. Efforts were concentrated on moving only one portion of this flexible unit at a time by successively shifting one end, then the middle, then the other end half way across the street. By repeating these operations once more the total lateral shift of about 18 ft. from curb to track was completed. The two seven-rail lengths were thus shifted laterally in three-quarters of an hour. Each multiple unit was then in turn placed on pipe sections as rollers and tugged along parallel to the track by means of a Fordson tractor to a position next to where it was to be installed. In the future low dolly trucks, equipped with center wheels of slightly longer diameter to facilitate free changes of direction, will probably be substituted in place of the pipe sections. Only a few minutes were required the following night for seven rail-tong teams to place the 420-ft. rails upon the yoke seats and bring one end flush with the rail already installed by battering the other end with a loose rail.

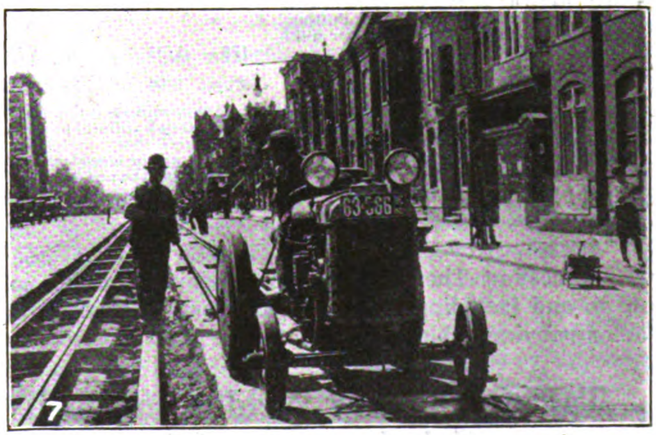
This reconstruction work was in direct charge of George Mahoney, supervisor of construction, and under general supervision of H. Jackson, supervisor of underground lines. The welding gang included a welding crew and a grinding crew, both under one foreman. Duties were arranged as follows:

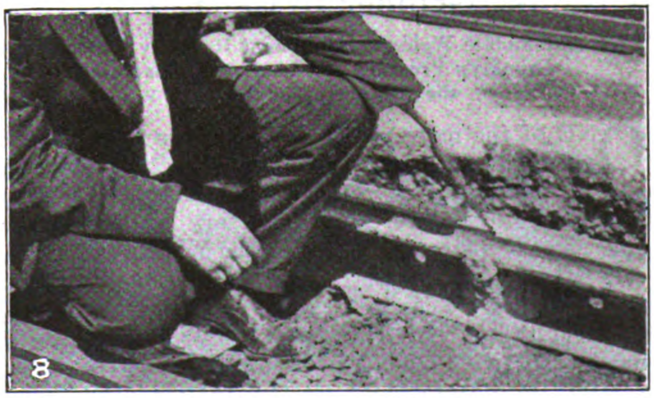
Welding crew (six men)—one man for making molds; two men for aligning, surfacing and clamping rail; two men for applying molds, preheating and pouring; one man for removing and cleaning up molds, also other cleaning up work.

Grinding crew (five men)—two men on one grinder,



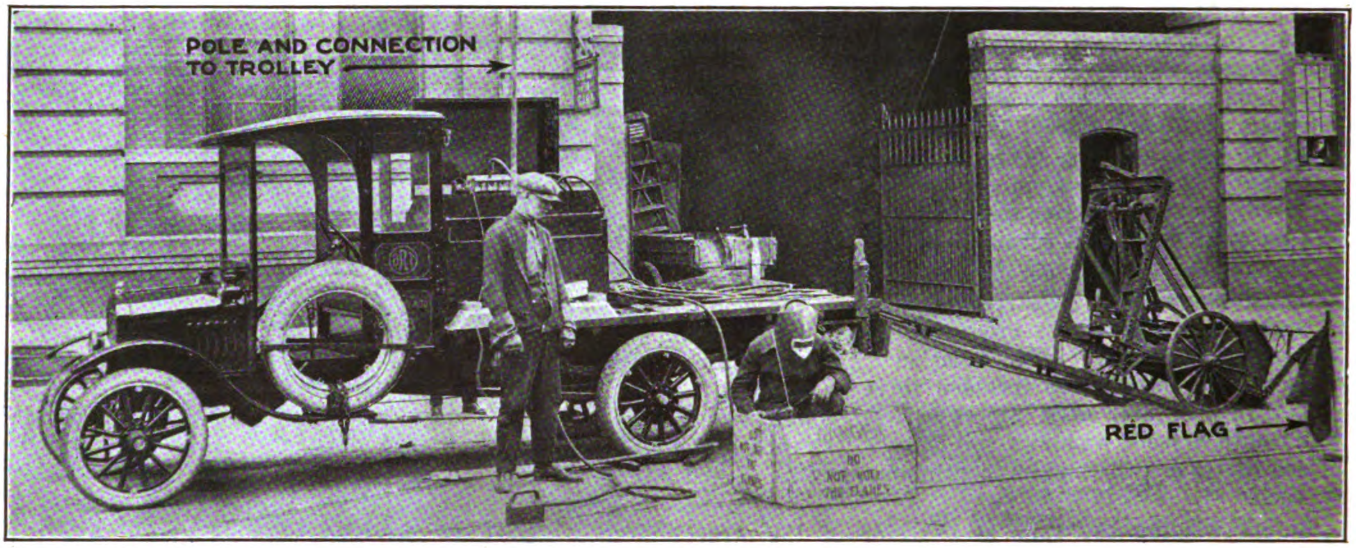






RAIL LENGTHS OF 420 FT. ARE HANDLED AS UNITS

No. 5—420-ft. length of rail partly lifted across street after being welded at curb.
No. 6—Two pairs of rails each welded from seven rail lengths in place alongside track for installation at night.
No. 7—Fordson tractor pulling 420 ft. of rail into position alongside track.
No. 8—Close-up of Thermit insert weld after installation.



Here Is the B. R. T. Welding and Grinding Apparatus Ready for Welding

grinding head of rail; two men on a second grinder, grinding weld at gage line; one man on small hand grinder, for finishing off grinding work.

COSTS OF WELDING RAIL JOINTS

	No. of Joints Con-sidered	Labor Cost Per Joint	Material Cost Per Joint	Total Cost Per Joint
1 Welding	105	$2.88	*$8.13	*$11.01
2 Thermit supplies and equipment (not including materials actually used up in welding)	500	......	.55	.55
3 Manufacture of rail clamps and blocking for rail (for using special welding method described)	500	.41	.22	.63
4 Extra handling of rail (for using special welding method described). Putting rail on blocks and removing after welding	170	1.33	......	1.33
5 Grinding (estimated only, because work not completed at this time)	.....	1.00	.50	1.50

Practically speaking, should additional welding be contemplated the cost of Items 2 and 3 would actually be much lower, as these materials will still be serviceable for additional work at the completion of this job.

As the work progresses the unit cost of Items 1 and 4 will be considerably decreased as the welding crew becomes more expert in applying the new method.

* Had the new "center pour" Thermit insert weld been used the material cost of welding per joint would have been only $5.50 and the total cost of welding per joint $8.38.

The cost of Thermit-welding rail joints on this job, up to and including Aug. 8, 1922, was as shown in the accompanying table.

Taking the Arc Welder and Rail Grinder to the Job

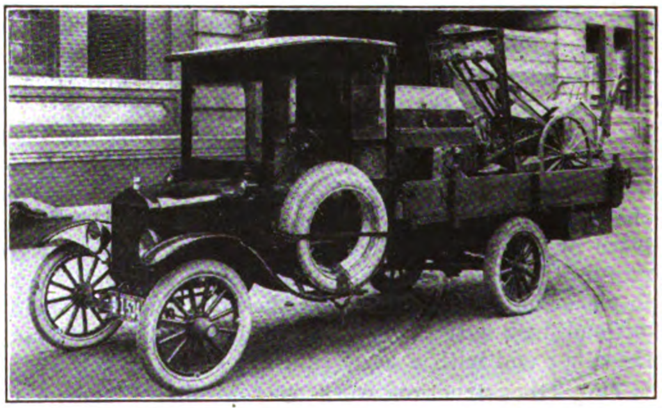
This Automobile Welding Equipment Recently Assembled in Brooklyn Provides for Speed in Dispatching the Apparatus to the Line

ONE of the more recent developments in the use of the arc welder in the repair of defective joints and special trackwork has been along the lines of portability. The portability feature was necessary so that sites of emergency repairs could be reached more quickly than can be done under the customary scheme of hauling the individual welder to the job.

Under this scheme it is necessary to haul the equipment from job to job, which in turn requires careful routing of an automobile to haul the equipment about and later requires the additional haulage of grinding equipment. Where emergency arc-welding repairs are needed, this all consumes a great deal of time and there is considerable lost time due to delay because of the difficulty closely to follow the welding work with the necessary grinding work. The latter should be done immediately, if the best results are to be obtained in the repairs to cupped joints or to defective parts of special trackwork.

The automobile welding equipment shown in the accompanying views was assembled by the way and structures department of the Brooklyn Rapid Transit System, in order to facilitate the work of emergency repairs. The equipment consists essentially of a 1½-ton Ford automobile having an Olsen extension and carrying a body which was designed by the surface track division under the general supervision of C. L. Crabbs, chief engineer of way and structures.

Removed from its usual running gear, a Type "W" Rail Welding & Bonding Company dynamotor welding outfit is mounted on special supports on the truck body immediately back of the cab. There is space between the welder and the tailboard of the truck body for the special swing-frame-type grinding equipment, which has been developed in Brooklyn for the particular needs of grinding special trackwork and minor welds at joints.



B. R. T. Emergency Welding and Grinding Outfit Ready to Move

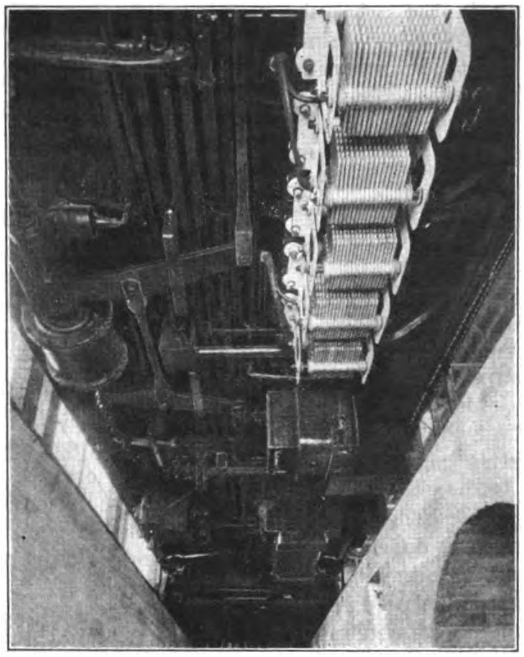
The sides of the truck are removable and are made to act as skids upon which to load and unload the grinding equipment. One of the views shows a block and tackle, temporarily installed for assisting in loading the grinder, but the outfit is now equipped with a small winch which better serves this purpose. The auto driver acts as a helper for the welder man, making a crew of two required to operate the outfit.

Inter-Operation Problems of Frankford Elevated

Use of Improved Features in Design Made Inter-operation with Present Equipment of Other Lines Impossible—Battery Control Adopted to Facilitate Use of Electric Couplers

BY J. N. DODD
Consulting Engineer

THE Frankford Elevated was built by the city of Philadelphia as part of an extensive system of municipally owned high-speed transit lines. In order to use it to advantage before the rest of the system is constructed, it was designed to be linked up with the Market Street subway and elevated line of the Philadelphia Rapid Transit Company, so that, assuming that a satisfactory operating contract could be arranged, the road would be operated as an extension of that line. The road is being equipped by the city, but even before the operating contract was signed by the company the engineers of both the company and the city were in close contact on all details of the determination of the equipment.



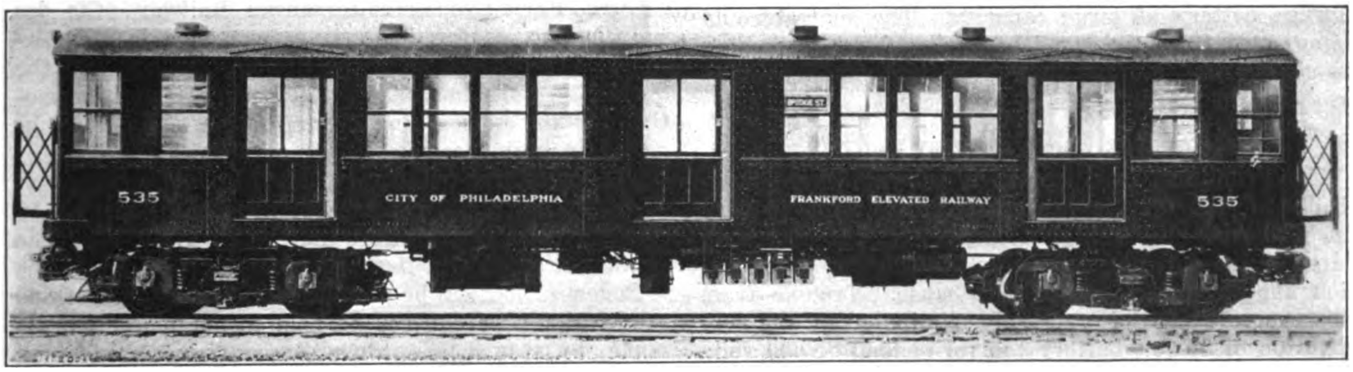
UNDERFRAMING AND EQUIPMENT

The existing cars of the Market Street line have line control. If the road was to be an extension, it would be necessary that the cars of either line should be able to run over the entire system. Satisfactory operation would be impossible if the Frankford cars were able to run only as far as the southern terminus, almost a mile from the center of the city, and the passengers were there compelled to transfer to the cars of the Market Street line in order to reach their destination.

Operation of the Frankford cars over only a portion of the Market Street line would be entirely impossible; that is, to have the Frankford cars run through the business center but no further. The interval between trains over that part of the line is already extremely close. For a portion of the rush hour there is a train every ninety-five seconds as far as Sixty-third Street, almost to the end of the line. It would be a physical impossibility to increase this service by the addition of the Frankford cars and still maintain a safe distance between trains. The only way to accommodate the Frankford cars in the subway would be for them to take the place of the Market Street cars when they enter the subway and to run to the end of the line and carry the Market Street traffic. It follows also that the track equipment of the Frankford line must be such as to accommodate the Market Street cars.

For this reason interchangeability of equipment also at first appeared desirable, at least to the extent that the new cars and the old should be able to run in the same trains. However, a brief consideration of the facts showed that this was impossible for a few years to come. The Market Street cars are equipped with a type of coupler which has given great satisfaction for many years on this as well as on many other roads. However, it is not automatic and it does not make the electric connections between the cars. It was realized that economy of operation demands an automatic coupler, which permits the cars to couple by impact; that is, by the mere bringing of them together. The coupler should also make the air-brake connection between the cars and simultaneously it should make the electric connections. Ordinarily it requires a considerably longer time to make the electric connections than the air, and some claim that three-fourths of the value of the automatic coupler lies in the electric features.

There is no modern coupler which can connect with cars on the Market Street line, and as no provision has been made for buying new couplers for the existing cars, operation of the two types of cars in the same train is an impossibility for some time to come. With



EXTERIOR SIDE VIEW OF FRANKFORD ELEVATED CAR this given as one of the conditions, the engineers felt free to consider carefully the advance which has been made in all details of car equipment to find out what was best without being bound by the requirement that the new cars should be able to run in the same train with the old ones.

IMPROVED BRAKE AND OTHER EQUIPMENT ADOPTED

The latest type of brake equipment has several improvements over the type on the Market Street cars. While the equipment on the old cars represented what was at that time the latest advances in the art, subsequent experience has shown the need of further refinements and additional features to meet the exacting requirements of modern rapid transit service. The new equipment has a much higher air pressure (and therefore brakeshoe pressure) for emergency application than has the old and a plentiful supply of air at this pressure, the purpose being to obtain the quickest possible stop when necessary. With the new equipment the brakes are applied automatically whenever the brake pipe pressure falls to a predetermined figure, whether this lowering in pressure is done designedly or inadvertently by the motorman, or whether it is due to leaks or even to failure of the compressor.

The control of the new brakes is such that in the event of failure of the electric control the brakes are controlled pneumatically without further action on the part of the motorman. It has many other refinements of greater or less importance. However, the control of the two types of brakes is radically different in that both cannot be run in the same train without abandoning the electric control. Electric control is such an important feature that its abandonment could not be considered.

The door-operating equipment has been improved so as to halve the operating cost and at the same time increase the safety. Operation has shown the need of an emergency system of lights which would be effective in case of failure of the power from the third rail. It was also desired to have the front and rear train marker lights supplied from a reliable source separate from the third rail so that the lights would burn even if the shoes should be broken off or the fuses blown. Adoption of any of these features would have made the operation of the two types of cars in the same train an impossibility.

It was felt that the improvements which could be obtained were so great that they should be adopted and that the ideal of uniformity of equipment be abandoned. This left the engineers free to adopt whichever type of control seemed best. The requirements that the cars be provided with emergency lights and with tail and marker lights energized from a source independent from the third rail meant that each car be equipped with a storage battery of large capacity. The control could be supplied from the same battery without increasing its size so that storage battery control would actually be a step in the direction of simplicity.

REASONS FOR USING BATTERY CONTROL

The Frankford cars run in a subway where practically all the dirt is brakeshoe dust. This is very finely ground and is highly conducting. It enters all parts of the equipment and the breakdowns in insulation appear mainly due to this cause. Trouble from this source would be practically eliminated by the substitution of 30-volt battery control instead of 600 volts from the third rail. Experience has shown also that when a failure occurs with 600 volts it is usually so serious as to require cutting out the entire cars. However, with 30 volts when a failure occurs it can be localized frequently to a single circuit.

One source of danger which not infrequently occurs from a failure of this sort is when the breakdown is on the first car of a train. When 600-volt control is used such a failure necessitates running the train from the second car. In a subway this not only is difficult but dangerous as well. As pointed out above, failure of insulation is very unlikely on a battery circuit, and even if it should occur on the 600-volt circuit of the first car battery control would permit cutting out the motors and operation of the remaining cars from the first. It is an interesting fact that in the Interborough subway in New York all cars originally had line control. However, 500 of them have been changed over to battery control and the last 1,000 bought also have battery control. It is said that the reason for the change is the freedom from insulation breakdowns. On the Brooklyn Rapid Transit line no subway cars are equipped with line control.

Strong as these arguments were, they took a secondary place when consideration was given to the electric coupler. The automatic electric coupler is essentially a detail of the equipment wherein trouble from high voltage may be anticipated. It consists of a number of energized knobs or buttons projecting from a plate. The necessity for compactness requires that these be placed very close to each other. In this case there would be thirty-three knobs, many of them placed not more than ½ in. from each other. If the voltage is only 30, a creeping surface of ½ in. may be considered with equanimity. If, however, the voltage is 600, it cannot be so considered, especially if the surface is also apt to be damp and covered with iron dust. An electric coupler was desired. If an electric coupler was to be used, the control voltage used should be the lowest with which reliable operation of the control could be obtained. It is usually felt that this is about 30 volts, and this type of control was therefore selected.

To recapitulate: The existing cars were equipped with line control, and economy of operation would usually demand that the new cars be such as to permit operation in trains with the old ones. However, the determination to adopt safety features and details to reduce the cost of labor for operation made their use in trains impossible. Experience elsewhere made the adoption of battery control advisable and the decision to use the automatic electric coupler made this imperative.

Trial Locomotive for P.L.M. Railway

THE Paris-Lyons-Mediterranean Railway (Cie des Chemins de fer de Paris à Lyon et à la Méditerranée) has ordered from the Société Oerlikon and the Société de Construction des Batignolles a trial locomotive for its approaching electrification. This will be placed in high-speed passenger service.

The locomotive will develop 1,840 hp. continuously at 50 m.p.h. and 2,400 hp. for one hour at 30 m.p.h. In starting the tractive effort may reach 47,500 lb. The maximum speed will be 68 m.p.h.

Regeneration will be provided for, and a train of 300 tons trailing weight will be held to not more than 25 m.p.h. by this means when descending a 3 per cent grade.

Richmond Problems Being Analyzed

Experts Consider Rerouting, Valuation and Traffic in the City of Richmond, Va.—Find Considerable Jitney Service in Non-Competitive Districts

THE traffic check just completed on the car lines in Richmond, Va., by the Beeler organization should give information of value in the solution of the railway problem there. The Virginia Railway & Power Company operates the street railway lines in Richmond under a number of separate franchises granted at various times and having different dates of expiration. Practically all these franchises specify a rate of fare of 5 cents, with six tickets for 25 cents and special workmen's tickets at further reductions.

The company has requested the city to grant a thirty-year blanket franchise to replace the various franchises under which it is operating. It seems, however, that the city can grant franchises only after competitive bidding, and the city's legal advisers have held that bids can be called for only after the company has surrendered its franchises or they have expired. As the company might be unsuccessful in bidding on the new franchise, it has been unwilling to surrender its present grants.

During the past several years the Richmond railway division of the company has been unable to cover operating expenses at the specified rates of fare, so the city suspended these rates and the company has been operating under a temporary rate of 6 cents granted by the City Council. The city government, in granting this relief, felt that definite action should be taken to provide a more stable basis of operation for the company. It was claimed that the division of expenses between the various physical and political divisions of the company was not being made correctly. The company produced a valuation which it presented as a basis for negotiations, requesting a fare to yield 8 per cent on the cost of reproduction as of Jan. 1, 1920. The city was opposed to acceptance of this valuation as it stood. In addition the city felt that the entire situation required an analysis.

To complicate matters still further, a strike of the trainmen last winter to combat a wage cut caused the growth of a competing jitney service. There was a partial boycott of the street cars by union sympathizers. The company fought the strike to a finish and is now operating with practically new forces. The business is now coming back. To curb the unfair jitney competition the city passed an ordinance restricting jitney operation to five definite routes which in general do not directly cover street car lines although they operate in street car territory. The jitney fare was fixed at 8 cents. Provisions for adequate bonding and insurance were included so that irresponsible jitney men would be forced out of business. The jitney operators contested this legislation and obtained a restraining injunction which was later dissolved, so that the city ordinance is now in effect. It has resulted in a reduction in the number of jitneys from about 500 to 100. Practically all the jitneys now in service are running on what is known as Route No. 1, which serves a high-class residence territory in which the car lines are a considerable distance apart. The railway for some time had an application before the Council to construct a car line in this territory, but met with much opposition from the property owners, so that the project was abandoned. In lieu of a car line the company has been willing to install a trackless trolley and operate it as a part of the street car system, at the same fare and with free transfers. The property owners have objected to this project also on the ground that the overhead wires would be a disfigurement.

In July of this year a bus line was granted a franchise to operate at an 8-cent fare over what is practically the same as jitney route No. 1, in the territory where the company was refused a permit for a trackless trolley. While the franchise has been passed by the Council and approved, it still remains open until bids are obtained and the franchise awarded to the successful bidder. Meanwhile the jitneys are doing a considerable business in this district. Manifestly a situation such as this is exceedingly unsatisfactory and should not be allowed to continue.

To have the full information before it to make a proper decision, the City Council, through Ordway Puller, chairman of the committee on streets, has engaged the Beeler organization to make a thorough investigation of the entire situation and advise with regard to the valuation, the efficiency of operation, the company's accounting methods and the car routing and service furnished in Richmond.

The valuation is being reviewed carefully to see if it is applicable to the present situation. This involves a check of the inventory and prices adopted, as well as an analysis of the theory on which the valuation was prepared. An audit of the books and records of the company is being made to determine their accuracy and also to find if the allocation of items between the railway and light and power departments, as well as between the geographical divisions, has been made properly.

Since it is probable that the routing, which was laid out a generation ago and has not been changed materially since, is not now adequate, a special study is being made to see if improvements can be introduced which will at the same time result in more efficient and economical operation. The service is being checked, since there appear to be inequalities that should be adjusted. The operating methods of the company are also being investigated. It appears probable that with a rerouting and the installation of modern methods the revenues of the railway can be increased and the operating expenses reduced. This should make it possible to earn a reasonable rate on a fair valuation, which is the result desired by both the city and the company.

A.B.C. of Commission Work

A LEAFLET on the methods of the Department of Public Works in Washington State, written in simple language, has been prepared by E. V. Kuykendall, director. It is entitled "Explanation of the Operation of the Washington Department of Public Works, Formerly the Public Serrvice Commission of Washington." It explains why the department was created, how rates are fixed, why inventory and valuation are made, how and why hearings are conducted, and other matters which might suggest themselves to one interested in knowing the practice of the commission. Under the heading "Our Responsibility" the pamphlet concludes as follows:

> The latent resources of our state are immeasurable. Our undeveloped water power vastly exceeds that of any other state in the Union. Our irrigable acreage will in future years support teeming populations. Capital is slow to put

investment in enterprises of low earning possibilities. Public utilities are the instrumentalities through which power must be developed and distributed for the reclamation of arid wastes and the operation of factories and industries soon to come. By a rash exercise of power we could drive utility investors from our state. We have sought in the performance of our duties to take a comprehensive view of our field of operation with forward vision. We who are charged with the responsibility of regulation must pursue the path of justice to the public and the utilities alike. Any other policy would not only violate our fundamental law but would also work untold injury to the progress and welfare of our state.

Track Grinder Warning

San Francisco Company Also Instructs all Employees in Accident Prevention—Other Safety Activities Carried On by the Company

THE Market Street Railway of San Francisco in its accident prevention work has adopted a plan of giving illustrated lectures to all newly employed trainmen who have been thirty days in the service. This policy has been established on the theory that the recently employed trainman is better able to understand, after thirty days in the service, the importance of conforming to the rules and regulations of the company, and these additional instructions impress him in the event that he thinks that he has mastered the duties of his position. Older employees who have shown a tendency to be neglectful or careless in their work are sent to these lectures, given by the claim agent.

TRACK GRINDERS IN SAN FRANCISCO AT NIGHT CARRY AN ILLUMINATED DANGER SIGN WITH RED LETTERS

Previous to attending the safety lectures, student trainmen are furnished with a booklet in which are graphically shown various types of accidents.

Safety bulletins and cartoons are posted on the bulletin boards in all carhouses; articles on "safety always" are published in the employees' monthly magazine, and every effort is made to keep the men enthused in their accident prevention work by displaying on the bulletin boards the monthly records of each carhouse compared with other carhouses on a car-hour, car-mile and passengers carried basis.

While the company does not maintain a safety committee among its employees, each employee is taught to consider himself a safety committeee member of one, and he is urged to present suggestions which if placed in effect might reduce accidents. At all times employees of the company are confronted by the company slogan, which is "Care; Comfort; Courtesy."

Accidents are investigated by the claims department regardless of whether claims are filed, so that all available information will be in the hands of the operating department when it endeavors to determine the question of responsibility.

The co-operation of the public is sought in accident prevention by utilizing the windows of the cars and backs of transfers for printed matter. Illustrated lectures under the auspices of the company are given to school children, for it is realized that they are the safety missionaries in the home, and the claim agent instructs boy scouts on how to assist in safety work.

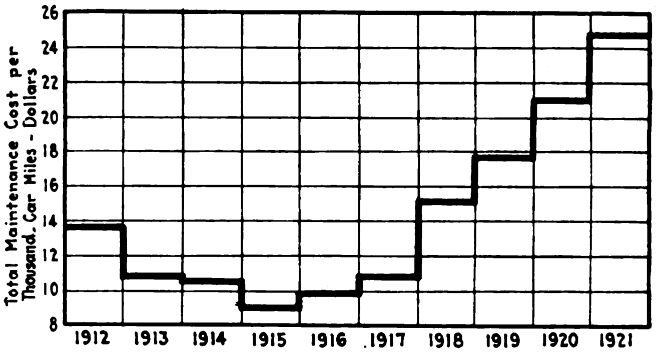
Almost twenty-five thousand illustrated booklets, titled "For Humanity's Sake; An Appeal to Automobilists for Safety," have been distributed to automobile owners throughout the city, and accident prevention placards published by the company and circulated under the name of the San Francisco Safety League have been placed in garages and stables.

The accompanying engraving shows an illuminated danger sign recently devised which is now being placed at night on track grinders, welding machines and concrete cutters when they are standing on the street. The sign is lighted by ten red incandescent lamps and the lettering is 6 in. high, making the word "Danger" visible for a considerable distance.

Maintenance Figures in Memphis

IN THE series of sixteen charts giving ten-year records of Memphis maintenance statistics, published on page 262 of the issue of this paper for Aug. 19, there is an error in the position of the decimal point in the chart showing total maintenance cost on a car-mile basis. This chart, in lower right-hand corner of the former group, has been corrected and is reproduced.

There was also an error in the figures on renewal and reserve expenditures in the large table on page 264 of the same issue. The figures given in the article were for all departments. The corrected figures on the mechanical expenditures, together with the renewal and replacement reserve and total balance reserve, which were given correctly in the table, are published below:



MAINTENANCE COST FOR TEN YEARS IN MEMPHIS

	Month of December 1921	Month of December 1920	Year to Date 1921	Year to Date 1920
R. & R. expenditures (mechanical department only)...........	None	None	$22,806.86	$10,938.51
R. & R. reserve (all departments).......	$7,841.66	$3,263.00	45,634.35	51,950.50
R. & R. total balance reserve (all departments)	....	....	234,049.54	179,920.06

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Solving a Difficult Situation in Pole Setting

CONSIDERABLE difficulty was experienced in spanning Edinburgh's north bridge with overhead wires for electric operation. A specially cast base for anchoring the poles stretches across a brick arch of the bridge carrying the entire weight on two steel girders at the end of the casting. The accompanying illustration shows one of these bases in position on top of the arch ready for concreting in. A very substantial construction is thus provided.

Gasoline Rail Car Operating Cost

THE Alabama, Tennessee & Northern Railroad, Mobile, Ala., is operating one gasoline rail car between New York and Silas. The one-way distance is 53.5 miles and the car makes one round trip each day, or a total daily mileage of 107. A scheduled speed of 25 m.p.h. is satisfactorily maintained, according to a statement by J. T. Cochrane, president, who also remarks that the car is pleasant to ride in and quite popular with the patrons of the railroad as there is very little vibration or noise. It will start easily on any grade on the line and it gets away as quickly as an automobile without undue noise, jerking or other discomfort.

By accurate records kept during the thirty-one days of May the car was operated 3,317 miles, an average of 107 miles per day. The gasoline consumption was 390 gal., costing $95.18, and the oil consumption 13 gal., costing $4.94. This is a cost for gasoline and oil of slightly over 3 cents a mile. Mr. Cochrane figures "that the maximum cost of handling this car, including wages, cleaning, etc., will not exceed 15 cents per mile."

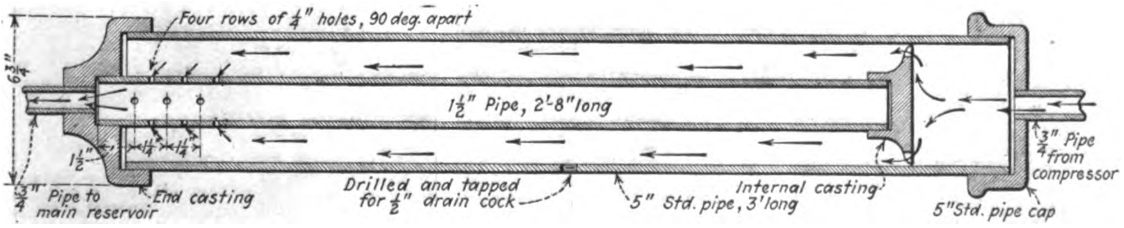
The car used was manufactured by the Indiana Truck Corporation, Marion, Ind. The body is arranged for pay-as-you-enter one-man operation and seats twenty-nine passengers. A toilet has been provided just back of the driver's seat. The chassis is mounted on a double truck at the front with single-drive wheels at the rear. The transmission includes four speeds forward and four speeds reverse. Brakes are provided on all wheels, the rear brakes being of the band type, while those on the front wheels brake directly on the wheels.

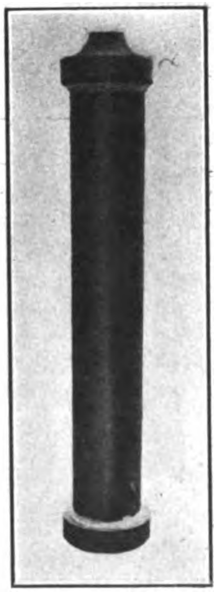
Air Cooler Made from Standard 5-in. Pipe

THE cars of the Cleveland Railway are being equipped with air coolers made from a 36-in. section of standard 5-in. pipe. Its purpose, of course, is to be inserted in the air line between the compressor and the main reservoir to cool the air sufficiently in passage so that all excess moisture will be dropped. The warm air, on being received from the compressor, enters the cooler and is deflected by a baffle so that it follows along in the space between the wall of the 5-in. pipe and another internal 1½-in. pipe concentric with it. In this way the air is kept in contact with the larger pipe where the cooling effect is obtained. The air leaves through twelve ¼-in. holes placed in the opposite end of the inner pipe. Accumulated moisture is drawn out of the outer pipe through a drain cock in the bottom of the cooler.

The only special castings required are the internal baffle and the cap on the reservoir end of the cooler. Both of these parts are threaded to receive the inner 1½-in. pipe. The simplicity and ruggedness of this device can be seen in the accompanying photograph, while the line drawing gives the details of construction and shows the path of the air as it passes first through outer portion and then leaves by the center pipe.

Terrence Scullin, master mechanic of the Cleveland Railway, is making the installation.





AIR COOLER MADE FROM STANDARD 5-IN. PIPE

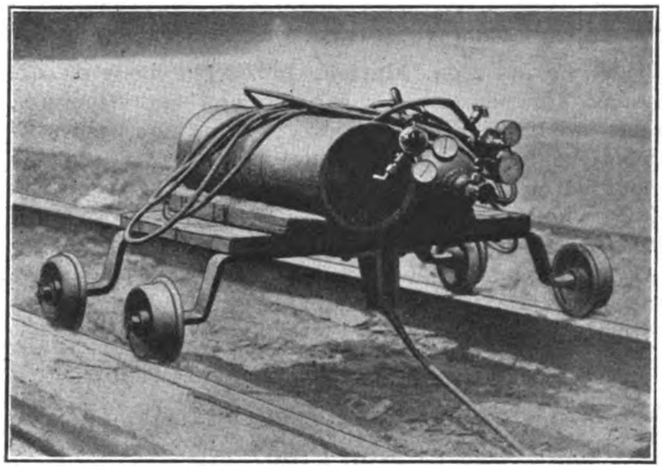
The line cut shows the details of construction of the air cooler. End castings and an internal baffle are the only special parts necessary.

The halftone illustration shows the air cooler, made from 5-in. wrought-iron pipe, which is being installed on the cars of the Cleveland Railway.

Truck for Oxyacetylene Tanks

IN CONNECTION with its track reconstruction this year the Brooklyn Rapid Transit Company has made considerable use of oxyacetylene torches for cutting the ends of the rails or burning the nuts off the bolts in the plates.

The accompanying illustration shows the manner of mounting the gas tanks on a small home-made truck so that they can be easily moved around on the job by the same man who does the burning with the torch. It will be seen that the truck is equipped with a "T"-shaped handle so that the man can pull it after him when he goes from one rail joint to the next. When it is desired to move the equipment from one job to another it is carried either on a heavy motor truck or in a car.



GAS TANKS MOUNTED ON TRUCK

Pressing Wheels Off Without Disturbing Gears

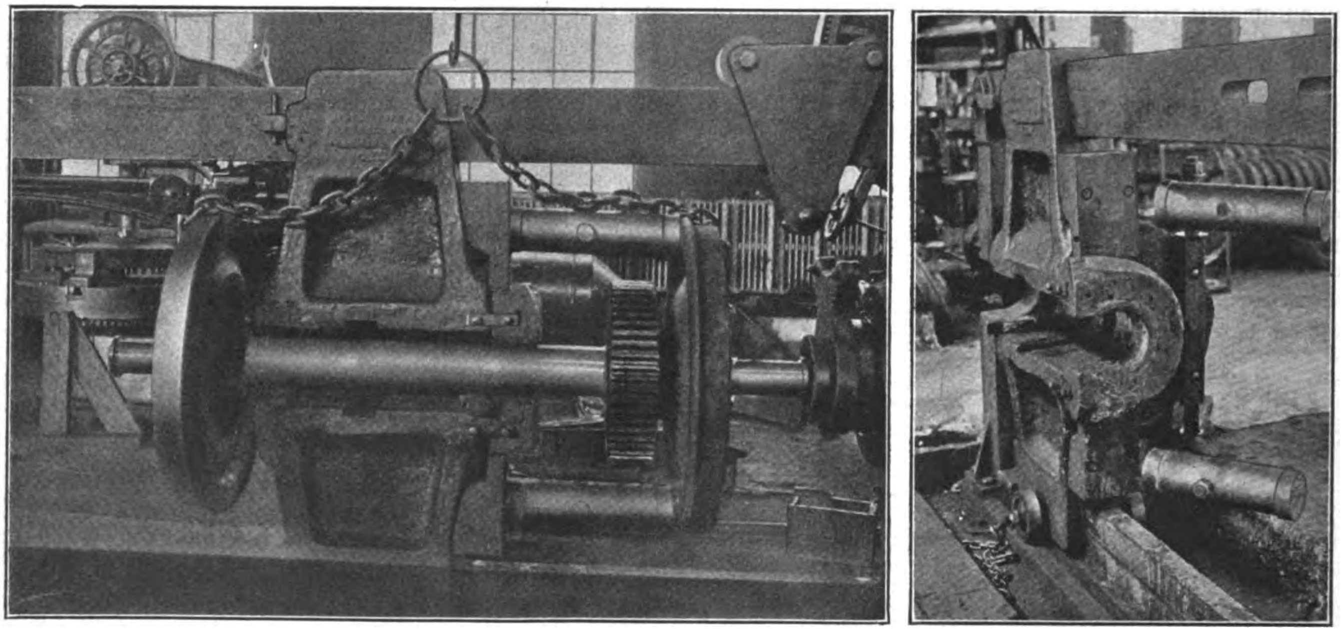
THE attachment of two cast-iron blocks to the traveling head of the wheel press in the shops of the Northern Ohio Traction & Light Company has made possible the removing of wheels from the gear end of an axle without disturbing the gear. These blocks act as seats for the two cylindrical spacing blocks that bear against the wheel rim. By mounting the spacing blocks on arms and hinging them to a post bolted to the back of the traveling head, they can be easily swung and held into position. They are also adjustable for different wheel diameters. Demounting the wheel adjacent to the gear on a wheel press equipped with these home-made devices makes the process little different from pressing off the one on the opposite end of the axle.

New Type Trailers for Toronto

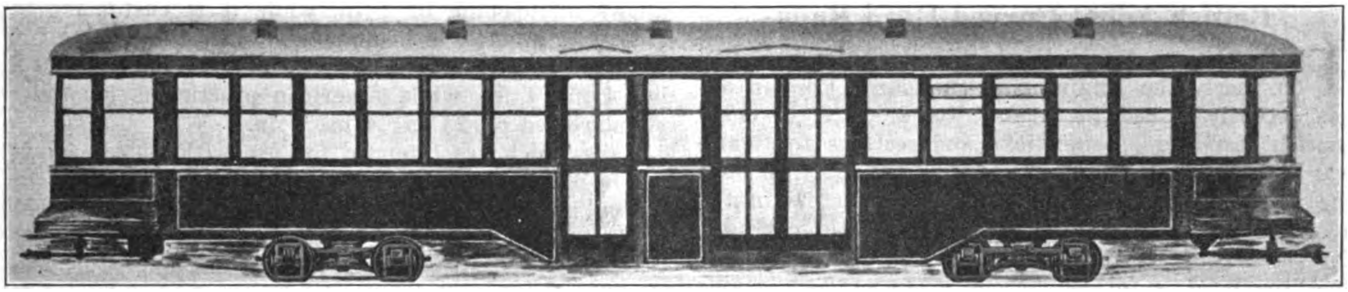
AS ANNOUNCED in the Rolling Stock columns of this paper in the issue for Aug. 19, 1922, the Toronto Transportation Commission has placed an order with the Canadian Car & Foundry Company., Ltd., for 100 trailers and fifty motor cars of the Peter Witt type. Some additional details regarding the construction of these cars are now available.

An accompanying illustration shows the design of trail car adopted. This is approximately 49 ft. over bumpers and differs from the trailers already in service in Toronto in the arrangement of the door openings. The new trailers have three doors near the center, one pair forming a double opening to the right, with the single door opening at the left. The door at the left is always used as an exit door and the door at the extreme right always as an entrance door, but the center door may be used either as an exit or entrance as traffic conditions warrant.

Inside the car at the center door is a movable barrier. When the conductor wishes to have the door used as an exit, the barrier is swung at right angles to the center of the car. The passengers in the forward part of the trailer can then file past the conductor, pay their fares and secure transfers as they leave without interfering with the unloading of passengers in the rear of the car who have previously passed the conductor on their way to the seats at the rear. When the barrier is swung along the center line of the trailer, the door can be used as an entrance to load the front of the car.



AT LEFT, TRAVELING HEAD OF PRESS FITTED FOR DEMOUNTING WHEEL WITHOUT PRESSING OFF GEAR. AT RIGHT, THE HINGED SPACING BLOCKS CAN BE EASILY BROUGHT INTO USE



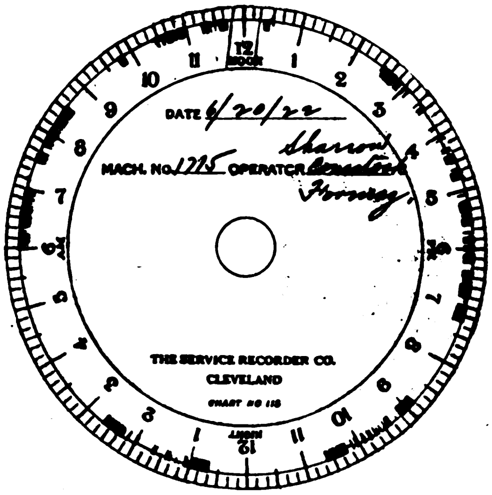
New Type Trailer for Toronto

This arrangement of openings was devised by G. W. Harvey, assistant general manager, to assist in quick loading and unloading at heavy traffic centers. When the car is operating in a district where the majority of passengers are boarding, the center door will be used as an entrance, and when the trailer enters an area in which the majority of passengers will alight, the conditions are reversed. The conductor's station is at the center of the car between the center and left-hand door.

The fifty motor cars, which are also being built by the Canadian Car & Foundry Company, Ltd., are of the Peter Witt type, but have some special features. They are smaller than the cars now in operation in Toronto, being but 47 ft. long as compared with 52 ft. for the present cars. The motor equipment will be of less capacity and they will not be used for hauling trailers as are the present cars. Provision is made so that the cars can be operated either as one- or two-man cars. The front vestibule is divided by curved barriers, so that the cars can be converted into one-man pay-as-you-enter, or one-man pay-as-you-leave as desired. Normally, they are intended to have the conductor placed in the center of the car.

Graphical Record of Tower Wagon Trips

THE accompanying illustration shows a record of the number of calls, the time taken to reach the point of trouble and the time consumed for making repairs taken on an emergency tower wagon used by the city of Detroit, Department of Street Railways. The record is made on a meter manufactured by the Service Recorder Company, Cleveland, Ohio.



Graphical Record of Operation of Emergency Tower Wagon

The mechanism consists of a clock driving a record on which a small marker makes an impression when the tower wagon is in operation. No ink is used, or rather the ink is "built in" to the record form. The meter pendulum which records the operation is extremely sensitive and the record is made by the rocking of the tower wagon while it is in operation. The meter can be mounted in any convenient location and can be padlocked so that the record cannot be tampered with. After each day's run records are removed for inspection and tabulation of data. The idea of using this method to form a graphical record of the operation of emergency tower wagons was originated by E. M. Gould, electrical engineer for the city of Detroit, Department of Street Railways.

Salt Mine Waste Used for Track Ballast

SOME TIME ago the Cary Salt Company of Hutchinson, Kan., donated a large quantity of waste product to the Hutchinson Interurban Railway to use as it saw fit. To make use of this material, the railway equipped an old stone crusher with a Westinghouse 323-A railway motor, together with the controller and necessary grid resistors. Through the use of this crusher the waste product was transformed into 2,000 cu.yd. of ballast at approximately 90 cents per cubic yard. The ballast was used to pave the company's right-of-way. The original crusher had a normal capacity of 2 cu.yd. per hour at 450 revolutions. Through the use of the railway motor, the speed was increased to 1,000 revolutions and the capacity of the crusher to 5 cu.yd.

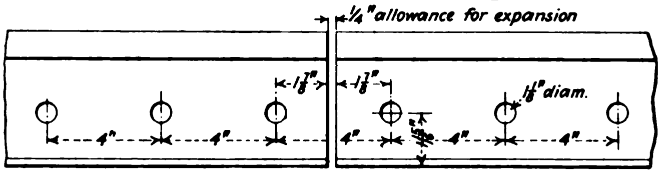
Railway Motor Used to Operate Stone Crusher

The current for operating the crusher was obtained from the trolley wire and the circuit was completed through a wire attached to an old brakeshoe which gave contact with the rails. The crusher was moved from one place to another by means of a cable which was hooked to one of the regular service cars of the company.

British Adopt Curved Head Rails

THE British Engineering Standards Association (formerly the Engineering Standards Committee) has recently issued its report No. 2, 1922, covering British standard specifications and sections for tramway rails and fishplates, revised March, 1922. Perhaps the most interesting feature of this report is in the adoption of the curved head (convex tread contour) for these rails. It will be seen from the illustrations that the head is formed by the curve of 9-in. radius which is connected to the gage side of the head by a fillet of 5/16-in. radius. This head curve radius is sharper than that used on either the American or Australian sections. The tapered web, similar to that of the American sections, is used in two of the new sections, but a straight web, ⅝ in. thick, is adopted for the heavy 7-in. section, and it will be noted that the 112.9-lb. section has a base 7 in. wide while the 103.7-lb. section has a base 6¾ in. wide. All told, there are now only four standard sections of varying weights with their accompanying guard rails, making a total of eight standard rails for tramways.

The angle of the gage side of the head is set at 7 deg. instead of the 5 deg. found in the American standard sections. The width of the head is the same for all sections, viz., 2⅛ in., which is practically a continuation of the British practice in adhering to comparatively narrow rail heads and wheel treads, in contrast to American practice, which tends towards wide rail heads and wheel treads.



Standard Drilling for British Standard Girder Rails

QUALITY AND CHEMICAL COMPOSITION OF THE STEEL

	Bessemer Process Acid Per Cent	Bessemer Process Basic Per Cent	Open-Hearth Process Acid Per Cent	Open-Hearth Process Basic Per Cent
Carbon	0.50 to 0.60	0.45 to 0.55	0.60 to 0.70	0.60 to 0.70
Manganese, maximum	1.0	1.0	1.0	1.0
Silicon, maximum	0.10	0.30	0.10	0.30
Phosphorus, maximum	0.075	0.08	0.06	0.06
Sulphur, maximum	0.07	0.07	0.06	0.06

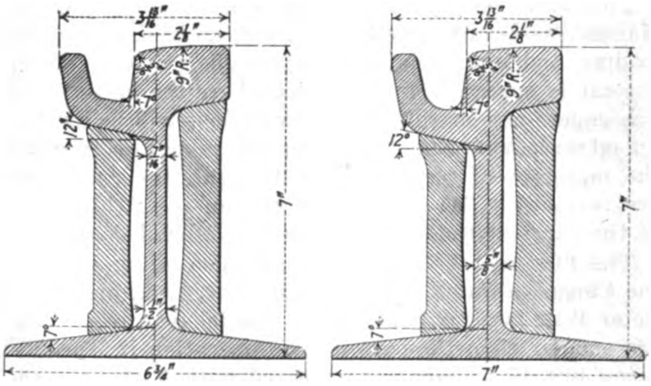
It will also be noted from the accompanying table, showing the chemical compositions specified, that the British specifications do not provide for as high carbon as do the American specifications, but for the basic open-hearth process, silicon is increased to 0.30 while American specifications call for a maximum of 0.20 and for both the bessemer and open-hearth processes. Manganese is permitted to a maximum of 1 per cent.

The British specifications provide a tensile test on a standard test piece to be cut from the rail head. The test must show a tensile breaking strength of not less than 45 tons per square inch with an elongation of not less than 10 per cent. This test is in addition to the usual falling weight (drop) test. Such a tensile test is not usually a part of any American rail specifications. There is no mention of the impression test which is being substituted for the drop test in our girder rail specifications by the A.S.T.M. and A.E.R.E.A.

The standard rail drilling adopted is shown in the accompanying illustration. It will be noted that this allows an opening of ¼ in. while it is customary in American practice to make no allowance for drilling for rails to be used in streets. The drilling indicated is 2 in., 4 in., 4 in., while American practice is generally standardized on 2½ in., 4 in., 4 in.

Rails which are intended for use with welded joints are to be undercut not more than 1/16 in.

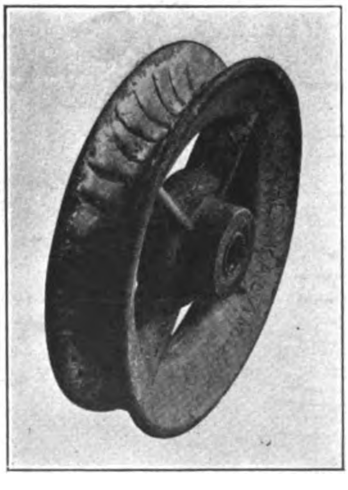
The new British standard fishplates (splice bars) present some interesting features, which are in contrast to American practice. The fishing angles in particular are of note, the angles of the top of the plate being 12 deg. and that of the bottom being 7 deg., while the angle for American standard splice bars for girder rails is held at 9 deg. for both top and bottom.



Left, British Standard Rail Section No. 7, 103.7 Lb. per Yard. Right, B. S. Section No. 8, 112.9 Lb. per Yard

Another feature is the use of 1⅛ in. square holes in the outside or wide bars in contrast to the American practice of using oval or elliptical holes in one set of bars. Both designs are, of course, for the purpose of preventing the turning of the bolt during the tightening process. There are practically no square holes used in this country in splice bars on electric railways and probably the only ones used on steam railroads are found in the standards of the New York Central Railroad and its allied lines.

Making a Sleet Cutter Out of a Worn-Out Trolley Wheel



Trolley Wheel Arranged for Sleet Cutting

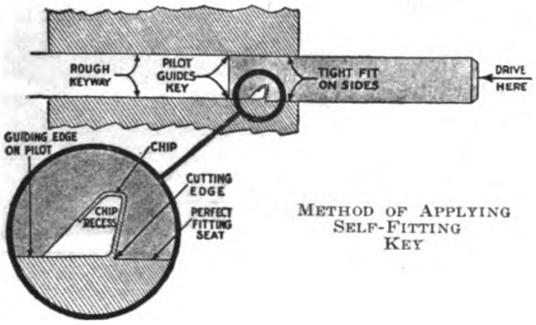
THE accompanying illustration shows a 6-in. trolley wheel which has layers of copper added to the groove so as to form a rough surface and to serve as a sleet cutter. Wheels arranged in this manner are used by the New York State Railways and have been found very satisfactory. During a sleet storm the regular type of sleet cutter used by the railway was exhausted, and these wheels were made up for emergency. They have worked so satisfactorily, however, that the railway is continuing a supply of them for future use. One advantage from the use of these wheels is that when they are placed in the cars during a sleet storm they do not need to be removed as soon as the sleet has disappeared, as they soon wear smooth and can be continued in service, while with sleet cutters it is necessary to have a gang of men remove them as soon as the sleet has been cleared.

What's New from the Manufacturers

Self-Fitting Keys

KEYS are used to make the driving connection between shafts, axles, gears, sprockets, pulleys, etc. It is usual to mill or slot the keyway in the shaft and to slot the keyway in the external member. But both of these keyway sizes will vary slightly and to obtain the desired tightness between the key and keyways it is necessary carefully to fit the parts together. This has usually been done by hand, either by filing the key to fit the keyways or by filing or scraping the keyways to fit the key.

It usually takes a good mechanic three or four hours to fit an ordinary 1½-in. x 1½-in. key. A key slightly smaller, say 1 in. x 1 in., may require only two hours and in exceptional cases may be fitted well enough in an hour. But the mechanic needs to be experienced and the key and keyways need to be almost the right size to start with in order to obtain these results. Such hand fitting generally is quite expensive work and the results are not always satisfactory.



METHOD OF APPLYING SELF-FITTING KEY

To meet this condition, Smith & Serrell, Newark, N. J., have placed a new "Keytite" self-fitting key on the market. A tough chisel stock is used and this is ground to a size very slightly larger than the nominal keyway width. A cutting edge and chip recess are provided near the front end of the key. Ahead of these is a pilot slightly smaller in dimensions than the nominal keyway width.

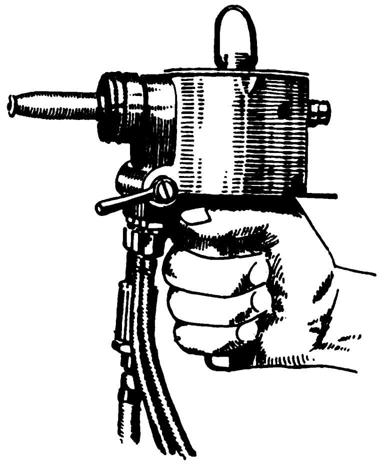
To install one of these keys the pilot is entered first with the cutting edge at the side. Then the key is driven home with an ordinary machinist's hammer or with a sledge, depending upon the size of the key. The cutting edge sizes the keyways to make a tight fit between the body of the key and the keyways.

In the larger sizes cutting edges are sometimes provided on both sides. When it is desired to fit top and bottom as well as on the sides, a cutting edge is also provided at the top. Gib keys and other modifications can be furnished as required, all with this self-fitting advantage.

Protective Coating by Metal Spraying

A Method of Applying Zinc or Lead Coating to Bridges, Railway Structures or Cars Has Been Perfected as a Means of Protecting Equipment Exposed to the Action of the Elements

A PROCESS of applying a coating to any metal parts as a protection has been perfected by the Metals Coating Company of America, Philadelphia, Pa., and is known as the Schoop metal spraying process. In this process the coating metal adheres to the object simply by mechanical union. The metal is discharged in hot impalpable particles moving with high velocity, and these when directed upon a prepared object penetrate the pores while the spray is still plastic. At present the principal use of the metal spraying process is for galvanizing. About two years ago the Swiss government adopted this method for protecting the transmission towers and girders on the electrified section of the St. Gotthard Railway. In addition to this certain railway bridges were galvanized and the underbodies of rolling stock were coated with a zinc coating.



FORM OF SPRAYING PISTOL USED

The operating principle of the process is briefly that metal wire or dust is first melted by an oxyacetylene flame and then the molten metal is blown by a compressed air jet in the form of spray against the surface to be coated. Three methods of applying the process have been perfected, each possessing particular features in its field of application. These consist of the "pistol" form which uses metal wire of standard commercial gages which is fused with gas; the powdered metal equipment, using powdered metal, as the name implies, and the electro-pistol. The wire spray process is the most extensively employed.

The principle of the spraying pistol is illustrated in an accompanying diagram. A fine wire of any metal is fed into a reducing flame zone at such a constant speed that the position of the end of the wire remains stationary, the melting rate being exactly equal to the rate of feed. As the end of the wire melts, each drop is struck a violent blow by an air blast. A fog or spray of fine metallic particles results and these pass through a diverging cone with a core of reducing gas. The spray thus forms a metal coating air brush, the diameter of which 5 in. from the pistol end is about 2 in. Objects

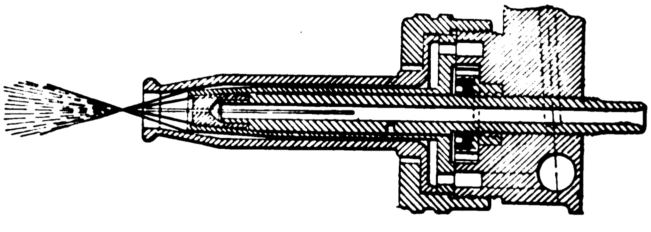


DIAGRAM SHOWING APPLICATION OF REDUCING FLAME TO METAL WIRE IN THE PISTOL to be sprayed with metal are operated upon by pointing the pistol normally at the surface to be coated at about 5 in. distance and by directing the pistol across the surface with a regular motion. A single coating is about 0.001 in. thick.

The pistol operates on an air pressure of 50 lb. and commercial oxygen and acetylene gases secured in tanks under pressure are used. A standard oxygen gage and an acetylene regulating gage are used for adjusting the proper proportions of each gas to secure the temperature required for melting the different metals. The pistol connections are attached to these gages with a set of valves.

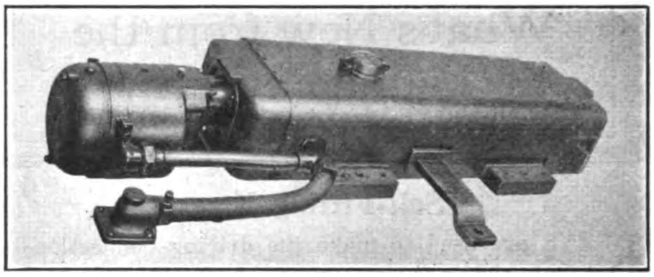
Portable Measuring Instruments

THE Westinghouse Electric & Manufacturing Company has added a new type of ammeter and voltmeter to its line of portable instruments. The instruments are designated as type PX-3. The movements of these instruments are light in weight and are mounted on a micarta sub-base which can be removed as a unit. The cases are made of molded composition which is strong and acid-resisting. A round open-faced dial gives good illumination on the scale. All instruments have external zero adjusters.

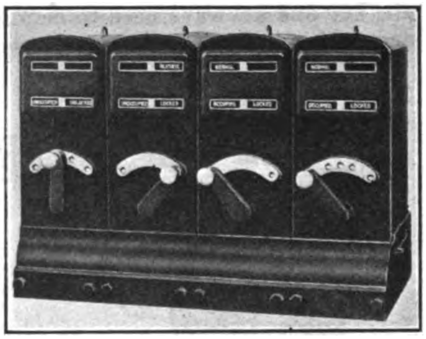
Remote Control of Outlying Switches for High-Speed Railways

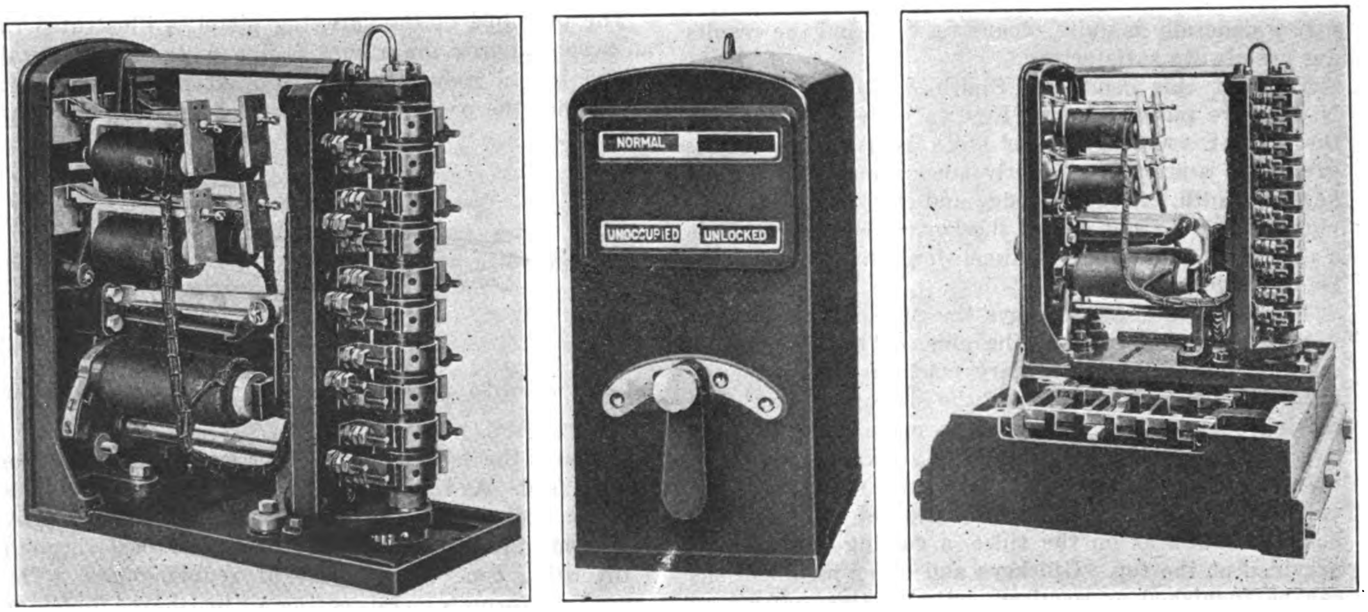
TO MEET the need of electric railways for apparatus to operate remote switches, the General Railway Signal Company, Rochester, N. Y., has developed an alternating-current switch machine and means for its control. The switch machine is a compact unit, made long, narrow and low so as not to interfere with the clearances of any electric railway. It is supported on two tie timbers and is easily installed. The machine may be furnished with a motor to operate on 110 volts, 25 cycles, or 110 volts, 60 cycles, or a direct-current motor can be provided if required where alternating current is not available.

The desk-type circuit controller is a recent development which simplifies the remote control of an outlying switch layout. It is a small, complete unit measuring 12½ in. high by 6¼ in. wide by 12 in. deep and comprises a controller with ten contacts, an electric lock and four indicators. In other words, the unit contains all of the apparatus necessary in the control station to control remotely a single switch and the signals which govern over it. When it is desired to control a layout consisting of more than one switch two or more circuit controller units may be used, and if it is necessary to interlock these units a sub-base 4 in. high is furnished with each unit. The bases are bolted together and serve as a locking bed.


SWITCH MACHINE

The unit construction of the circuit controller makes it adaptable to almost any conceivable switch layout that could be remotely controlled. It may be furnished fully equipped or parts may be omitted when not required. The signals used to control train movements over a remotely operated switch layout may be of the semaphore or color light type—as desired. Practically no expense is added to the operation and maintenance of remotely controlled switch layouts if they are installed on track already equipped with automatic block signals and if they can be operated by a station attendant who has other duties.


FOUR-UNIT INTERLOCKED CIRCUIT CONTROLLER



DESK CONTROL PARTS

The Financial Side of Accident Prevention*

Expenditures on Account of Accidents and Insurance Against Accidents Are the Only Non-Productive Items of Electric Railway Operating Costs—Their Increase in per Cent of Gross Earnings Is Alarming

By Garrett T. Seely
Vice-President and General Manager Pennsylvania-Ohio
Electric Company, Youngstown, Ohio

FURTHERANCE of the cause of accident prevention primarily is to be considered from the humanitarian viewpoint. Efforts to reduce to a minimum accidents in industry, on the highways and in the homes are efforts directed toward the prevention of the deaths or suffering of individuals. That is the basis on which the movement for accident prevention started; that is the basis upon which we must continue to build.

The humane aspect of the work is the prime essential. Death and suffering in themselves cannot be measured in monetary units, but there is a corollary to deaths and injuries and accidents as a whole that must be measured in dollars and cents. This is the economic loss caused by the interruption to the usual occupations of those injured, the loss to industry through the deaths of workers, the utter waste of property needlessly destroyed.

This economic loss cannot be measured with exactness, but it mounts into staggering sums of hundreds of millions of dollars each year. Payments for loss and damage to property and injuries to persons by the steam railroads of the United States in the year 1920 alone amounted to $199,591,261; the total annual accident cost in all lines of industry and business has been estimated at $1,500,000,000. It is an economic loss to the entire people, and part or all of it must be paid for through the companies experiencing the accidents that cause the loss.

Cost of Accidents to Public Utilities

A somewhat detailed consideration of these dollars-and-cents losses, of this financial side of the accident-prevention work, then, is fitting. For the purpose of this discussion the cost of accidents to public utilities alone will be considered, adequate figures to include the whole field of industry not being available.

Every cent spent by public utilities for operating expenses, taxes and interest is devoted to something productive, with the exception only of those sums expended for accidents and insurance. The money spent for maintenance restores the physical property to normal condition, providing new tracks, equipment, poles, ties, wires, insulators and the like; the money expended to produce gas or power yields something that is salable; the sums disbursed in wages produce that which is salable, or do some constructive work; the taxes paid, inequitable and burdensome though the portion placed upon utilities may be, secure fire, police and governmental protection. Interest and dividends paid make it possible to obtain new capital for improvements and extensions; but the money expended because of accidents cannot in any way be considered as productive. It is a severe drain on the earnings of the industry—it is irretrievable waste.

Little published information is available as to the actual cost of accidents of all classes, including legal and claim department expense chargeable thereto. The United States Census Bureau's report on electric railways gives the cost of accidents for 1917, but no figures for earlier or later years were obtainable. An excellent and complete report on the cost of accidents on the steam railroads from 1897 to 1920, inclusive, is contained in a publication entitled "Railway Statistics of the United States of America for the Year Ended 1920," prepared by Slason Thompson, Bureau of Railway News and Statistics, Chicago. The information bearing on our subject which has been obtained from these two sources will be given in detail later.

Government Reports Not Complete

There are no government reports or compilations prepared by national associations available to show the accident costs of water companies, telephone and telegraph companies, gas companies, electric light and power companies, interurban railway companies or city street railway companies.

Therefore, to secure sufficiently comprehensive data on the accident costs of the various utilities, several hundred letters were sent to representative companies in all parts of the United States. These letters asked for the total cost of accidents and damages, including expenses of claim and legal departments, and the gross earnings of each of the companies for the last five years. The generous response to these hundreds of questionnaires made possible a study of the subject that may be accepted as truly representative of the utilities of the country as a whole.

In the study made of the statistics obtained, the averages for the last five years were taken rather than the figures for one year, as it was felt that such averages would reflect more accurately the conditions that actually obtain. A careful effort also was made to segregate the earnings and accident costs of companies operating more than one class of utility, so that the grouped figures for each classification would be representative.

The gross earnings of all utility companies increased at an abnormal rate during this five-year period, due largely to rate increases. The cost of settling accident claims also increased greatly, because of the lessened value of the dollar.

The amount of money and the percentage of gross earnings expended because of accidents vary widely with the different classes of utilities. They vary almost in direct proportion with the degree of contact on the part of the public with the commodity sold or the equipment used in rendering service while such commodity or equipment is under direct control of the utility. They also vary in proportion to the extent that the business of the utility is conducted on or across public streets or highways.

As is to be expected, the water companies and the telephone and telegraph companies have the smallest number of accidents, both to the public and their employees, and the lowest costs in proportion to earnings of all utilities. There is nothing hazardous in itself about the commodity they have for sale or the means of rendering service. Their mains and pipes and wires and equipment in general are well removed from normal contact with the public.

To a somewhat lesser degree this also is true of the gas companies. Their commodity does present some hazards of fire, explosion and asphyxiation, but their pipes or conductors, or the vehicles transporting the commodity, are entirely underground or built in walls and floors of buildings or firmly attached to permanent structures.

The point of delivery of their commodity usually is at the entrance of a building, where practically all responsibility of the utility ends. The utilization of the commodity is in the hands of the consumer, and service is affected only to a minor degree by weather conditions and not at all by traffic on the streets or by any such public interference.

Electric light and power companies are next in low costs of accidents. They render no service openly on the public streets and the commodity furnished is carried either in underground conduits or in insulated wires high enough above the streets to be away from the public. Poles, wires and insulators may fall and storms may create undue stresses, but the public, under normal conditions, does not come into direct contact with the vehicle carrying the commodity.

Measure of Responsibility Important Factor

Transportation companies are engaged in a business that is most hazardous to the public and to employees. Generally speaking, the business is the carriage of human beings or material articles and the company is responsible for their security from the time the persons present themselves or the articles are turned over to it until delivery at their destinations.

Steam railoads are almost entirely on private right-of-way and grade crossings in congested city and rural districts are rapidly being eliminated. Collisions and derailments are the most general sources of accidents. Elevated or subway electric lines carry passengers only, but operate their cars either above the street level on isolated structures or below the street level and their type of construction is such as are likely to reduce accidents to the minimum.

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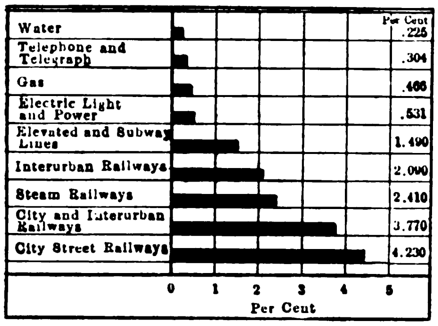
*Abstract of paper presented at eleventh annual convention of National Safety Council, Detroit, Aug. 28-Sept. 1, 1922.

Surface electric lines have the most intimate contact with the general public and, accordingly, they have the greatest accident cost. Their business is chiefly the carriage of human beings and these are carried in light cars in the midst of dense traffic, the cars threading their way among pedestrians and rapidly propelled vehicles, which are under the control, many times, of irresponsible individuals.

With these varying conditions in mind, let us turn to the consideration of some of the actual costs that the various utilities have had to meet and see in dollars and cents how important is the "Financial Side of Accident Prevention."

STEADILY RISING PERCENTAGE OF GROSS RECEIPTS

As has been stated, a complete compilation of the cost of accidents on steam railroads was obtained from the 1920 issue of "Railway Statistics of the United States of America." Table I shows payments on account of loss and damage and injuries to persons, the gross earnings and the proportion of each of the above items to gross earnings for each fifth year from 1900 to 1915 and for each year from 1916 to 1920, inclusive. The loss and damage items include payments on account of loss and damage to freight, baggage, property and livestock. The injuries to persons include costs of accidents to employees, passengers and the general public.



ACCIDENT COSTS OF PUBLIC UTILITIES EXPRESSED IN PERCENTAGE OF GROSS EARNINGS

It will be noted that in 1900 the cost of loss and damage to property was less than the cost of injuries and damages to persons.

TABLE I—STEAM RAILROADS OF UNITED STATES—PAYMENTS ON ACCOUNT "LOSS AND DAMAGE" AND "INJURIES TO PERSONS" AND PROPORTION TO GROSS EARNINGS

Year	Gross Earnings	Loss and Damage Amount	Loss and Damage Per Cent of Gross	Injuries to Persons Amount	Injuries to Persons Per Cent of Gross	Total Cost of Accidents Amount	Total Cost of Accidents Per Cent of Gross
1900	$1,487,044,000	$7,055,622	0.474	$8,405,980	0.565	$15,461,602	1.04
1905	2,082,482,000	19,782,692	0.950	16,034,727	0.770	35,817,419	1.72
1910	2,750,667,000	30,984,854	1.127	23,665,488	0.860	54,650,342	1.98
1915	2,956,103,000	37,947,468	1.284	27,090,222	0.916	65,037,690	2.20
1916	3,679,989,000	31,274,827	0.850	30,156,759	0.819	61,431,586	1.66
1917	4,074,672,000	94,079,992	1.082	34,109,331	0.837	78,189,323	1.91
1918	4,969,910,000	66,300,736	1.334	34,229,536	0.689	100,530,267	2.02
1919	5,231,750,000	117,671,790	2.250	38,238,803	0.731	155,910,593	2.98
1920	6,300,160,000	142,227,070	2.260	57,364,191	0.910	199,591,261	3.17

TABLE II—ELECTRIC RAILWAYS OF UNITED STATES—ACCIDENT COST, 1917

District	Gross Earnings	Accident Cost	Per Cent
New England	$68,399,091	$2,883,646	4.2
Middle Atlantic	230,354,775	8,529,035	3.7
East North Central	162,091,962	5,465,417	3.3
West North Central	52,455,024	2,140,595	4.1
South Atlantic	42,426,736	1,455,076	3.4
East South Central	15,882,474	955,783	6.0
West South Central	20,166,036	887,217	4.4
Mountain	10,294,660	233,285	2.3
Pacific	48,079,048	1,193,377	2.5
Total	$650,149,806	$23,743,431	3.65

In 1915, the gross earnings had increased practically 100 per cent, while the loss and damage had increased more than 400 per cent, and injuries to persons had increased more than 200 per cent. The combined cost increased $65,037,690, or more than 300 per cent, while the percentage of gross earnings thus paid out increased from 1.04 per cent in 1900 to 2.20 per cent in 1915.

In 1916, 1917 and 1918 there was very little change in the percentage of gross earnings required to meet these costs, despite the fact that the gross earnings increased greatly.

In 1920, while the gross earnings increased to more than $6,300,000,000, the loss and damage costs had risen to 2.26 per cent of the gross earnings, and the cost of injuries to persons had increased to 0.91 per cent, making the combined cost $199,591,261, or 3.17 per cent of the gross earnings. Thus, while in twenty years the earnings had increased from $1,487,000,000 to $6,300,000,000, or 324 per cent, the cost of loss, damage and injuries had increased from a total of $15,461,502 to $199,591,261, or an increase of 1,191 per cent.

TABLE III—ACCIDENT COST OF PUBLIC UTILITIES EXPRESSED IN PERCENTAGE OF GROSS EARNINGS

	Average of Last Five Years Gross Earnings	Average of Last Five Years Accident Cost	Average of Last Five Years Per Cent of Gross
Water companies	$6,961,896	$15,713	0.225
Telephone and telegraph companies	387,800,942	1,179,312	0.304
Gas companies	94,616,598	441,365	0.466
Electric light and power companies	159,672,546	847,977	0.531
Elevated and subway lines	89,553,846	1,337,164	1.49
Interurban railways	20,329,306	425,773	2.09
Steam railways	4,940,000,000	119,120,000	2.41
City and interurban railways	41,122,343	1,551,424	3.77
City street railways	337,272,147	14,274,290	4.23

NOTE: Amounts shown above for gross earnings and accident costs are only for companies replying to questionnaires, and do not represent total figures for the United States except in the case of steam railways. The information shown in this tabulation is expressed graphically in the accompanying chart.

PAYMENTS MADE BY ELECTRIC RAILWAYS

While confined to one year and therefore not nearly so satisfactory as the complete data concerning the steam railroads, Table II, from the United States Census Report for 1917, is illuminating.

A considerable difference in percentage is shown for the various geographical groups, but the two groups showing the highest and the lowest cost contain comparatively few companies and the variations shown are no greater than between individual companies in approximately the same geographic locations.

INFORMATION GLEANED FROM QUESTIONNAIRES

From the questionnaires sent out additional data were obtained, which, with the complete statistics of the steam railroads, permit us to group the various classes of utilities in regard to the relative cost of accidents. The large number of responses to the request for the gross earnings and accident costs was most gratifying. It is believed that a sufficient number of companies in each group replied to make the results shown in Table III fairly representative.

The earnings and accident costs were separated strictly in accordance with the character of the service, with the single exception of the item "City and Interurban Railways." Here the earnings and accident costs are shown for one group of companies operating both classes of service in such manner that it was impossible to make a separation between city service and interurban service.

VARIATION SHOWN BETWEEN INDIVIDUAL COMPANIES

It will be noted that the percentage of gross earnings required to meet accident costs for water, telephone and telegraph, gas, and electric light and power companies is relatively small, while among transportation companies, that group whose business is the carriage of human beings in vehicles that are operated in public streets (that is, the city surface railways) has the highest percentage of accident cost.

In each group of utilities, individual companies showed a great variation in percentage of accident costs, but a company having a high percentage is not necessarily operating in a careless or negligent manner. Local conditions with regard to the activity of personal-injury lawyers, the laws of the state, and local precedents have a most important bearing on the costs of accidents but no relation to this number or seriousness.

As an illustration: In two large cities, not widely separated, both companies efficiently managed, the cost of accidents in one is 2 per cent of the gross earnings and in the other 8 per cent of the gross earnings. For a typical large company with gross earnings of $5,000,000 a year, the difference between 2 per cent and 8 per cent in the cost of accidents is $300,000 a year, which is equivalent to carrying charges at 8 per cent on $3,750,000.

While it is natural, perhaps, to view the importance of the financial side of accident prevention from the percentage of gross earnings required to meet the cost of accidents, no company having a ratio less than the average should feel that it is doing the best it can, or that it is impossible for it to make further reductions in the number and cost of accidents.

It is found that the relative importance of various classes of accidents changes from year to year. For instance, a number of years ago boarding and alighting from cars was the most serious cause of accidents on street railways, while accidents due to collisions with vehicles were not a severe drain. The use of inclosed platforms and doors has done much toward the elimination of step accidents, while the increasing number of automobiles used and the greater congestion in city streets therefrom have made automobile accidents the most expensive class for street railways. An analysis of the amount of money expended during a year or two years, classified as to the causes of the accidents, will be a better criterion by which to select the field for intensive work in reducing accident expense than the number of accidents occurring in any particular classification. In view of the difficulty experienced by utility companies in assembling comprehensive accident data, it might be to the interest of all concerned if the various national associations or governmental agencies would assume the task of compiling this information and analyzing it so as to point the way for a reduction of this tremendous tax on industry and business.

HUMANITARIAN SIDE OF WORK COMES FIRST

In view of the experience of every class of utility and industry, might it not be well to work for greater co-operation in combating that insidious and extremely costly evil, the activities of the "ambulance-chasing" personal-injury lawyer?

Always keeping in mind that the humanitarian side of accident-prevention work comes first, nevertheless let us not forget that the financial side is where we find the measure of economic loss, that whatever we may be able to do to reduce the number of accidents is so much accomplished toward eliminating irretrievable waste, is so much won for the economic improvement of the entire nation.

The Human Side of Our Business*

Decent Treatment of Workmen by Those in a Supervisory Capacity as Much a Factor in Accident Prevention as Safety Devices on Dangerous Machines

BY BRITTON I. BUDD
President Chicago Elevated Railroads and Chicago, North Shore & Milwaukee Railroad

THERE is a trite saying that "there is no sentiment in business." Equally shopworn is the phrase that "corporations are soulless." The fact that so many representatives of large corporations and of big business enterprises are here today to discuss methods of conserving human life and limb is as complete a refutation as could be found of the challenge that corporations are soulless and that there is no sentiment in business.

I shall approach my subject from a different angle than that usually taken at safety gatherings of this kind. By that I mean that I shall not dwell on the human misery caused by accidents, the number of which, happily, is being gradually and surely reduced year by year by the excellent educational work carried on by the National Safety Council. That particular phase of the "human side of our business" is well understood by all who are engaged in this great work of accident prevention. It makes an appeal which no one can resist.

But there is another angle to the human side of our business which is closely related to accident prevention and which I think sometimes is not as much emphasized as it ought to be.

Decent treatment by men in a supervisory capacity of those working under them is, in my judgment, as much of a factor in accident prevention as are the safety devices which we place on dangerous machines and on which we lay so much stress. I will go further and say it is a more important factor, because if workmen are not treated as thinking human beings by those having authority over them, they are constantly in such a frame of mind that they will cause accidents in spite of all the safety devices and precautionary methods that can be adopted.

It is a common saying that the best safety device is a careful man. I fully agree with that saying, but would add that to make a man careful you must treat him in a way that makes him contented in his work, in a way that will make him glad to meet his foreman or superintendent rather than afraid to meet him. That is the human side of our business which I wish to emphasize.

Fear is one of the causes of accidents. Frequently we call it "carelessness," but if we look more carefully into the subject, we may discover that the seeming carelessness was due to a nervous condition. Those who have made close study of accidents in a shop or factory have found that a frequent cause of accident is some trouble over which the workman was brooding at the time the accident occurred. The cause of the brooding may have been some family trouble, or some difficulty with a foreman or a superintendent, but it was sufficient to bring on a nervous strain that took the workman's mind off his work.

How many times have you observed a workman under the critical eye of a foreman become so nervous and excitable that he scarcely was conscious of what he was doing? Some workmen are of an excitable temperament, and it requires only some tactless act on the part of a foreman to put them in a frame of mind in which they are largely irresponsible.

Men in positions of authority have a great deal of responsibility in the matter of safeguarding the lives and limbs of workmen under them. In some respects they bear the same relation to the men under them that the father does to his child. A wise father does not exact obedience from his child through fear of punishment, but through respect. He must set a good example and win the child's confidence by kindliness. A child in constant dread of his father may, for a time, have respect for authority, but soon he will have little respect for the father.

It is the same with the foreman or superintendent who seeks to enforce discipline by harsh treatment of the workmen under him. He loses their confidence, with the result that the character of the work itself usually is inferior and the danger of accidents is greatly increased. What is needed is a little more human understanding, or, in other words, a closer study of the human side of our business. Every one who has had experience in dealing with men knows the effect of an accident on the morale of the working force. For a time after the accident takes place the shop or railroad is demoralized. Fear has crept in and weakened the morale.

So it is if men are in constant fear of their foreman or superintendent. The morale of the force is weakened and to that extent the danger of accidents increased. I do not wish to convey the impression that I think men always should be patted on the back, or that strict discipline should not be maintained. Although I believe there is, and should be, some sentiment in business, I do not believe in sentimentality.

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*Abstract of address presented at the annual convention of the National Safety Council, Detroit, Aug. 28-Sept. 1, 1922.

My contention simply is that the cheerful manner, the sympathetic word, the kindly act will bring much better results than the gruff and domineering manner or harsh treatment.

ESPECIALLY IMPORTANT ON ELECTRIC RAILWAYS

In the electric railway industry, with which I am connected, the human side is of the greatest importance. Success in our industry is dependent on the good will of the public, and the public forms its opinion of a company largely by the conduct of the employees with whom it comes in direct contact.

It is of the greatest importance, therefore, that the employees of a company engaged in the service of the public be cheerful and contented in their employment, that they be courteous and polite to the customers of the company; that they, in fact, consider themselves a part of the company.

To produce such a spirit among employees it is essential that they be treated as human beings. If those in authority do not treat the men under them with proper respect, how can they expect the men to treat the public courteously and respectfully? When the employees serving the public are in a happy and contented frame of mind their good humor extends to their passengers. On the other hand, if the employees are grouchy and irritable, their manner irritates their passengers. Keep employees in a contented and happy frame of mind and many of our troubles will disappear.

Human nature is much the same the world over. Seldom do we find a man so callous that he will not respond to a touch of real human sympathy. Seldom do we find a man who will not inwardly, if not outwardly, resent unjust or harsh treatment.

The brief message which I wish to bring to you men, most of you occupying positions of authority, is that the human side of our business is more important even than the financial side, because it is necessary to the financial success of our business that we establish and maintain good human relations. The more attention we pay to the human side of our business, the more successful will we be on the financial side. The better that our human relations are with the men who work for us, the safer will our operations be, whether on the railroad or in the shop or factory.

The Proposed Public Utilities Advertising Association*

BY W. P. STRANDBORG

Chairman Organization Committee, and Publicity Agent Portland Railway, Light & Power Company, Portland, Ore.

IT SEEMS strange that the public utility industries, such as electric railways, light and power, gas, telephone and others, have never been able to put their publicity and advertising work on the same basis as other large organizations of less vital importance to the American people. We have in the four major utilities enumerated, a total capital investment of over sixteen billion dollars, and protection of that investment is largely in the hands of the public who legislate and regulate concerning utilities with and without our own leave.

Now we all know that a very large and important element in the creating and maintaining of good will on the part of our customer public must be looked after by the men who are identified with that important section of our industry—the public relations men, and under this classification of course come our active advertising and publicity managers. So that in proposing the organization of a Public Utilities Advertising Association, the foregoing is a birdseye view of the field within which we may properly and profitably function. It is proper to include both publicity and advertising men in the new association, because in a very large number of cases, both the publicity and advertising activities of the individual companies, as well as of the national associations, are directed by the same leader or at least by the same staff of workers.

One of the important thoughts in mind in connection with the proposed plan is to get away, so far as possible in our public utility life, from the so-called "press agent" who in many of our utilities and other industries for years past has had for his chief duty the questionable assignment of trying to put things over on the newspapers and other publications. We hope to develop within our new organization a firm, fixed policy, subscribed to by every concern that joins our ranks, to the effect that we pledge ourselves to go out after advertising and publicity work on a strict business basis and pay for what we get. In other words, the men who are behind the new movement are firmly convinced that there is no place in our industry any longer for the man who tries to beg, borrow or steal space in the newspaper, but there is a growing demand for the presentation of our public utilities story in a frank, honest and fearless manner.

Millions of dollars are spent for advertising each year by our public utilities, and with very few exceptions, each advertising manager spends his money in his own way and works out his own campaigns without relation to or consideration of the great and universal problems that affect both the personal and physical service of all companies. It is not hard to understand why the situation is so, for the reason that until very recently the individual public utility advertising manager has had no clearing house through which valuable ideas and suggestions that would be of benefit to him in his local activities could be presented and worked out through the associated effort of the most skillful advertising and publicity men in the industry.

We find occasionally that a national convention will give a publicity or advertising man place on the general program for reading a paper. Sometimes a round table conference, or an informal meeting of publicity and advertising men is included in the activities of the national convention, but beyond that we have practically been orphans.

It is not the purpose of the new Public Utilities Advertising Association to supersede or duplicate any of the constructive work now being done by national associations within our major public utilities. It is rather to work with them, and perhaps to co-ordinate their efforts with ours in such a way so that we will all be mutually benefited. The fact that the men directing the advertising and publicity work in the A.E.R.A., A.G.A. and N.E.L.A. are all represented on our organization committee is evidence enough that there is a valuable work for us to do, and that these national leaders are willing to co-operate with us in bringing all the utilities together into one efficient operating body. We hope likewise to secure the fullest co-operation from the great manufacturing industries which are identified in a business way with one or more public utility organizations.

The new Public Utilities Advertising Association has the backing of the major utilities themselves, also of approximately fifteen of the directors of state committees on public utility information, and scores of individual companies whose favorable attitude has been reflected in the large volume of inquiries which has come to the organization committee during the past sixty days. In addition to this, it is very gratifying to know that many trade publications dealing with public utilities have requested further information about our movement, and the editors of these publications have expressed their emphatic indorsement of the plan and tendered the fullest use of their columns.

Technical details of the plans for organization need not be discussed at this time, for they will properly come through the selection of sub-committees when our general organization conference is held in Chicago during the coming American Electric Railway Association convention, to be held on the Municipal Pier during the week of Oct. 2-6, inclusive.

Another point. We hope to have our association admitted as a department of the national advertising commission, and to conduct our own convention each year as part of the great world advertising convention, and it is through contact and association with these thousands of advertising experts that we shall derive the greatest benefit from our proposed Public Utilities Advertising Association.

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*Abstract of paper presented at the convention of the Associated Advertising Clubs of Iowa, Mason City, Ia., Sept. 12-13, 1922.

French Tramway Track Construction

Engineer of Paris Unified Transportation System Points Out Some Special Features of Track Problems in that City—Several Rail Sections Evolved from Experience Are Given

THE coming discussion on the 1922 report of the committee on way matters of the American Electric Railway Engineering Association renders timely a brief review of the report presented at the last (1921) meeting of L'Union des Voies ferrées d'intérêt local et des Transports publics automobiles, by M. Gagné, chief engineer of electric services, track and buildings of the Société des Transports en commun de le Region parisienne (the unified system in Paris). This report covered the subject of tramway track construction and traced the history of tramway track construction back to its beginning in France.

The author said that at the close of the war, when the question of standardization came up, the union had been able to utilize, without undertaking new investigations, the work which it had done before 1914, notably on grooved rails. Only the five types shown in section below had been conserved. These rails are known respectively as U.V.F.1, U.V.F. 2, U.V.F. 3, U.V.F.L. and U.V.F. 5.

Rail U.V.F. 1 is the section employed for tangent track in the important centers where traffic is intense. Rail U.V.F. 2 is an adaptation of the preceding for curved tracks. Rails U.V.F. 3 and U.V.F. 5 are lighter sections intended for systems in smaller cities. The section U.V.F.L., with a large groove, is for use in track where both tramways and steam railroads must be accommodated on the same stretch of track.

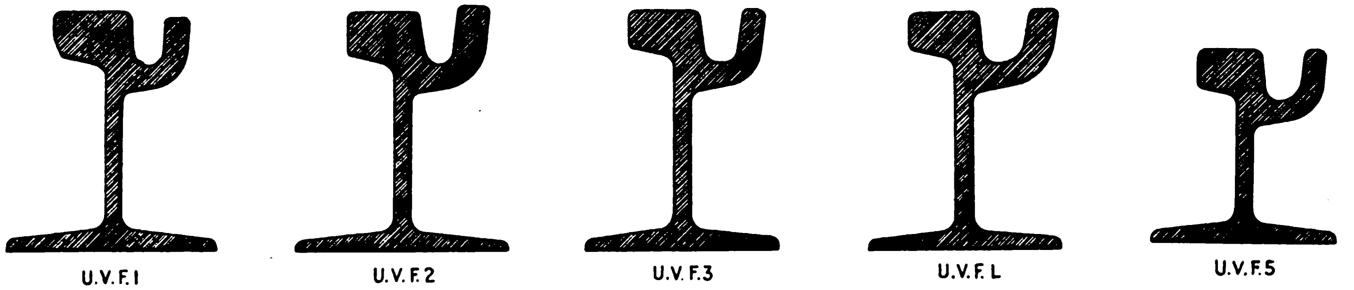
In the U.V.F. rails the form of cross-section is based on the following principles: The base of the rail is made as wide as possible, compatible with the possibilities of rolling; while the web has the minimum permissible thickness, to keep down the weight and at the same time not permit bending, in order to reserve for the parts subjected to wear the greatest amount of metal possible. The position and height of the head with respect to the groove were determined in such a way that when the flange of the wheel bears on the bottom of the groove the head will yield the maximum of wear. The author points out that as researches have shown that the best form for the wheel tread is a cylindrical surface, the surface of the rail on which the wheel rolls should be a plane.

SPECIAL RAIL SECTIONS FOR USE ON CURVES

The quality of the steel of the rail was made the subject of careful study by the tramways companies, particular attention having been directed to this matter after American rails had been purchased in 1915. These gave better results than the pre-war French rails. As a result modifications in the specifications for rail steel have been made.

Tests have also been undertaken with alloy steels, such as titanium-steel, silicon-steel, etc. The tests include rails treated by the Sandberg sorbitic process. No conclusions have been reached as to these special rails.

Manganese steel has been used for a long time on curves. It is well known that on curves it is the guard section of the inside rail which wears most rapidly, so that the first inclination would be to make only this guard section of manganese steel. Further, it is known that to diminish the wear on the guard of the inside rail and of the rolling surface of the outside rail, it is desirable on curves to raise the bottom of the groove in the outside rail so that the flange of the wheel will roll on the bottom of the raised groove and not the wheel tread on the rail surface.



FIVE STANDARD FRENCH GIRDER GROOVED RAIL SECTIONS
U.V.F.1, for heavy traffic, tangent track; U.V.F.2, same, but for curves; U.V.F.3 and 5, for lighter traffic; U.V.F.L., for use where steam railroad cars must be accommodated.

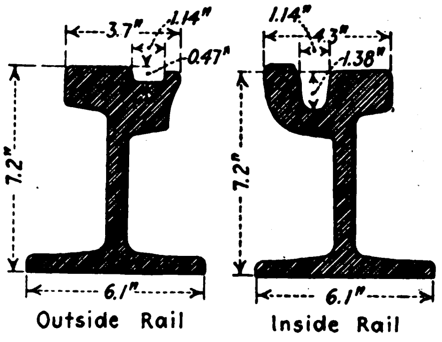
DIMENSIONS OF FRENCH TRAMWAY RAILS—ALL DIMENSIONS IN INCHES

	U.V.F.1	U.V.F.2	U.V.F.3	U.V.F.L.	U.V.F.-5
Height over tread	7.1	7.1	6.9	6.9	5.7
Width of base	6.3	6.3	5.7	5.7	5.5
Thickness of web	0.43	0.43	0.41	0.41	0.40
Width of head over all	4.0	4.25	4.0	4.45	3.75
Depth of groove	1.57	1.57	1.57	1.57	1.5

The use of a separate manganese guard rail was considered to involve troublesome maintenance so that there were made in 1913 some special manganese rails which gave excellent results. The inside rail was made with a heavy guard section and a deep grove, while the outside rail had a light guard section and a shallow groove. The use of these special section rails of manganese on all curves of less than about 100 ft. radius has been decided upon in Paris, but the rails will have the modified sections shown in section below. These were designed to utilize most effectively the expensive manganese steel.

The Paris company has adopted three types of tongue switch corresponding to three radii of the branch-off curves approximately 65 ft., 100 ft. and 165 ft. The author notes that some systems have successfully employed tongue switches with a mate opposite. It does not appear that this can be done in all cases, but its advantages recommend it in many.

The engineers of the company have therefore been studying, but only for the 65-ft. radius switch, the use of a mate, or, as the author terms it, "a fixed-point switch."



SPECIAL MANGANESE RAILS FOR USE ON CURVES WHERE SERVICE IS SEVERE

As to the system of switch control the T.C.R.P. (Paris unified system) has employed a plan in which several switches are controlled from a control station. Satisfactory results have been obtained from this and the author anticipates the perfection of automatic electric control based on the same principle. He says that France seems to be slow in the solution of this problem which has been solved in other countries.

Much of the lack of success in previous electric control experiments has lain in the imperfect functioning of the electro-magnet. The T.C.R.P. has preferred to change the control system, and in place of the magnet uses a motor as in steam railroad practice to operate the switch.

In connection with this apparatus the following points have been considered: The condition of security must come before all others, and all chances of collision must be eliminated. The apparatus must be arranged in such a way that the switch tongue in repose remains open for the right track. A motorman going to the right will have no operation to perform, while one passing to the left will throw the switch while passing without current under a contact some distance ahead of it and will restore the switch to the normal position in passing under a contact outside the danger zone beyond this.

American Association News

New York Central Train Leaves Sunday

THE schedule of the special train to the American Electric Railway Association convention over the New York Central lines has now definitely been set. A special train for the convention over the New York Central lines will leave the Grand Central Terminal, New York, at 1 p.m. Sunday, Oct. 1, connecting at Albany with a special car or cars leaving Boston at 10 a.m. on the same day. Stops will be made at Poughkeepsie, Schenectady, Utica, Syracuse, Rochester, Buffalo, Cleveland and Toledo, as well as at Worcester, Springfield, Pittsfield, and Chatham on the Boston & Albany. The train is scheduled to reach Chicago at 1 p.m. on Monday, Oct. 2. The one-way fare from New York, exclusive of Pullman, is $32.70, and the round trip $49.05. Entertainment and special features are being arranged.

Reservations of those from New York State should be sent with remittance to C. B. Keyes, General Electric Company, 120 Broadway, New York, who will supply other information. Those who wish reservations on the special car from Boston should make reservations with and send remittance to F. F. Stockwell, general manager Barbour-Stockwell Company, 205 Broadway, Cambridgeport, Mass. Accommodations will be allocated in the order in which they are received. The return tickets have a final return date of Oct. 12 and will be good on any New York Central train except the Twentieth Century Limited.

Program of the Claims Association

AN EIGHT-PAGE pamphlet, entitled "The President Has the Honor to Report to You," has been issued by the Claims Association, giving an account of the topics to be taken up at the Chicago convention, the objects sought by the association, subjects at previous meetings and other information of value to all interested in safety and claims.

Sessions of the Claims Association will be held on the afternoons of Oct. 2, 3, 4 and 5, and the program will be built around the four following basic subjects: Prevention of accidents, discouraging unreasonable claims, minimizing inequitable expenditures and defending litigation.

Program of the Accountants' Association

THE final program of the American Electric Railway Accountants' Association for the 1922 convention is now available and is presented below:

MONDAY MORNING, OCT. 2

9.30 A.M. to 12.30 P.M.

Registration and distribution of badges at booth at Municipal Pier.

MONDAY AFTERNOON

2.00 p.m. to 4.30 p.m. Meeting held in Accountants' Hall.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees on resolutions and nominations.

Four-minute address on safety by a representative of the Transportation & Traffic Association.

Report of Committee on Standard Classification of Accounts, H. L. Wilson, treasurer Boston Elevated Railway, chairman.

Address on "Present-Day Responsibilities of Public Utility Accountants." by Walter H. Timm, clerk New Hampshire Public Service Commission.

TUESDAY AFTERNOON, OCT. 3

2 p.m. to 3 p.m. Joint meeting with Engineering Association, to be held in Engineers' Hall.

Four-minute address on safety by a representative of the Transportation & Traffic Association.

Report of joint engineering-accounting committee—Charles R. Harte, chairman (Engineering); H. C. Kimball, chairman (Accountants).

Paper—"Related Function of Engineer and Accountant in Public Utility Development," Edwin D. Dreyfus, engineer West Penn Railways, Pittsburgh, Pa.

At the conclusion of the discussion of Mr. Dreyfus' paper the Accountants will adjourn to Accountants' Hall and the accounting session will be continued as follows:

3:00 p.m. to 4:30 p.m. Report of committee on stores accounting—R. A. Weston, special accountant the Connecticut Company, New Haven, Conn., chairman.

General Forum—A "round table" talk, which was a feature of the 1921 convention, will follow the report of the committee on stores accounting.

WEDNESDAY AFTERNOON, OCT. 4

2:00 p.m. to 4:30 p.m. Meeting held in Accountants' Hall.

Four-minute address on safety by a representative of the Transportation & Traffic Association.

Report of committee on relations with other associations, M. W. Glover, general auditor West Penn Railways, chairman.

Address on "The Budget—Its Preparation and Administration," by Harry A. Snow, assistant controller the Detroit Edison Company.

THURSDAY AFTERNOON, OCT. 5

2.00 p.m. to 4.30 p.m. Meeting held in Accountants' Hall.

Four-minute address on safety by a representative of the Transportation & Traffic Association.

Report of committee to represent Accountants' Association at the annual convention of the National Association of Railway & Utilities Commissions, by W. L. Davis, auditor Lehigh Valley Transit Company, chairman.

Informal talks by past-presidents and presentation of badges. "Master of Ceremonies," William F. Ham, president Washington Railway & Electric Company.

Report of convention committees on resolutions and nominations.

Election and installation of officers.

Adjournment.

Red Special Reservations

THE schedule of the "Red Special" is out. The train runs as a second section of the Pennsylvania Liberty train No. 5, leaving New York at 11:05 a.m. (standard time) on Saturday, Sept. 30, reaching Chicago about 9 a.m. Sunday morning. Reservations may be made with the following: New York, C. H. Beck, Room 2101, 165 Broadway; Philadelphia, Thomas H. Cooper, Westinghouse Electric & Manufacturing Company, Widener Building; Baltimore and Washington, L. H. Palmer, United Railways & Electric Company, Continental Building; Pittsburgh, F. G. Hickling, Westinghouse Electric & Manufacturing Company, Union Bank Building. Accommodations on the return trip can be arranged in Chicago with the Pennsylvania representative, F. E. Scott, who will accompany the "Red Special" to Chicago, and will have headquarters on the pier during the convention. Baggage will be handled as usual.

Meeting of Publicity Agents

FOLLOWING the plan adopted at the Atlantic City convention in 1921, the publicity agents of railway companies in attendance at the convention will hold a round table discussion on Wednesday afternoon. The time of meeting has been set at 2:30 and the place is the Better Health Exhibit room on the pier. Labert St. Clair says that no set program has been arranged for the meeting, but a profitable time may be expected by all in attendance.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Strike Fund Financed

Philadelphia Men Back Mr. Mitten with $1,000,000 to Carry On Campaign Against Jitney at Buffalo

Trustees of the co-operative wage dividend fund of the employees of the Philadelphia Rapid Transit Company have arranged for the purchase from the trustees for the stockholders of the International Railway, Buffalo, and the future resale to them, of $2,000,000, par value, of International Railway 5 per cent bonds for $1,000,000, the proceeds to be used by the International to continue the fight against union domination of the local and interurban lines of the company in western New York.

This announcement on the part of Thomas E. Mitten, chairman of the board of directors of the International, came as a severe blow to the motormen and conductors at Buffalo who have been on strike since July 1. Within the last week there have been many desertions from the ranks of the strikers and a large number of former strikers are now operating local and interurban cars on the International lines.

MAYOR'S PROPOSAL FLATLY REJECTED

Walter P. Cooke, one of the three voting trustees of the International and chairman of the board of the Marine Trust Company, Buffalo, to whom Mayor Frank X. Schwab appealed to help end the strike by appointing two members of a board of arbitration to settle the problem, flatly rejected the Mayor's proposal. He said:

> In the recent strike in which Mr. Tulley (president of the International) and his associates had to contend with a campaign of intimidation and lawlessness, they conducted a dignified, manly and straightforward fight which I believe must have commanded the respect of all thinking people.
>
> I have talked with Mr. Tulley in reference to your desire that the company should enter into your proposed arbitration and beg to advise you that the company feels for the reasons already repeatedly stated that it is unable to comply with your request.

Added impetus has been given the campaign of the International to rid the streets of jitneys which are operating in defiance of the Supreme Court and the Appellate Division by the decision of Justice Harley N. Crosby of the Appellate Court, who has denied the motion to vacate his anti-jitney injunction requiring Mayor Schwab to remove the jitneys from the streets of Buffalo. The motion to vacate the injunction was made by counsel for the jitney drivers.

The opinion of Justice Crosby points out that the operation of jitneys is not only "positively forbidden by law but that it is indeed actually criminal." The opinion, in part, says:

> Such of the defendants, if any such there be, as entered upon their illegal business in the belief that they were acting legally, may well be entitled to sympathy, but the imposition practiced upon them was not practiced by the plaintiff (the International Railway) nor by the courts. The law must be respected. Our courts have never gone the length of giving endorsement to acts that were made criminal by law.

Despite the decision of Justice Crosby, Mayor Schwab and the police are giving practically no support to the International in its efforts to rid the streets of jitneys. Traffic police are ignoring the jitney drivers who are racing up and down Main Street and the principal East Side thoroughfares. Private detectives have been retained by the International and with the aid of officers of the company evidence is slowly being obtained which has resulted in scores of jitney drivers being fined from $50 to $250 and more arrests will be made. The campaign will be continued by President Tulley and his associates until there is no more competition from jitneys.

Passenger travel over the local and interurban lines of the International has shown a big increase in the last week. Travel over the Park & River division of the company at Niagara Falls is normal and traffic on many of the West Side lines in Buffalo is normal. Few passengers are riding on the East Side, although there has been an increase of almost 50 per cent in the last week. The Buffalo-Lockport, Buffalo-Niagara Falls, Buffalo-Tonawanda and Buffalo-Depew lines are carrying a good quota of passengers.

Louisville Stockholders Approve Franchise Settlement

With about forty persons attending the stockholders' meeting of the Louisville (Ky.) Railway on Sept. 11 and 72,000 shares represented, some 65,000 shares by proxy, the agreement with the City Council for the new franchise ordinance was ratified. As a result the 6-cent ticket fare will become effective on Sunday, Sept. 17, provided the injunction is dissolved that was secured in the Federal Court some nineteen months ago, preventing the city from interfering with the company in the collection of the 7-cent fare. It is expected that action by the court will be quickly accomplished. Tickets or metal tokens will be sold at five for 30 cents, but cash fares will remain at 7 cents.

James P. Barnes, president of the company, said:

> Our attorneys and representatives of the city will go before Judge Walter Evans in Federal Court on Sept. 13 and make the necessary motions for withdrawal of the suit and modification of the injunction. What the motions will be, I am unprepared to say, as this is a matter to be determined by the attorneys. But there was complete accord among the directors that the plan of settlement as already agreed on by the city be accepted. So I am hopeful that beginning next Sunday, the new rate will be in effect.

Mr. Barnes announced that steps will be taken at once to work out with the Board of Public Works, the plans for expending $900,000 for improvements. These improvements will include the purchase of approximately eighty one-man cars; the installation of electrical machinery at its High Street power house of capacity sufficient to carry all of the present load; and to provide facilities for the comfort, convenience and welfare of its employees at carhouses and in shops.

The $900,000 is the excess accumulated by the company since the 7-cent fare became effective on Feb. 21, 1921, but which it was not permitted to spend because of the litigation over the fare question. The sum will not be added to the company's capital account, and hence will not be reckoned on its earnings against the barometer fund.

Electrification Plans Under Way by British Columbia Railway

The British Columbia Electric Railway, Vancouver, B. C., is electrifying six miles of steam railway connecting its Stave Lake Power plant with the Canadian Pacific Railway at Ruskin, B. C. The line is used mainly for hauling logs from the lake above, past the power plant and rapids. At present, the company is building a million dollar dam and the line will be used for hauling gravel from a point down the Stave River. Two steam locomotives have been used with a gasoline car for passengers. The voltage will be 550 and there will be one substation comprizing three transformers and one 400-kw. motor-generator set. Considerable saving in the cost of coal will be made.

As the plans of the company include a second plant on the river and the damming of the stream, the railway line will some time in the future be flooded and dismantled. Electrification work is therefore not entirely permanent. Electric locomotives now used on the company's interurban system will be transferred to the Stave Lake line.

Counsel for City in Utility Cases Resigns

Chester E. Cleveland, Sr., special counsel for the city of Chicago in charge of street car, elevated, and phone rate litigation, has resigned. In his note, dated Aug. 9, in which he asked to be relieved from duty on Sept. 1, Mr. Cleveland assigns no reason for wanting to step out of public service. Corporation Counsel Ettelson gave no explanation for Mr. Cleveland's action. His announcement of retirement from the city's service says only: "Chester E. Cleveland, having resigned as special assistant corporation counsel, will engage in the practice of law."

Minority Report Favored

Recommends Ten-Year Franchise Extension for Winnipeg Railway—Referendum Expected Soon

The franchise under which the Winnipeg (Man.) Electric Railway operates provides that in 1927—thirty-five years from the date on which it was originally granted—the city of Winnipeg shall have the option to purchase the railway property.

During the war and after the war period, the company, like practically every other public utility company, was unable to make large capital expenditures and from 1914 to the present time only a few extensions to the system have been made. Since taking charge of the property in the fall of 1917, A. W. McLimont, the vice-president and general manager, has made a great and successful effort to rehabilitate the property and to bring it into a high state of efficiency, which conditions consequent upon the first three years of war had impaired. For some time past the city authorities have been demanding of the company that it make a number of extensions to the system, calling upon it also to put its wires underground and to carry out certain other improvements which entail the expenditure of a large sum of money.

PROGRAM OF WORK OUTLINED

After considerable negotiations between the company's officials and a subcommittee of the City Council, an agreement was reached as to what was deemed necessary and expedient to do. The program of work outlined called for the expenditure of a considerable sum of money. The company found that owing to the uncertainty of the future it was necessary to provide some better security than it was in a position to offer, and, consequently, asked that the city defer to 1937 the right to exercise its option to purchase the property in 1927. This, it was pointed out, would permit the company to issue a security that would be salable and provide the necessary funds. When this proposition was made to the City Council it was referred to a special subcommittee. This sub-committee demanded certain concessions from the company before agreeing to consider the extension asked for, and the company replied with a proposition in which it stipulated the extensions to be made, the provision of motor bus service where necessary, and a promise to put into effect a sliding schedule of fares which, by Aug. 1, 1925, will put the whole system on a ticket fare of 5 cents. The proposed schedule was published in the *Electric Railway Journal*, Aug. 12.

Two of the five members of the subcommittee were in favor of the company's proposal and recommended to the Council in a minority report that the committee be instructed to continue the negotiations with the company and effect an agreement giving the ten years extension. It also recommended that the question of taking a referendum on the agreement be reported upon. The other three members of the committee opposed dealing with the company's application at the present time, suggested delaying action until the experience with municipal ownership in Detroit, Toronto, and Seattle had been thoroughly tested, and proposed that in the meantime the city of Winnipeg advance the railway company $1,000,000 to be spent on extensions. The proposal that the city should become the bankers for the company did not find favor with the majority of the Aldermen, and the recommendations of the minority committee were adopted.

Negotiations have again been resumed between the committee and the company's officials with a view to carrying out the instructions of the Council and drafting an agreement incorporating terms upon which the city will substitute the date 1937 for 1927. It has not yet been decided whether or not the agreement when finally passed by the Council will be submitted to the voters for ratification. There is a movement in the city that this should be done, but, on the other hand, the Council is desirous of getting the traction question settled as early as possible, in order that the company might start on some of its proposed work and thus provide employment throughout the winter and at a time when it is most needed.

The municipal elections take place in Winnipeg at the end of November and members of Council individually have expressed themselves as being opposed to permitting the traction question to become a political issue and for this reason it is expected that an agreement will be reached at an early date, and if it is submitted to a referendum the vote will be taken some time in October.

Mayor Couzens Scents a Conspiracy

In a statement made public a few days ago by Mayor Couzens of Detroit it was charged that a number of electric railways have employed private detectives to spread discontent among members of the Amalgamated Association now working for the Department of Street Railways. The statement was made, the Mayor explained, so that the city railway employees may not be misled.

The employees of the city who man the cars of the Municipal Railway are seeking a wage agreement. The Mayor explains that the city charter does not permit the city to recognize a union among the employees of any city department. The city has continued to pay the wage scale that was in effect when the local lines of the Detroit United Railway were taken over on May 15. This scale was fixed by a previous agreement between the Detroit United Railway and the men who have since become city employees.

As the Mayor sees it the effort which he says is now being made to stir up the local men has for its purpose creating discontent among platform men so as to, if possible, destroy municipal ownership of street railways as a policy. The Mayor's statement continued in part:

> The voters of Detroit have repeatedly shown overwhelming evidence that they are liberal and fair with city employees. There is no reason why any trade, division or occupation should be preferred over all other citizens. There is no more reason why an employment agreement should be entered into with the street railway men than with the policeman, fireman or employees of the water or lighting departments.
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> We have treated our employees fairly and we did not reduce wages when wages were being generally reduced; a trial board has been established to investigate all complaints against employees, and it is our firm conviction that our employees will not be misled or discouraged by interested and selfish propaganda.

$100,000 Reward Offered

Rewards totaling $100,000 are offered by the International Railway, Buffalo, N. Y., for information leading to the arrest and conviction of the person or persons responsible for the dynamite outrages on its local and interurban lines since the strike of trainmen on July 1. Frank H. Gaskill, Philadelphia, head of the secret service of the Philadelphia Rapid Transit Company, who has been in Buffalo for almost a month, is in charge of the investigation. Private detectives from four nationally famous agencies are on the case.

The first reward offered by the International was $10,000, but last week this was raised to $100,000 by Herbert G. Tulley, president of the company, to stimulate interest in the investigation. Rewards commensurate with the value of the information received will be paid to those supplying facts helpful in effecting arrest and conviction of those damaging any other property of the International. The identity of those giving information will be protected and safe conduct out of the country will be given, if desired.

For information leading to the arrest and conviction of those responsible for the dynamiting of the high-speed Niagara Falls line at midnight Aug. 7, the company offers a reward of $20,000 and $10,000 will be given for information leading to the arrest and conviction of each of the other eight dynamite outrages, which were as follows:

East Ferry car at Fillmore Avenue at 12:30 a.m. on Aug. 18, high-speed Niagara Falls line at Gill creek bridge at 3:15 a.m. on Aug. 17, East Ferry car at Wohlers Avenue at 12:05 a.m. on Aug. 12, Fillmore and Delevan Avenue at 5:55 a.m. on Aug. 11, Elmwood Avenue and Middlesex Road at 9 p.m. on Aug. 9, Elmwood Avenue near State Hospital at 6 a.m. on July 30, Lockport line tracks between Hodgeville and Pendleton Center at 7:45 p.m. on July 28 and Cold Spring carhouse at midnight on July 19.

News Letter Appears.—The Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., is publishing a News Letter occasionally for circulation among its employees. The July 18 issue published some interesting company doings and in addition gave a few reminders to platform men on courtesy and safety.

Agreement Reached

San Diego Railway Relieved of Paving —Adams Avenue Line To Be Reconstructed

An agreement was reached on Sept. 14 between the City Council and the San Diego (Cal.) Electric Railway through the efforts of the State Railroad Commission whereby the Adams Avenue car line will be reconstructed at once and the company relieved of paving obligations. It was decided that the city will pave the balance of the street leaving a strip in the center with 2 ft. each side of the track for the company to fill with surfacing material not paving. General Manager Spreckels has announced that work will start at once on double-tracking Park Boulevard to the city limit with concrete ballast and twin steel ties and 93 lb. rails totaling two miles. This ends the controversy in San Diego the direct cause of which was the tearing up of the tracks by the company on Adams Avenue on Aug. 27.

CONTROVERSY OF LONG STANDING

The tearing up of the tracks by the railway came as a climax to a long series of squabbles with the City Council over paving matters. About 1 a.m. Sunday morning, Aug. 27, after the passenger traffic had ceased the railway rushed a car of tools and a gang of about 100 men to Adams Avenue, and with picks, shovels and jacks the work of tearing up the tracks was begun. About 5 a.m. the work was brought to a close when Mayor John L. Bacon, with a squad of policemen, arrived on the scene and ordered the workers to desist and arrested H. A. Kuehmsted, engineer of the railway company, who was directing the work, on a charge of tearing up the streets without permission. But in the four hours work about a mile of track had been torn up.

The following day the city of San Diego had secured a writ of mandate from the Superior Court of San Diego County ordering the company to restore its tracks and service at once or appear in court Aug. 30, at 10 a.m. and show cause why it should not do so. Likewise the City Council, at a special meeting, suspended the ordinance against jitney buses until the "emergency" shall be deemed to have passed.

The next step in the fight was the action of Judge S. M. Marsh, who in the Superior Court on Sept. 7 sustained the demurrer of the railway company to complaint of the city seeking a mandamus to compel the company to restore Adams Avenue tracks on the point that the city was not the proper party to bring action. Other points in the company's demurrer were not ruled on.

Attorneys Titus and Macomber, for the railway company, argued that the city had not stated sufficient facts for a cause of action, and challenged the jurisdiction of the Superior Court in the matter. Attorney Macomber for the railway contended that the city, as a municipal corporation, was not the proper party to institute an action of such nature and that it had not filed the proper kind of action.

Judge Marsh sustained the contention that the city was not the proper party to bring the action for a writ of mandamus, but did not rule on the other points in the demurrer and argument, saying it was unnecessary to rule on the other points after sustaining the demurrer on the one point.

In replying, City Attorney S. J. Higgins argued that since the city was the grantor of the franchise it had the right to regulate rates and service and cited decisions calculated to support his contentions. After the decision was rendered, City Attorney Higgins said he had not decided what course the city would pursue. He intimated that one of three courses was open—allow the matter to rest with the Railroad Commission, with which body complaint had already been lodged by citizens of the Adams Avenue district; file an amended complaint on behalf of the city, or start a new action with a taxpayer of the affected district as plaintiff.

In tearing up the tracks and abandoning service, Mayor Bacon claimed that the railway was acting illegally and violating its franchise contract. The Mayor and his friends asserted that the company could have delayed the paving matter until after the coming election by legal means had it so desired, instead of tearing up the tracks and discontinuing service.

Each side of the controversy accused the other of "playing politics."

The San Diego *Sun*, an afternoon newspaper, made the statement during the fight that the Council was determined to pave Adams Avenue, and that if necessary the railway's property would be seized to pay its share of the bill.

GENERAL MANAGER SPRECKELS EXPLAINS

Early in the fight General Manager Spreckels declared that the hand of the electric railway had been forced and that the tracks were torn up to protect the company against liability for paving Adams Avenue. Further, that his company stood ready to relay its tracks whenever assurance was given the company that it would not be required to bear any paving charges. In his statement to the public under date of Aug. 27 Claus Spreckels reviewed the history of the paving situation. He said that he had under instructions from John D. Spreckels, the president of the company ordered the abandonment of the line. He promised an adequate and efficient bus service operating on the same schedule as that of the railway in order that patrons of the Adams Avenue line would not suffer any inconvenience.

The day following Mr. Spreckels' statement to the public he sent a similar communication to the City Council stating that he had ordered the abandonment of the track and had made arrangements for transportation for residents along the Adams Avenue car line.

$5,000,000 of Assets Behind Amalgamated

W. D. Mahon, president of the Amalgamated Association, is reported to have said at the meeting of the American Federation of Labor in Atlantic City that in 1917 he had obtained a loan of $100,000 from a Boston bank to finance the street car men's strike in New York and that no collateral security was demanded. He is also reported to have said that the Amalgamated owns $5,000,000 of government securities. He is quoted as follows:

> When informed that the New York strike would collapse unless funds were made immediately available. I with other International officials took the train to Boston, obtained the $100,000 without difficulty, being told by the bank officials that they would accept our 100,000 membership organization as quick as an organization of employers or any other. We paid back this loan by an assessment of from $1 to $5 on the membership before $50,000 of the loan had been used up in the strike. The other $50,000 went to the union.
>
> Why should not banks loan to labor unions? Such loans are absolutely safe and secure. Our union, for instance, owns $5,000,000 worth of Government bonds and securities. We have considerable business with banks. The entire cost of the conduct of our international union, $225,000 a year, is paid out of the interest received on the bonds and funds on deposit. Not one cent of the assessments or dues from members is used for salaries or conduct of the international union.

Mr. Mahon's remarks were evidently prompted by comment appearing in the daily papers about loans made by the Harriman Bank in New York to officers representing the striking coal miners.

Arbitration Board Will Decide Wages

An arbitration board will decide the wages to be paid trainmen of the Boston & Worcester Street Railway, although no date has been set for the first meeting of the arbiters. The contract with the car men expired on Aug. 31. Thirty days previous to that date the company notified the employees and the employees notified the management that a change in the articles governing wages was desired. Several conferences were held previous to the expiration of the contract and it was agreed that all articles about wages were satisfactory.

The contract called for arbitration in the event that the company and the men could not agree and prescribed procedure for such arbitration. The old wage was 54 cents an hour; the company offered 52 cents. As they were unable to agree the company told the union it would arbitrate as prescribed.

At a meeting on Sept. 1, against the advice of their officers and the vice-president of the Amalgamated, the men refused to arbitrate and voted to strike at the end of work on Sept. 2 unless the company agreed to renew at the old wage. The men held several meetings during the three days strike, and on Sept. 5 decided to return to work on Sept. 6 and agreed to arbitrate if their officers and the company's officials could not come to a satisfactory agreement in reference to wages. In this case, as in all other cases of wage controversy, the old wage prevails until changed by agreement or arbitration.

Circulation Managers Have Direct Interest in Electric Railways

C. D. O'Rourke, circulation director of the *Journal* and the *Herald* at Dayton, Ohio, was one of the speakers before the members of the Ohio Circulation Managers in convention at Columbus a few weeks ago. The question which he put before the assembled members in the form of a paper was "How will we ship when the auto buses and trucks cause the elimination of the interurban and electric lines?"

In emphasizing some of the things with which he had to contend in his work in shipping newspapers over the electric lines Mr. O'Rourke said that near Dayton five spurs of main electric lines had been torn up within the last few years because the electric lines could not meet operating expenses in competition with the buses. He said that as a result all farm land values and small town real estate values along these electric railway lines had dropped. On a discontinued spur between Franklin and Lebanon the public would not stand for an increase in fare from 25 to 35 cents, but was now paying 75 cents to a bus line, and had to pay five times as much for freight haulage by auto as was paid previously to the railway.

On a discontinued line between Miamisburg and Germantown, the fare by bus is now 50 cents, while it was formerly 15 cents on the electric railway. He said that between Lebanon and Cincinnati no effort was now being made by the buses in service between these places to keep any regular schedule.

Mr. O'Rourke said that morning paper circulation managers should take time to look well into the financial condition of the electric railways. By far the majority of papers are sold to street car patrons. He presented for the consideration of the members in attendance a map on which he had marked the interurban lines which had discontinued service within the past few years, so that they could see just what it now meant to every one interested in newspaper distribution. It seemed to him that the electric railways and the interurban lines asked only that jitneys and buses be put on the same basis with the electric railways, and since the continued operation of the electric railways meant so much to newspaper men as a class, the newspaper men in turn should do everything within their power to help keep the electric railways running. He said that the local electric railway managers would gladly give facts and figures which show many reasons why all the newspaper publishers should be anxious to do all they could to prevent further abandonment of lines by the electric railways.

Usual Big Time at P. R. T. Picnic

Willow Grove Park teemed with good fellowship and rejoicing on Aug. 29 when the fourth annual picnic of the Philadelphia (Pa.) Rapid Transit Company took place. Besides, "a good time had by all" an amount of $10,000 was realized as a starter for the Helping Hand Fund which will be used as a beneficiary for needy employees.

There were so many P. R. T. picnicers that two days were necessary to give every employee an opportunity to attend. The days' events included musical features, athletic contests, etc., with the second day terminating in a dinner for officials and directors of the Co-operative Welfare Association at which Thomas E. Mitten, president of the company, explained what Mitten Management stood for and what it had striven to accomplish. Earlier in the day he delivered another address before the employees at which he said that the dream of his life was to see the employees not only operators but owners of the Philadelphia Rapid Transit Company's stock.

Weekly Pass for Chicago Elevated Approved

Slightly lower fares on the Chicago Elevated Railroad, including the company's plan to sell unlimited transportation on a weekly payment plan, were approved on Sept. 13 by the Illinois Commerce Commission and will become effective next Monday morning, Sept. 18. The commission has made the provision, however, that the pass may not be handed back at the turnstile to another member of the pass owner's party.

The new rate schedule, which provides for the sale of three tickets for 25 cents, instead of four for 35 cents, thus reducing the straight ticket fare from 8.75 cents to 8.33 cents, was explained to the commission at length by Gilbert E. Porter, attorney for the lines. The cash fare remains at 10 cents.

Most of the discussion among the commissioners revolved about the proposal to sell weekly transferable passes for $1.25, good between all points south of Howard Street and for $2 good between points in Chicago and points in Evanston. This plan is considered revolutionary because it has never been tried in American cities of more than 175,000 population.

An extensive advertising campaign to popularize the weekly passes is planned by the lines. Advertising matter already has been prepared and the first appeared in the newspapers on the morning following the approval of the plan by the commission. The officials hope the transfer feature of the passes and the fact that, in addition to their daily use in going to and returning from work, the purchaser or his friends may use a pass to go to the theaters, parks, the corner grocery store, or the downtown department store, will make it a good seller.

Among benefits which "L" officials urge in favor of the pass plan are that it will eliminate standing in line for tickets, with consequent speeding up of service, and that it will increase traffic in non-rush hours, thus increasing the number of short-haul passengers.

News Notes

Seeks Suggestions.—In an effort to secure constructive criticism from employees and passengers the Lincoln (Neb.) Traction Company has been issuing blank cards for service suggestions for its employees to fill out.

Seeks Extension.—Citizens of Van Zandt County, Tex., which has very little railroad mileage, are holding meetings and seeking to induce the Dallas Railway, which is completing an electric interurban rail line from Dallas to Terrell, thirty-one miles east, to extend the line through that county and to Tyler.

Wage Scale Continues.—As the result of an agreement between employees and management of the Birmingham Railway, Light & Power Company, Birmingham, Ala., the present wage scale will continue for another year or until Aug. 31, 1923. The vote taken by the men showed that they were in accord with the company's offer of allowing the present wage to continue.

Article Tells About Trailer Trains.—Trail trains and how far the Cleveland (Ohio) Railway has progressed in the development of adequate service for its patrons has been made the subject of an article in the July-August Ohio Brass Company Bulletin. The account was written by R. G. Averill, commercial engineer of the Ohio Brass Company. Reference is made in the article to statistics of train operation published in the *Electric Railway Journal*, issue of Oct. 2, 1920.

Seeks Mayor's Co-operation.—The Celebration Committee of the Frankford "L," the new line to be operated by the Philadelphia (Pa.) Rapid Transit Company, called on Mayor Moore recently to enlist the co-operation of the city in the program to mark the opening of the new line. After promising municipal assistance the Mayor forecasted other big rapid transit developments which would be speeded up as soon as the Frankford "L" was in operation.

Employees Have Good Courtesy Ideas.—The Georgia Railway & Power Company, Atlanta, Ga., operating the city's street car lines, in a recent contest awarded $100 in ten prizes ranging from $25 down to $5, for the best essays written by employees of the company and dealing with the manner in which courtesy between employees of a public utility and the general public might best be promoted. Many valuable ideas were found in the essays submitted in the contest, some of which the company expects to employ to serve this end. The first prize was won by C. F. Jones, a conductor, while three motormen and one other conductor were also among the prize winners.

Financial and Corporate

Surplus in Montreal

Tramways Realize $187,947 for Year's Operation—Statistics Under Present Grant Included in Report

The fourth annual report of the Montreal Tramways Commission to the city of Montreal has been made public. It contains statistics on the operation from 1921-1922 and a recapitulation from Feb. 10, 1918 (when the contract became effective), to June 30, 1922, "in order to ascertain the present situation." In the accompanying statement of operation it is noted that for the year ended June 30, 1922, a surplus of $187,947 was realized. In the previous years there were deficits and the interested parties, according to the report, in order to avoid an excessive rate of fare, have agreed not to exact immediate payment of the amounts due them.

It was in 1916 that the Montreal Tramways started negotiations with the city officials for additional and extended franchise rights. Opposition developed and finally led to the appointment by the provincial government of a commission to investigate the situation and draft a franchise, fair alike to the company and to the community served. The franchise recommended by the commission, with some modifications, was approved by the city and accepted by the company on Jan. 28, 1918.

The Montreal grant allows a 6 per cent normal return upon capital value. Upon new capital furnished by investors during the war or within two years after its termination an additional 1 per cent is allowed, but this supplementary return is wholly withdrawn within five years after the war. The railway also receives a further return to the extent of 20 per cent of the divisible surplus, the balance of the surplus going to the city (30 per cent) and the tolls reduction fund (50 per cent).

There is no restriction upon the use of the city or company allotments. The company is not permitted to pay dividends on its stock in excess of 10 per cent.

The Montreal grant also provides for two supplementary allowances, one of which is unique in franchise history. Thus there is a fixed annual sum, equivalent to one-half of 1 per cent of the initial capital value ($181,431) for the expenses of new financing, including printing and engraving, legal and registration fees, listings, etc. Any unused part of this allowance must be kept intact with interest accretions until the termination of the franchise, when it may be distributed.

STATEMENT OF OPERATIONS OF THE MONTREAL TRAMWAYS COMPANY
From Feb. 10, 1918, to June 30, 1922

	Feb. 10, 1918, to June 30, 1919	Ye r Ended June 30, 1920	Feb. 10, 1918, to June 30, 1920	Year Ended June 30, 1921	Feb. 10, 1918, to June 3), 1921	Year Ended June 30, 1922	Feb. 10, 1918, to June 30, 1922
Gross receipts	$11,572,210	$10,782,470	$22,354,680	$11,773,004	$34,127,685	$11,712,525	$45,840,210
Operating expenses and taxes	$6,640,715	$5,849,911	$12,490,627	$6,327,841	$18,818,468	$5,769,403	$24,587,871
Operating profit	45,927	46,606	92,534	47,442	139,976	47,959	187,936
Maintenance and renewals	2,098,120	2,190,557	4,288,678	2,529,054	6,817,732	2,579,200	9,396,932
Total	$8,784,763	$8,087,076	$16,871,839	$8,904,337	$25,776,177	$8,396,563	$34,172,740
Balance	$2,787,445	$2,695,394	$5,482,840	$2,868,667	$8,351,507	$3,315,961	$11,667,469
Allowance due company:							
6 per cent on capital value	$3,018,224	$2,177,177	$5,195,402	$2,177,177	$7,372,579	$2,177,177	$9,549,757
7 per cent on additions to capital	32,91?	69,827	102,746	118,859	221,606	145,683	367,290
6 per cent on working capital	40,645	23,832	64,478	12,490	76,969	6,596	83,565
Financing expense	251,353	181,431	432,784	181,431	614,215	181,431	795,647
Total	$3,343,142	$2,452,269	$5,795,411	$2,489,959	$8,285,371	$2,510,889	$10,796,260
Balance, debtor	$555,695	$243,124 (a)	$312,571	$378,707 (a)	$66,136 (a)	$805,072 (a)	$871,209(a) (b)
Payable when earned:							
City of Montreal rental	$692,694	$500,000	$1,192,694	$500,000	$1,692,694	$500,000	$2,192,694
Contingent reserve fund	115,722	107,824	223,546	117,730	341,276	117,125	458,402
Total	$808,416	$607,824	$1,416,240	$617,730	$2,033,970	$617,125	$2,651,096
Deficit	$1,364,111	$364,700	$1,728,811	$239,022	$1,967,834	$187,947 (a)	$1,779,886

(a) Surplus.
(b) Total amount, payable to the city of Montreal, since the coming into force of the contract, on account of its rentals.

MONTREAL TRAMWAYS COMMISSION
Comparative Traffic Statistics from 1912 to 1922

Years from July 1 to June 30	1912–1913	1913–1914	1914–1915	1915–1916	1916–1917	1917–1918	1918–1919	1919–1920	1920–1921	1921–1922
Gross receipts	$6,754,227	$7,142,804	$6,525,231	$6,609,765	$7,725,498	$7,579,410	$8,645,547	$10,782,470	$11,773,004	$11,712,525
Revenue passengers	159,892,021	168,472,952	153,576,271	156,408,303	178,267,232	182,173,701	183,350,923	191,941,835	190,212,799	188,201,367
Car-miles	20,000,000	22,200,000	20,375,050	20,462,845	22,172,469	22,691,507	23,155,516	22,888,670	21,803,871	21,547,343
Total operating expenses	$4,032,664	$4,206,114	$3,713,996	$3,707,053	$4,601,771	$5,255,586	$6,669,340	$8,087,076	$8,904,337	$8,396,565
Net receipts available for payment of fixed charges and dividends	$2,721,652	$2,936,689	$2,811,235	$2,902,712	$3,123,727	$2,323,823	$1,976,207	$2,695,394	$2,868,667	$3,315,961
Gross receipts per revenue passenger, in cents	4.22	4.24	4.25	4.23	4.33	4.16	4.72	5.61	6.19	6.22
Gross receipts per car-mile in cents	33.7	32.2	32.05	32.26	34.90	33.40	37.40	47.11	53.99	54.36
Percentage of gross receipts devoted to total operating expenses	59.5%	58.9%	56.9%	56.1%	59.6%	69.4%	77.14%	75%	75.23%	71.69%
Operating and maintaining expenses per car-mile in cents	20.1	18.9	18.3	18.1	20.8	23.2	28.8	35.33	40.84	38.97
Net earnings per car-mile, in cents, for payment of fixed charges and dividends	13.6	13.2	13.8	14.2	14.1	10.3	8.52	11.78	13.15	15.39
Operating, maintenance and renewal expenses, in cents, per revenue passenger	2.52	2.5	2.42	2.37	2.58	2.88	3.64	4.21	4.68	4.46
Net earnings, in cents, per revenue passenger, for payment of fixed charges and dividends	1.70	1.74	1.83	1.86	1.75	1.28	1.08	1.40	1.51	1.76

Terms of East St. Louis Deal Announced

The conditions have been announced under which E. W. Clark & Company, have entered into an agreement with Dillon, Read & Company, representing the North American Company, for sale of preferred and common stock of the East St. Louis & Suburban Company, owned by E. W. Clark & Company. The agreement provides that all stockholders may sell their stock upon the same terms. The price is $55 per share for the preferred stock and $10 per share for the common stock, payable one-half in preferred stock of the North American Company at $50 per share and one-half in the common stock of the North American Company at $100 per share (the par value of both classes of stock of the North American Company being $50 per share).

The announcement of the impending purchase, made originally in the *Electric Railway Journal* of Sept. 9, has attracted much attention in financial circles everywhere, but particularly in the Central West where both sets of financial interests operate. In Columbus, Ohio, where the Clarks formerly operated, the impending deal has been treated at considerable length. On some of the more personal phases of the matter the *Ohio State Journal* of Columbus said:

> In January, 1919, W. H. Sawyer of Columbus, vice-president of E. W. Clark & Company, Management Corporation, accepted the presidency of the operating companies and undertook to salvage whatever was possible out of what looked to be and really was at that time a discouraging proposition. Columbus bankers, who know the situation, give Mr. Sawyer credit for bringing the operating properties to such a financial condition that the stockholders are now able to cash in on the present basis.

Eight Months' Traffic Increases

The Cincinnati (Ohio) Traction Company transported 330,169 more passengers during the eight-month period which closed Aug. 31, than during the corresponding period of 1921—the first time in five years that an increase in the business of the railway system has been shown. The total number of passengers for the eight months of 1922 was 71,282,908, against 70,952,739 in the corresponding time in 1921. Although the general report for the period is encouraging, W. Jerome Kuertz, Street Railroad Commissioner, in making comparisons for the month of August expressed himself as concerned with the falling off in the passengers carried as compared with July.

In August, 1921, there was an increase of 27,000 passengers over the preceding month. In August, 1922, however, there was a falling off of 99,000 passengers as compared with July.

Commissioner Kuertz attributes the drop to the numerous strikes and the consequent economic depression. However, the number of passengers carried last August was 123,801, greater than the number carried in August, 1921, the figures being 8,783,636 and 8,659,835. The railway patronage showed a steady increase from month to month up to and including July, when there was a drop.

Consolidation Matter Will Be Deferred

Bills to permit voluntary consolidation of the street railway companies of Washington into one corporation will not be considered by the House District of Columbia committee until the December session of Congress. Hearings on the several bills on this subject will be held early in the short session of Congress, according to announcement by the committee secretary.

It is probable that the House committee will shelve the House bills on consolidation and take up the two bills passed by the Senate, in order to expedite the legislation.

After having passed the one bill for voluntary consolidation, the Senate recently passed another, practically identical with the first excepting that it contains a special tax on income provision.

The tax provision was strongly urged by Senator Jones of Washington, who stated that two members of the House committee had assured him that the section would be carefully considered by that body.

A tax of 50 per cent on net operating income above 6 and not more than 7 per cent of the fair value and of 75 per cent above 7 per cent of the fair value is contemplated, in lieu of all other taxation excepting the ordinary real estate tax.

Financial News Notes

Interest on Bonds Paid.—The Third Avenue Railway, New York, N. Y., has announced an interest payment of 3¾ per cent on the adjustment mortgage fifty-year 5 per cent income gold bonds payable Oct. 1. This makes the total interest declared for the fiscal year 5 per cent.

Dividend on Account of Accumulations.—The directors of the New York State Railways, Rochester, N. Y., have declared a dividend of $6.25 a share on the preferred stock on account of cumulative dividends due on the senior shares. The dividend is payable Oct. 2 to stockholders of record of Sept. 27.

Seeks Abandonment.—The Michigan United Railway, Jackson, Mich., has petitioned the Public Utilities Commission for permission to abandon a 5-mile line between Frankenmuth and Frankenmuth Junction in Saginaw County. It is said that bus competition is responsible for the company's financial position.

Dividends Announced.—The Duluth-Superior Traction Company, Duluth, Minn., will pay on Oct. 2, 1922, two dividends of 1 per cent each on the 4 per cent cumulative preferred stock for the quarters ended June 30, 1921, and Sept. 30, 1921. In April, 1921, a dividend of 1 per cent was paid on the preferred stock.

Officers Elected.—Directors of the new Norwalk-Shelby Railway have elected the following officers: J. L. Baugh, Indianapolis, president and general manager; C. E. Heath, Plymouth, vice-president; A. D. Sanders, Norwalk, secretary; C. R. Irwin, North Fairfield, treasurer. The company will begin operating the line with gasoline cars about Oct. 1.

Valuations Announced.—The Pennsylvania Public Service Commission recently fixed valuations of two traction properties on petition of the companies for purposes of reorganization. The valuation of the Southern Pennsylvania Traction Company, Delaware County, has been set at $6,700,000 and of the Altoona & Logan Valley Electric Railway, Blair County, in the sum of $6,600,000.

Receiver for Interurban Named.—Judge Duval West, acting for Federal Judge Hutcheson in the United States Court at Houston, Tex., has named I. C. Griffith receiver for the Bryan & College Interurban Railway. The bill of complaint was filed by Louisiana bondholders, who claimed that $50,000 interest was overdue. Mr. Griffith is assistant cashier of the National Bank of Commerce.

Profits Increasing. — The Muskegon (Mich.) Traction & Lighting Company in a report filed recently shows that for the first time in more than two years both the electric railway and gas departments are showing a substantial profit. The profits for May, June and July in the traction department were $13,121. In addition the company paid $9,300 out of its earnings in interest charges.

Booklet on Public Service Corporation Issued.—Bonbright & Company, New York, have issued a booklet of forty-four pages on the Public Service Corporation of New Jersey. It contains a general description of the corporation, its properties and territory, with statements of the corporation securities and most of the securities of the subsidiary and leased companies. Earning statements of many of the leased properties are given. The book is well illustrated with many halftones, charts and maps.

Merger Under Consideration. — The possibility of a merger of the Joplin & Pittsburgh Railway, an electric line, with the Northeastern Oklahoma Railway, has been announced by J. J. Heim, president of the Joplin & Pittsburgh line. Contemplated plans for an 11-mile link between Columbus, Kan., and Pitcher, Okla., would give the combined line a total mileage of 250 miles, in the heart of the coal and zinc fields of Kansas, Missouri and Oklahoma. The plans have been filed with the Interstate Commerce Commission for approval.

Traffic and Transportation

Operation of One-Man Cars Would Effect Operating Reduction

George F. Russell, superintendent of Public Utilities, which department operates the Seattle (Wash.) Municipal Railway, claims a reduction of $782,800 a year can be accomplished in the operation of the railway system by completely changing from two-men to one-man cars and that faster and better service will be afforded. This is a part of the program recently started by Superintendent Russell which he states will bring the city nearer to the return of the 5-cent fare.

Superintendent Russell believes that a reduction now from 8⅓ cents to 5 cents would cut off 33⅓ per cent of the revenues. The revenues for the first six months of the year were approximately $3,500,000, or at the rate of $7,000,000 for the year, and a reduction of 33⅓ per cent would bring the revenues under $5,000,000 for the year. He said that his company was working on the program of increased efficiency and reduced costs. One of the main items in reducing operating costs would be the replacing of the heavy two-men cars with one-man cars. An approximate reduction of $782,800 would be the result. Another reduction would be realized in the elimination of certain lines called "policy lines," where cars are operated far beyond a point necessary for efficient service. This would mean a reduction of $145,000, which with the $782,800 saving would put the company, in the opinion of Superintendent Russell, within striking distance of the 5-cent fare.

Bus Petitions Initiated

Initiative petitions in favor of an ordinance regulating the operation of buses in Pasadena, Calif., providing for the issuance of five-year permits and the granting of universal transfers on bus lines operated in Pasadena are being circulated for the purpose of being filed with the city directors.

The resolutions are fostered by the Federated Improvement Association of Pasadena calling on the city officials to submit to the public at a general election in November the proposition to regulate the bus lines. At least two propositions, one from the Pacific Electric Railway and the other from the bus operators, are asked for in the resolution adopted. The association is clamoring for competition in the bus field in order that there may be had the very best of transportation facilities.

The text of the resolution follows in part:

Whereas some of the franchises of the Pacific Electric Railway on streets of Pasadena will expire at various times between the years of 1923 and 1944;

Whereas said company seeks to renew its franchises and asks permits for the operation of bus lines to serve portions of the city not served by street railway lines:

Whereas in addition to the service given by the Pacific Electric local street car lines in Pasadena, service is being given by a number of independently owned and operated bus lines;

Whereas the bus lines are now operated under permits from year to year revocable at the will of the City Council; and

Whereas these bus lines offer, if given a five-year permit, to operate in competition with the Pacific Electric Railway and to do the following things:

1. Give a 5-cent fare and agree to ask no more.
2. Grant a 3-cent fare to school children.
3. Grant universal transfers.
4. Practically double the bus service at once and add new lines as rapidly as the need arises.
5. Give a direct service to parks on holidays.
6. Give ten-minute service instead of all twenty-minute service.
7. Hold one bus in reserve for every three in operation, to provide against tie-ups due to accidents.
8. Form a co-operative company in order that the above betterments may be carried into effect.
9. Offer that the city may take over their business and equipment at any time for municipal purposes, by paying a fair price for it, same to be fixed by disinterested parties.

That the permit asked for is for five years only, long enough to enable the bus lines to install better equipment, more frequent service and new service in portions of the city not now served, and yet not long enough to embarrass the city, should new or better methods offer themselves within that period.

The proposed ordinance sought for five-year term of bus line permits provides that the city directors may in their discretion deny applications, except when a permit request is accompanied by a petition bearing the signatures of at least thirty adult residents of the district to be served. In such an event the directors would be required by the terms of the proposed ordinance to grant the permit so sought.

Another feature proposed by the ordinance is the granting of universal transfers good on all bus lines in the city. It also provides that the city directors shall establish rules and regulations for the operation of motor buses that will not be inconsistent with the ordinance.

Fare Fight in Court

Testimony of City of Fort Worth Heard to Compel Northern Texas Traction Company to Reduce Fares—Seven-Cent Fare Pending Referee's Report

The fight of Fort Worth, Tex., to compel the Northern Texas Traction Company, which owns and operates the street car lines in Fort Worth, to reduce its fare from 7 cents to 6 cents or possibly 5 cents is now before N. A. Dodge, referee appointed by the Federal Court to hear testimony on points involved and make report of his findings to the court. Hearing was held in Fort Worth last week before the referee in which the city presented testimony in support of its claim that the traction company is earning more than a justified return on its investment and that a reduction in fares is warranted at this time.

The Northern Texas Traction Company has been operating under a franchise similar to that under which the Galveston Electric Company was operating when its case was carried to the Supreme Court for decision. The Fort Worth case was very similar and officials of Fort Worth did not push their fight until the decision was rendered in the Galveston case. The Fort Worth franchise gives the traction company the right to fix fares so that a fair return shall be earned on the invested capital, and the only recourse the city has to prevent overcharge in fares is to go into court and show that fares are higher than justified. The traction company raised its fares to 7 cents. Thereupon, the city passed an ordinance directing the traction company to reduce fares to 6 cents. The ordinance was ignored, and the city went into court to compel a reduction. The hearing just concluded is to determine if the city's order calls for a fare that is confiscatory in that it fails to provide adequate return on the invested capital of the traction company.

Numerous points were developed in the hearing and street car service in Fort Worth was compared with similar service in other cities where fares are lower. Invested capital, replacement values, depreciation, and other factors to be considered in rate making were developed at the hearing. The traction company presented its side of the question before the referee several months ago, and the hearing this time was devoted to a presentation of the claims of the city.

H. P. Gillette of Chicago, editor of *Engineering and Contracting*, was placed on the stand as a witness for the traction company. Mr. Gillette declared that the Northern Texas Traction Company is warranted more at the present time in charging a 7-cent fare than in 1920. The valuation of the company's properties in Fort Worth now is $9,133,913, Mr. Gillette declared, as against a valuation of $11,575,513 in 1920. In response to the direct question of "What would happen to the traction company if the car fare had been reduced to 6 cents during the last fiscal year?" Mr. Gillette declared that the company would be facing a deficit of $23,000 at this time, because the 6-cent fare would have been inadequate to pay the operating costs if service is to be maintained at present standard.

The witness cited figures to show that the traction company during the last year earned 2.58 per cent on its valuation, whereas it has been held by Federal Courts in similar cases that a public utility of this kind should be permitted to earn a return of 8 per cent. An increase to 8 cents or 9 cents is more justified than a reduction to 6 cent or 5 cents, he said.

The standard of service maintained

in Fort Worth as compared with service maintained in other Texas cities was an important factor in the hearing and much testimony centered about this point. During the year ending Oct. 1, 1921, the traction company served 28,248,000 passengers, he said, whereas during the year ending June 1, 1922, it had served only 25,809,000 passengers, a decline of more than 10 per cent. This means a reduction of more than 10 per cent in revenues, he said.

The one-man car proved a bone of contention in the hearing. This car is operated extensively in Fort Worth and on some lines the patrons have objected strenuously. The cars were first tried out in Fort Worth in 1915, when ten cars were placed in service. Since that time the one-man car has proved its superiority over the larger cars in economical operation, Mr. Gillette said, and there are now more than 4,600 in operation in this country.

EXCESS SERVICE MAINTAINED

Joseph M. McShane, testifying as an expert witness for the city on the question of standard of service, asserted that the traction company in Fort Worth is maintaining 34 per cent more efficient service than it maintained in 1919, and that the net returns under the 5-cent fare in 1919 amounted to more than the net return in 1921 under the the 7-cent fare. This condition he attributed to an excess in service maintained. Curtailment of service would permit the traction company to reduce fares to 6 cents or even to 5 cents he asserted without lowering the net revenue. Testimony of Mr. McShane was attacked by W. E. Tucker of Boston and Sam B. Cantey, Fort Worth, counsel for the Northern Texas Traction Company, and the witness was forced to admit that his study of the operation of the Northern Texas Traction Company had been somewhat cursory. He also was forced to admit that his assertion that the company is maintaining 34 per cent excess service was in error, that the real excess should be stated at about 25 per cent.

George H. Clifford, general manager of the Fort Worth traction lines, took the stand on the closing day of the hearing. Mr. Clifford admitted that the service maintained in Fort Worth is superior to that maintained in Dallas and in other Texas cities. Mr. Clifford said that Mr. McShane in comparing service rendered under the 7-cent fare with service rendered prior to that, had taken 1919, which was the greatest year in the history of the traction company in regard to passengers carried, and had compared that year with 1921, which was the poorest year in the history of the company when measured by actual net returns.

The city attacked the contract between the local traction company and the interurban under which the traction company is paid 2½ cents per mile for use of its lines within the city limits by the interurban company.

A report by the referee to the court is not expected for a period of sixty days or longer, as attorneys for both sides are given thirty days in which to file written briefs, and the referee is expected to take at least thirty days for an examination of these briefs and formulation of his report. In the meantime the traction company continues to collect a 7-cent fare.

Weekly Pass Meeting with Favor in Washington

Figures presented by the Puget Sound International Railway & Power Company, Everett, Wash., show that its weekly pass plan is meeting with the approval of the riding public. The records show that 10,204 through pass rides were enjoyed the first week by the public for the sum of $404, or an average fare of 3.96 cents. Somewhat larger sales and equal approval are reported by the Bellingham lines, which also sell the pass at $1. While the cash fare in Everett is 10 cents, almost everybody used four tickets for 25 cents before the pass came. In Bellingham the cash fare is 7 cents and tickets are sold at fifteen for $1, the ticket sales, however, being small on account of the amount required for purchase.

Hearing on Railway Application for Bus Permit

The State Railroad Commission of California will hold a hearing in San Diego on Sept. 15 on the application of the San Diego Electric Railway for a permit to operate an auto bus line as a feeder to the San Diego-National City-Chula Vista interurban railway line. If granted, the company will establish its bus line over a route about 5 miles in length, connecting with the interurban street railway at Eighth Street and National Avenue, National City. It is planned to maintain a fifty-minute schedule except for one hour each morning and evening, when the three Fageol buses to be placed on the run are used in taking from and returning to their homes students of the new Sweetwater Union High School, which has just been completed.

The new bus line would supplement the present railway service.

Lower Fare in Providence Under Consideration

The board of directors of the United Electric Railways, Providence, R. I., recently authorized President Potter to file with the Public Utilities Commission special rates for school children eighteen years or under. The new plan, by which tickets would be sold in strips of ten for 40 cents, will mean a reduction in fare amounting to 2 cents. The tickets will be good for riding to and from school and will carry the same transfer privilege as the cash fare.

Mr. Potter said that a survey was being made in Providence of fare systems. He added, however, that he did not believe his company would adopt the pass system.

Offers Five-Cent Fare

A Cut of Two Cents in Regular Fare Proposed by Newport News Railway Head

With a view of doing the greatest good to the greatest number the City Council of Newport News, Va., has approved the plan of J. N. Shannahan, president of the Newport News & Hampton Railway, Gas & Electric Company, to put into effect as soon as possible a universal 5-cent fare. The present fare is 7 cents with half-price work and school tickets. It is expected that the new fare schedule will meet with the approval of the State Corporation Commission. Six weeks will be needed to take care of the legal requirements involved in changing the franchise.

Mr. Shannahan stated that the reduction will be put into effect in every zone on the peninsula. He submitted figures to show that 76 per cent of the peninsula's traveling public will have their car fare reduced 2 cents while about 21 per cent will have it increased 1½ cents. He frankly stated that he did not know whether his company could "get by" on the arrangement but was willing to give it a trial, hoping to secure more riders at the reduced rate.

Members of the Council declared that they believed the men and women who lose the half-price work ticket will benefit in the end as a result of the flat 5-cent fare, they and members of their families having to use the cars at times when the reduced fare does not apply.

In opening his statement of the practicability of the straight 5-cent fare, Mr. Shannahan stated that he had studied the matter from all angles and that the fare could be had in only one way, the establishment of a universal fare at this rate. He could not make special labor and school rates and have his company remain solvent. He added that he was willing to try the straight fare and make reports to the Council. In answer to a question he stated that the average fare is 6.11 cents and that the only way to make up for the loss of revenue is to carry more passengers.

The percentage of fares was then brought out, showing that labor tickets are but 18 per cent of the total number of fares.

In regard to the reduction President Shannahan said that it would be impossible for the company to give this reduction without the ordinance recently passed regulating the use of the city streets by jitneys and buses.

Under the plan not only would the fare within the city limits be reduced to 5 cents, but the fare on the interurban lines would be lowered also. The fare to Hampton would be 10 cents instead of 14 cents and the fare to Old Point and Buckroe would be 15 instead of 21 cents.

Appreciation of Mr. Shannahan's offer was expressed by the Mayor and by members of the Council. Councilman Smith characterized the plan as a "clean-cut" proposition and that the only question was whether the people of the city wanted a 5-cent fare.

Recommends Drastic Changes in Traffic Regulation

In co-operation with the Los Angeles Traffic Commission the Automobile Club of Southern California has just completed an extensive study and report on its plan for relieving congestion in the city of Los Angeles. The principal measures recommended include the widening of city streets and the elimination of cars from some of the downtown streets. The report states that if traffic congestion continues after making drastic changes then all cars should be removed from the downtown congested area and a belt line or loop system of railways should be built. The report was filed on Aug. 30 and copies were submitted to the Board of Public Utilities, City Planning Commission, Chamber of Commerce and other civic bodies.

The report contains a map showing the location of the proposed new streets and charts showing the population curve and other causes of congestion, also extensive information concerning the manner of dealing with traffic problems in other cities. The report of the club was prepared by its consulting engineer, J. B. Lippincott. It consumed one year to prepare the completed report, with the engineer in charge using forty assistants.

Weekly Pass in Pine Bluff

Another railway announced recently its intention of putting into effect the weekly pass plan. This is the Pine Bluff (Ark.) Company, which started on Sept. 4 the selling of $1 passes good for an unlimited number of rides between Monday morning and Sunday night. The plan also provides that school children may enjoy the same privilege for 50 cents a week, provided they are able to present certificates showing that the students are bona fide pupils in the public or private schools. The new plan will make no change in the cash fares, which will remain at 6 cents a ride.

Hearing Set on Suit of Puget Sound Property

Preliminary to the litigation in Federal court this fall, which is expected to have a bearing on the adoption of a 5-cent car fare for the Seattle (Wash.) Municipal Railway, the city recently filed with the Circuit Court of Appeals in San Francisco its brief in the so-called "specific performance" suit brought by the Puget Sound Power & Light Company. Hearing has been set for Sept. 18, when the high tribunal will sit in Seattle.

This is the case in which Federal Judge E. E. Cushman in the District Court rendered a decision favorable to the power company, which was seeking to have the general fund of the city made security for the $15,000,000 of bonds with which the street railway was purchased from Stone & Webster. Since that decision the State Supreme Court has interpreted the statutes of this State as forbidding any invasion of the city's general tax funds for the purpose of operating and maintaining the street car system, and the city had appealed from the decision given by Judge Cushman. The city will be represented by Corporation Counsel Walter F. Meier, T. J. L. Kennedy, first assistant, and Robert H. Evans, special counsel.

Fare Dispute in Dallas

Petition to Mandamus City to Compel Reduced Fare—Appeal Against Six-Cent Fare Collection

The fight to compel the city of Dallas, Tex., to reduce fare by repealing the ordinance granting an extension of the 6-cent fare to the Dallas Railway has found its way into the courts. Two petitions are now pending, one seeking to mandamus the Mayor and City Commissioners to compel them to act on the petition filed on July 24 asking that the ordinance granting the extension of the 6-cent fare be submitted to the qualified voters of the city for approval or rejection under the referendum provision of the city charter.

The legal department of the city of Dallas had held that the fare extension ordinance carried an emergency clause and under the charter provisions is not subject to referendum. The petitioneers seeking the referendum, on the other hand, allege that there was no emergency and that the fare extension ordinance should not have carried the emergency clause but should have become effective only after the regular period of thirty days.

SEEK TO ENJOIN COMPANY

The other petition seeks an injunction restraining the officials and agents of the Dallas Railway from collecting 6-cent fares, or any other fare than the 5-cent fare provided in the original franchise granted to C. W. Hobson and his associates in 1916. The latter petition has just been filed in the district court by the same petitioners as filed the former petition with the City Commission and later filed petition for mandamus to compel the City Commissioners to act on their petition.

The petition seeking an injunction cites provisions of the original franchise and alleges that any action by the city in increasing fares except as provided in that franchise was in violation of law and void. The petition further asks that in case the 6-cent fare is not immediately set aside, the court order the Dallas Railway to issue receipts for fares paid by its patrons so that in case the 6-cent fare is set aside later the patrons may secure refund of excess fares paid.

W. M. Holland, president of the Dallas Railway, and Richard Meriwether, vice president and general manager, are named in the petition as agents of the defendants.

The petition also asks the court to compel the defendants to deposit the amount of the monthly difference between the 5-cent and the 6-cent fare if the order for a temporary injunction is not given by the court, and designates the difference between the two rates of fare as $500 a day. The claim that the 6-cent fare is being collected illegally is repeated in the petition.

The petition also cites that the 6-cent fare ordinance would not go into effect legally until it had been voted upon by the electors of the city of Dallas, in conformance with the charter, because a scale of 5-cent fares is designated under the original Hobson franchise, which was voted upon by the people.

Will Seek Review of Commission's Fare Order

The city of Alhambra, Calif., served by the Pacific Electric Railway lines, is preparing to go before the Supreme Court and charge the State Railroad Commission with unfair discrimination. Alhambra has taken exception to the recent ruling of that body which reduced the fare to South Pasadena and has ignored the claims of Alhambra for a similar reduction, although the mileage to Alhambra is considerably less than to South Pasadena. T. C. Gould, city attorney, has announced his intention of asking legal representatives of other cities adjacent to Los Angeles to join with him in requesting a writ of review. The commission ruling which reduced Hollywood and South Pasadena fares was reviewed in the *Electric Railway Journal* issue of Sept. 9.

Transportation News Notes

Weekly Pass Plan in Effect.—The Pacific Power & Light Company, Astoria, Ore., began on Sept. 4 issuing weekly passes on the railway lines at $1 each, good for an unlimited number of rides by the holder during the seven days following the issuance. This company is the first in Oregon to adopt this plan.

Wants to Restrain Buses.—The Mayor of Houston, Tex., has indicated that he will secure submission to the voters in November of a proposal to prohibit the operation of jitneys in that city. Electric railway facilities have recently been increased by the expenditure of more than $1,000,000 by the Houston Electric Company.

Plea for Permanent Transfer Points.—Electric railway companies of Dayton, Ohio, have requested the City Commission to curtail transfer privileges. It is alleged that the transfer privilege is being abused. Permanent transfer points are being sought. Railway officials claim that in some cases it is possible for a person to go downtown on one line, get a transfer and reach home on another for a single fare plus a 1-cent transfer charge.

Personal Mention

Mr. Shryock Advanced Again

E. O. Shryock, who was recently appointed superintendent of the light, power and transportation departments of the Columbus, Newark & Zanesville Traction Company at Zanesville, Ohio, has a long service record in electrical utility work behind him.

In June, 1906, he was employed by the Meadville Traction Company, the Meadville & Cambridge Springs Street Railway and the People's Incandescent Light Company, which were jointly operated. While in their employ, he was connected at various times with practically every department. In February, 1909, Mr. Shryock was made superintendent of a new division then being operated under the name of the Meadville & Conneaut Lake Traction Company, holding this post until 1913, when these companies were consolidated under the name of the Northwestern Pennsylvania Railway and the Northwestern Electric Service Company. At this time he was made superintendent of transportation of the Meadville-Cambridge Springs Division, Meadville Division and the Meadville and Conneaut Lake Division.

Later in 1913 the Erie Traction Company was consolidated with these companies and Mr. Shryock was made superintendent of transportation and purchasing agent for the combined systems. In the following year he was promoted to be general superintendent, which position he held until 1920, when he resigned to become superintendent of railways of the Northwestern Ohio Railway & Power Company, with headquarters at Oak Harbor. This position he resigned in June, 1922, to become superintendent of transportation of the Columbus, Newark & Zanesville Traction Company at Zanesville. He was promoted to the general management of the company's local properties on Sept. 1 when the resignation of B. S. Watters went into effect.

Spanish Railway Officials Visiting Here

Señor Don José Moreno Ossorio, general manager of the Norte Railway in Spain, and several other Spanish railway experts who are working out plans for the proposed electrification of the Norte Railway recently made a tour of inspection through the East Pittsburgh works of the Westinghouse Electric & Manufacturing Company.

The other members of the inspection party were Don Mario Viani Caballero, chief engineer of the motive power department, Norte Railway; Prof. Don José A. Pérez del Pulgar, professor of electrical engineering Instituto Católico de Artes e Industrias, and R. F. Hamilton, consulting engineer of the Sociedad Española de Construcción Naval, which represents the Westinghouse Electric International Company in Spain.

The initial electrification on the Norte system, which is one of the largest in Spain, will include about 40 miles of line running from Ujo through the mountainous Pajares section in the north. Three thousand volts direct current will be used in this section, and water power will be purchased from the Electra de Viesco Company in Asturias. More extensive electrification work is planned for the future of the Madrid-Venta de Baños section of this Spanish railroad.

John E. Wilkie Assists General Manager of Chicago Surface Lines

John E. Wilkie, a vice-president and director of the Chicago (Ill.) Railways, is made assistant general manager of the Chicago Surface Lines under a new organization plan. His department, in addition to handling routine matters of the general manager's department in the absence of that officer, will have charge of publicity and public relations, real estate transactions and records and all complaints relating both to service and personnel.

J. E. WILKIE

By thus placing in the control of one executive the reception and adjustment of complaints both as to service and employees, the management recognizes the importance of these features of public relations as affecting the reputation of the company with its patrons. It also assures a co-ordination of effort between the complaint and transportation departments, which it is hoped will work to the decided advantage and profit of the company. Mr. Wilkie is a former newspaper man who, for sixteen years before joining the forces of the Chicago Railways in 1913, was chief of the Federal Secret Service in Washington.

E. R. Kelsey Resigns at Toledo

Edward R. Kelsey, for twelve years in charge of the publicity department of the Doherty company, has resigned. He will become scout executive for Toledo, Ohio. Mr. Kelsey was a newspaper reporter before 1910, devoting part of his time to the interests of the Toledo Railways & Light Company. In 1910 he left newspaper work to become manager of the publicity department at Toledo. In 1912 he was appointed general passsenger agent.

W. B. Yereance has completed his contracts with the Eighth and Ninth Avenue Railroad companies, New York, and has relinquished his office of general manager and chief engineer of those properties.

R. F. Clute has been appointed supervisor of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C. He succeeds A. H. Roberts, who resigned recently. Mr. Clute has been an inspector and dispatcher for the company for several years.

Edward Roach is in charge of the installation of the electrical equipment on the lines at Muncie and Anderson, Ind., of the Union Traction Company of Indiana. Bradford Fields is in charge of the installation of the high-tension lines under construction between the Muncie substation and Eaton power plant and between the Muncie and Selma substations.

C. H. Evenson has been appointed assistant general superintendent of transportation of the Chicago (Ill.) Surface Lines. Mr. Evenson entered the service of the Chicago City Railway in 1910. For a number of years he was secretary to the president of the Surface Lines and for the past two years has been employed in the transportation department.

Paul Warwick has been appointed assistant director of the public relations department of the Georgia Railway & Power Company, Atlanta, Ga. The change is effective Sept. 1, according to an announcement by Lincoln K. Starr, director of the public relations department. Mr. Warwick, who has been secretary of the Georgia Committee on Public Utility Information, was formerly Mr. Starr's assistant with the Georgia company. He succeeds "Fuzzy" Woodruff, who has held the position the last several months and who resigned to take up newspaper work again.

J. M. McElroy, one of the leading tramway authorities in Great Britain, has been presented by the Manchester Tramways Committee with a silver tea service on the occasion of his retiring through ill health as general manager of Manchester Corporation Tramways, a post which he has held for twenty-two years. The chairman of the tramways committee and the Lord Mayor of Manchester bore high testimony to the value of the work accomplished by Mr. McElroy, voicing the sorrow of all concerned that it was necessary for him to retire.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Pulverized Coal Installations on Increase

One Manufacturer of This Class of Equipment Reports Record Orders, Which Include Many Converts in the Electric Railway Field to Use of the New System

EVERY utility is interested in anything that has to do with the use of coal. In the operation of the power plant, the first problem just now happens to be how to get the coal to burn. That is a temporary or passing condition, however, so that, after all, the problem resolves itself into what coal to get and how best to use it after the coal has been purchased. At first, the criterion was to get as good coal as possible and then to burn it as economically as possible, but with coal prices at their present level and the prospects very remote of any very large decrease in the price of fuel, increased attention is being paid to the possibilities contained in the use of low-grade fuels with mechanical means called upon as an aid to securing better power station results.

PULVERIZED FUEL EFFECTS OPERATING ECONOMIES

It is just here that pulverized coal has forced its way to the front as a possible aid to economy when properly used. At least one large utility plant has been built entirely with the end in mind of using pulverized fuel, and the tendency has been constantly growing among other power users to turn toward the use of coal in pulverized form. In the particular case to which reference has just been made the installation contemplated that the utility should pulverize its own coal in its own plant, but this was merely an incident in the operation and if anything emphasizes the advantages of the use of the pulverized fuel.

No matter what the coal market conditions or technical considerations may be that govern this tendency, the fact that more and more companies are turning toward the use of pulverized fuel is a development too important not to merit very serious consideration everywhere. Among the latest converts to the use of pulverized fuel are the United Electric Railways, Providence, R. I.; the West Penn Traction Company, Pittsburgh, Pa.; the Rochester Railway & Light Company, Rochester, N. Y.; the Duquesne Light Company, Pittsburgh, Pa., and the Union Electric Company, St. Louis. All of these companies are on record as having placed orders recently with the International Combustion Engineering Corporation for the installation of the Lopulco system, and that company reports bookings for combustion equipment during August for more than $900,000, exceeding by more than $200,000 the record of any previous month. This is the recent record of just one manufacturer of this class of equipment.

INSTALLATION IN MILWAUKEE SUCCESSFUL

The Philadelphia Rapid Transit and the Milwaukee installations for burning pulverized coal, described previously in the *Electric Railway Journal*, are of course among the most important of the kind so far made in the public utility field. The significance of the results of the Milwaukee installation in particular is doubly important as the installation there has apparently more than justified the faith of its sponsors, for among the latest companies recorded as turning toward the use of pulverized fuel is found the Union Company, also a subsidiary of the North American Company along with the company at Milwaukee.

Thus is the record set down of a tendency among power users that seems to have great impetus behind it. Therein may lie a lesson for power uses elsewhere. As for the company making the equipment, the intending purchaser may not be interested in the extent to which the producer is prospering because all his plants are now being run to capacity, but even that fact is not without significance for the power user, although he may not be interested in the details of the figures of the manufacturer's output. In the case of the International Combustion Engineering Corporation this output includes also the products of the Underfeed Stoker Company.

$3,000,000 Power Development Planned

The Potomac Public Service Company, which purchased the Hagerstown & Frederick Railway, together with holdings at Eddes Fort along the Cacapon Creek in Morgan County, West Virginia, will erect a hydro-electric station, costing about $3,000,000. The company hopes to supply power within a radius of 75 miles of the plant.

A dam will be built at Eddes Fort, which will impound water that will drain an area of 672 square miles. The lake will flood an area of 5,000 acres. It will be 165 ft. high from the bed of the creek.

The company has secured options for a distance of 30 miles or more. It will require two years to complete the work. The setting of the lake in the natural woodland will no doubt result in the formation of a summer colony along its banks.

Inasmuch as many miles of the country road will be flooded, the company will provide a highway of concrete the whole length of the lake. The large dam will be of concrete construction and will be more than 700 ft. in length at the crest. The company will develop approximately 30,000 hp. High-tension transmission lines will be built to connect the company's lines over four states.

Westinghouse Company Receives French Railway Contract

An order covering the complete control equipment for 120 electric locomotives, now under construction, has been received by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., from the Paris-Orleans Railway of France as part of an electrification contract amounting to approximately $8,000,000.

The Paris-Orleans Railway, which is one of the largest systems in France operating over 5,000 route-miles of track, is electrifying 125 miles of its main line between Paris and Vierzon. This is the first of an extensive program laid out by the Paris-Orleans for the electrification of its lines.

The complete order of control equipment will be manufactured in the United States and shipment of this order will commence in January, 1923, and extend to December, 1924.

Rails Will Cost More

The United States Steel Corporation announced on Sept. 13 that the price of standard steel rails would be advanced from $40 to $43 per gross ton on Oct. 1.

This is the first advance made in the prices of rails for many months and is accepted as marking the beginning of the resumption of the upward trend in prices.

Formal announcement made by the corporation said:

Until Sept. 30, 1922, the price of standard rails will continue to be $40 per gross ton base f.o.b. mills for deliveries to be made in about equal monthly instalments prior to June 30, 1923. Commencing Oct. 1, 1922, the price will be increased to $43 per gross ton base f.o.b. mills for same deliveries.

Metal, Coal and Material Prices

Metals—New York	Sept. 12, 1922
Copper, electrolytic, cents per lb	14.00
Copper wire base, cents per lb	15.625
Lead, cents per lb	5.90
Zinc, cents per lb	6.70
Tin, Straits, cents per lb	32.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.375
Somerset mine run, Boston, net tons	5.125
Pittsburgh mine run, Pittsburgh, net tons	4.625
Franklin, Ill., screenings, Chicago, net tons	4.375
Central, Ill., screenings, Chicago, net tons	4.325
Kansas screenings, Kansas City, net tons	2.75
Materials	
Rubber-covered wire, N. Y., cents per lb.	6.25
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl lots), N.Y., cents per gal.	91.50
White lead, (100-lb. keg), N.Y., cents per lb.	12.50
Turpentine, (bbl. lots), N.Y., per gal	$1.29

Rolling Stock

New York & Queens County Railway, New York, N. Y., has leased fifty cars of the Third Avenue Railway. These will replace some of the bad order equipment of the Steinway lines operating in Long Island City.

Boston (Mass.) Elevated Railway placed an order during the month of July for forty steel cars of the elevated type for operation in train service in the East Boston tunnel upon completion of the Maverick Square Terminal.

Louisville (Ky.) Railway, now that the new franchise ordinance has been finally arranged, is expected to purchase about 80 one-man cars under the plan calling for the expenditure of $900,000 in improvements.

Chattanooga, Tenn.—The first gasoline motor car will be placed in operation out of Chattanooga by the Tennessee, Alabama & Georgia Railway. The car was purchased from the Service Motor Truck Company, Wabash, Mich. For the present the motor car will make a round trip to Gadsden and will be run on the same schedule as the steam passenger trains.

The Cincinnati (Ohio) Traction Company has ordered seventy motor and control equipments for new cars from the Westinghouse Electric & Manufacturing Company. The outstanding feature is the application of Westinghouse cabinet type control, which simplifies the operation of cars. This type of control was first tried out successfully in Cleveland, Cincinnati being the second city to adopt it. The seventy cars are being built at the plant of the Cincinnati Car Company.

Track and Roadway

Cincinnati (Ohio) Traction Company will order at once the necessary material for the installation of tracks and switches in connection with the rerouting plans.

Trenton & Mercer County Traction Corporation, Trenton, N. J., is making a number of improvements to the roadbed at Hopewell, N. J., and raising the rails at several points.

Muskegon (Mich.) Traction & Lighting Company is placing its profits in improvements to the line. The work of double-tracking the line in the business section of the city has been completed.

Toronto (Ont.) Transporation Commission has commenced work on the double-tracking of Yonge Street from Woodlawn Avenue to the northern city limits. The street will then be paved.

The Connecticut Company, New Haven, Conn., through President Storrs has notified the Mayor of Hartford that it is ready to lay its share of the pavement on Windsor Avenue. New rails and roadbed will be laid. The expenditure will approximate $75,000.

Eureka (Calif.) Street Railway has materially improved its roadbed since January of this year. The rails have been straightened out, new ties used and trolley wires replaced. The cars have been remodeled and rebuilt and a new rotary converter has been installed.

Fresno (Cal.) Traction Company will likely begin work on its $85,000 extension program on Oct. 1. E. A. Devereux recently announced the arrival of ten car loads of rail and a large quantity of ties to complete the extension of Adlington Heights and the Fresno Avenue extension.

Columbus, Delaware & Marion Electric Company, Marion, Ohio, may build a new belt line in Marion. It became known that the company bought a right-of-way 20 ft. wide in Uhler Road in Vernon Heights addition. In case the company builds a belt line the Center Street line will be used as a feeder, it is said.

Pacific Electric Railway, Los Angeles, Cal., was authorized by the California Railroad Commission to construct three tracks at grade across Pico Avenue and the Southern Pacific Company to relocate its railroad track across Pico Avenue in Long Beach. The changes follow a relocation of the industrial district of Long Beach.

Dallas-Terrell. — Extension of the Dallas-Terrell line of the Texas Interurban Company, to Mineola and Tyler which is expected to be placed in operation before the end of 1922, is being sought by commercial interests of these and other East Texas cities and towns. The matter has been placed before the officials of the companies interested in building the new interurban line.

Groton & Stonington Street Railway, Groton, Conn., has completed negotiations with the state highway department of Connecticut for the purchase of 1,800 ft. of trackage over the Thames River at New London, Conn., including the approaches on both sides of the bridge. The highway department when the bridge was built two years ago, laid the tracks over the bridge since at that time none of the street railways were in a financial condition to pay the expense of construction. State Highway Commissioner Bennett has agreed to sell the trackage for the sum which it originally cost the state, $3,800. The full amount will be paid the State before the trolleys begin to operate over the bridge.

Power Houses, Shops and Buildings

Savannah Electric & Power Company, Savannah, Ga., has recently completed repairs on the two steel stacks of the Indian Street power plant.

Springfield (Mass.) Street Railway has offered to pay $3,000 toward the cost of building a cement bridge at Frog Hole, in Westfield, Mass., the bridge being on the company's route between the two cities. The bridge is to be 30 ft. wide and will cost $30,000.

Trade Notes

Globe Railway Equipment Company, St. Louis, Mo., has been incorporated with a capital stock of 20,000 shares of no par value to manufacture and deal in railway machinery, equipment, devices and all articles pertaining to railway lines.

G. P. Atkinson, who has been associated with the Weston Electrical Instrument Company for the past six years, will also represent the Ward Leonard Electric Company in the Atlanta district. Mr. Atkinson has established an office in the Atlanta Trust Building, Atlanta, Ga.

Rail Welding & Building Company, Cleveland, Ohio, announces the addition to its staff as sales engineer of L. R. Berkeley, E. E. of Cornell University, who has been associated for a number of years with the sales and engineering departments of the National Carbon Company. Mr. Berkeley will cover the territory of western Pennsylvania, Ohio, Indiana, Kentucky, and Michigan. He replaces A. C. Sullivan, resigned.

L. D. Miller, Stamford, Conn., formerly Eastern representative International Motor Company, has made public plans which he is prepared to carry out for the leasing of buses to electric railway companies. Under this plan, the lessor supplies all service, including driver, gasoline, oil, repairs and public liability insurance for a limited period at a price determined by the mileage operated. It is expected, however, that this price will be approximately 30 cents per bus-mile.

New Advertising Literature

R. D. Nuttall Company, Pittsburgh, Pa., has issued Bulletin No. 32 giving thirteen important points of the Nuttall Form 13-E Trolley Base.

Erie Electrical Equipment Company, Johnstown, Pa., has issued a new catalog of fittings and other construction devices. A large number of special fittings have been developed by this company which are of particular value for construction of outdoor substations and automatic substations.

Brown, Boveri & Company, Baden, Switzerland, have issued a well-illustrated 100-page bulletin giving descriptions of the manufacturing plants and of the products of the company. A large section is devoted to electric traction on main line and interurban railways, in the development of which this company has played an important part.

Crouse-Hinds Company, Syracuse, N. Y., has issued a complete and attractively bound book on Condulets. The Catalog known as No. 2000 containing 713 pages has been carefully compiled to show in a comprehensive manner the various devices manufactured by the company for use in conduit installations and known under the trade name "condulets." The catalog is replete with illustrations.

ELECTRIC RAILWAY JOURNAL

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Chicago Transportation Experience

This Issue—Its Aim

CUSTOM has led to the expectancy in the electric railway field that this issue of *Electric Railway Journal* would be devoted to the Chicago traction properties as Chicago is the convention city this year. The theme of the annual convention souvenir number has usually been a comprehensive description of the railways centering in the convention city, except when this was Atlantic City. A departure from the usual theme, however, seemed advisable and desirable this year, for several reasons.

In 1912 such an issue was prepared on Chicago, that being the date of the last Chicago convention. In the ten years since then the changes in the physical properties of the elevated and surface lines in Chicago have been comparatively of small proportions or importance on account of unfavorable political circumstances, and what additions have been made have been thoroughly treated in this paper as they occurred. Furthermore, in 1912 there had been under way for the previous five years a comprehensive rehabilitation of the surface lines with the adoption of certain standards of construction and design in nearly all phases of the physical construction and equipment of the surface properties. These subsequent ten years have thoroughly tested out the designs installed and have developed the defects and the strong features. Here, then, was the theme about Chicago of greatest interest and value to the men of the industry generally: What has been Chicago's experience with the kind of construction and equipment in use there under the extremely heavy traffic conditions?

The aim of this issue has been to answer that question, and to point out the successive developments made in design and construction as dictated by the experience with the previous designs. This theme of operating experience was applied also to the articles requested from the members of the elevated organization, with equally interesting and instructive results as regards rapid transit.

Again, the Chicago-Milwaukee electric railroad has had an experience in these last six years in building up an interurban system which is probably without parallel in the annals of the business. This organization has also had much experience in what is required of the various elements of the physical property of a high-speed heavy traction line. The experience along these lines is ably represented in the articles by North Shore officials which follow. They will prove of great interest and suggestive value to other interurban men.

Street railway, rapid transit and interurban operating experience, as known to these three outstanding companies of the industry, are therefore treated in the following pages. It is only regretted that twice as many pages could not be devoted to these Chicago companies, for the wealth of their experience has been by no means exhausted.

The Convention City as a Center for Transportation Study

THE annual convention of the American Electric Railway Association in Chicago this October will bring to that great central city several thousand electric railway executives, engineers and operating men. These men will come with minds open to new methods or ideas about the conduct of their business. The convention meetings and the exhibits will doubtless supply much food for reflection. But this is not all. Attendance in Chicago affords an opportunity for first-hand observation and study of the several classes of electric railroading such as is available in no other city. Here are the largest street railway system in the world with all its ramifications; the very small but well-equipped and operated street railway company in Evanston; the 190-mile system of rapid transit elevated railways; five important radiating interurban lines, including third rail and trolley, plain span and catenary, 600 volts d.c. and 6,600 volts single phase, special and M.C.B. equipment; two strictly suburban electric railways, and an electric underground freight subway. Then if the electric railway man chooses to look beyond the scope of his immediate kind of transportation service, there is in Chicago the largest and most conspicuously successful taxicab company in the world, and one well-established, successful, large motor bus company and several smaller ones.

The average railroad man can get a lesson out of the remarkable precision with which the elevated trains may be observed to conform to the schedule. There are reasons fundamental behind such service, of course, and one might spend many hours most profitably in searching into the inspection and maintenance methods in the shops, in the way department and the electrical department, for the detailed explanation. When it is considered that a considerable part of the elevated equipment is very old, this service performance reputation is only the more notable. It is made possible only through a systematic and rigid system of maintenance—unstinted

HAROLD V. BOZELL, Consulting Editor HENRY W. BLAKE, Editor HARRY L. BROWN, Managing Editor
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maintenance. But the schemes evolved and equipment adopted to lessen the cost of such maintenance may be of greatest interest, for much has been done in this direction and the elevated men are able and ready to tell about it when asked. Another matter that should not be overlooked is the recent introduction by the Elevated of the use of the pass. This is an innovation in selling transportation that has not been in use in Chicago sufficiently long to afford any real criterion as to what it may or may not do to increase elevated patronage, but there are some points in connection with the physical application of the plan that can be observed on the spot.

As to the surface lines, the extent of the system is so great and the problems involved are of such magnitude that there is plenty to arouse the keen interest of street railway operating men and to expand their imaginations in trying to grasp the vast ramifications of a system which carries 750,000,000 revenue passengers a year. In fact, to comprehend the full meaning of any proposed important change has been one of the great difficulties, almost impossibilities, on the part of the management or of experts called in, a circumstance which has developed in the company a high degree of conservatism in considering innovations in equipment or operating practice.

One may observe as much data as to wear and life of elements of street railway property in one day in Chicago as could be gained in a month in the average city, so heavy are the mileage and vehicular traffic and so severe the operating schedules. It is a common remark of many who know Chicago street car service that there are only two points on the controller—on and off. This is an exaggeration, of course, but it does characterize about how rapidly the motormen accelerate their cars. The controller is also kept right against the post during the running period and the rate of stop is as fast as the acceleration. A motorman from another city visiting Chicago and riding on the front end expressed his idea of the speed in this characteristic way: "This ain't streetcarin'; this is railroadin'." This is a rather extended discourse on "Chicago's speed," but the point of it is that the almost complete absence of "loafing along" of cars, the feeling the passenger gets of being hurried to his destination, and the close headway, probably have a great deal to do with the ability to secure the enormous business of 278 annual revenue rides per capita in a territory where both elevated railroads and buses are also important transportation factors.

For men of all departments of the street railway, there is in Chicago an opportunity to spend with greatest profit all the time that can be spared to study the working tools and practices of the Chicago Surface Lines.

The third road to which it is desired to direct particular attention is the Chicago, North Shore & Milwaukee Railroad. There are several well-operated and interesting interurban properties entering Chicago which are well worth inspection and study. But one who is interested in high-speed intercity electric railroading can scarcely discuss the North Shore Line without becoming enthusiastic. What may be learned here from first-hand observation can be gleaned perhaps from the articles herein published. The editors of this paper feel that any interurban railway man attending the convention who goes home without having ridden over the North Shore Line to Milwaukee and back will do himself and his company a great injustice.

Chicago Men Respond Generously

AT A great sacrifice of time and effort, the Chicago railway men whose names are signed to the articles in this issue have responded to the request and plan of the editors to write articles setting forth certain aspects of their experience for use at this particular time. The summer for these men has been one of greatest stress, for the burdens of handling a strike have been imposed on top of the pressure of an exceedingly heavy program of new operating methods and betterments. And heaped on top of this have been the many details of arranging for the convention, much of which has devolved upon them. Nevertheless, time has been found to produce their part of Chicago's issue of the *Journal*, though several have expressed disappointment that they had been unable to make their articles all that they would wish them to be.

This generous response to the *Journal* only bespeaks the broad interest of these men in giving freely of their time, energy and experience toward the general advancement of the art. The Chicago men have much to give in the way of experience, for in their methods and in the magnitude of their properties and traffic, they are among the leaders in the traction business. Yet these men are keen to learn and take advantage of any better ways and means found by any other companies. This accounts for their willingness and desire to reciprocate by contributing to this special issue for whatever help it may be in the common good.

Safety a Most Prominent Topic at This Convention

SOME ten years ago a writer in one of the popular magazines referred to the fact that at the previous convention of the American Electric Railway Association there was no paper on safety. Such a comment cannot be made on this convention. The Transportation & Traffic Association has a committee on safety which will render a report, but this is not all by any means. In fact, the subject of safety is by all odds the most prominent one on this year's program. In the first place, the convention of the Claims Association will be given up largely to discussions of various phases of safety. In addition there will be a safety address at each meeting of each of the other affiliated associations by a representative of the Transportation & Traffic Association. Finally there will be a safety exhibit of commendable magnitude among the other exhibits at the convention. The forerunner of this exhibit was that made by this year's safety committee at the midyear meeting at Indianapolis. This exhibit attracted so much attention that the one in Chicago, which is toward the end of the Pier, is certain to be most valuable. It is being prepared on the basis of showing what safety means and what must be done to provide it. The motto of this year's work might well have been "Safety Again and Always."

Another departure in the program of the Transportation & Traffic Association this year is in the adoption of a "round-table" discussion, the subject in this case being interurban problems. Of course many other topics on the program concern directly or indirectly interurban electric railways, but on this particular afternoon a definite time has been set apart for the interurbans. There should be a full attendance at this meeting.

Carrying a Billion Passengers a Year in Chicago

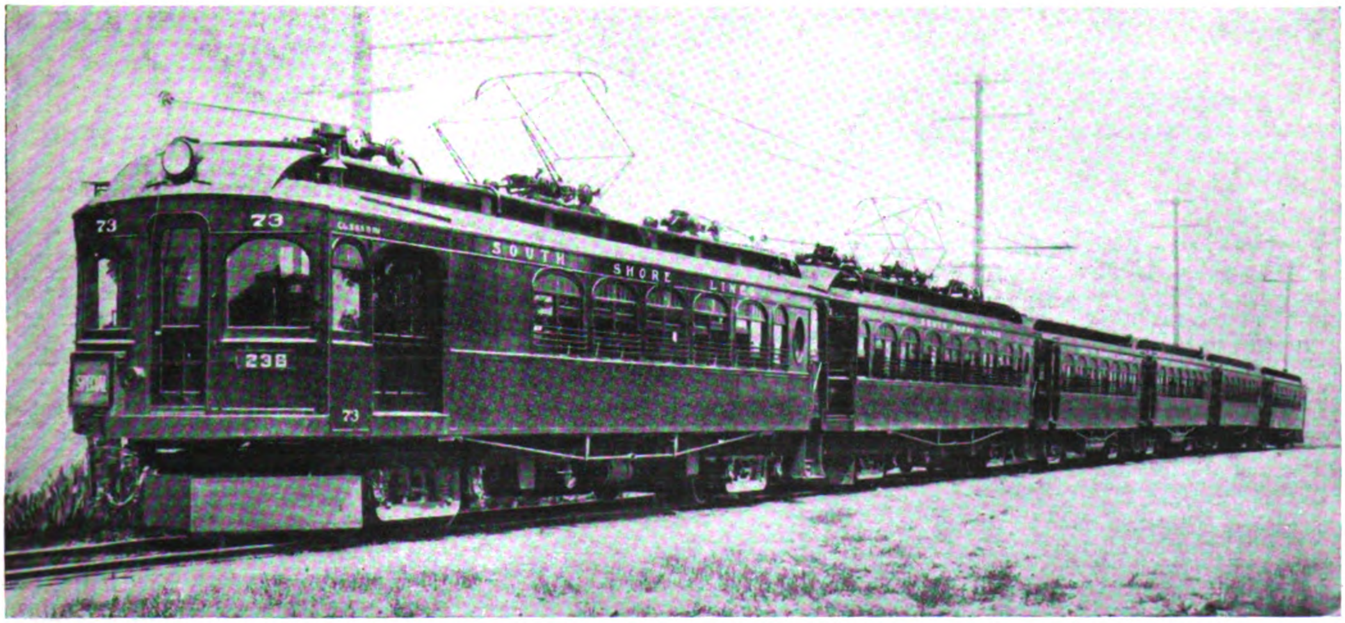
OF THE LOCAL and suburban riding, the elevated and surface lines carry 90 per cent, with the steam roads the next largest factor. The several railway companies supplying these services are characterized and the tendencies in their traffic cited

DURING the year 1921 Chicago and environs supplied a passenger traffic to all the local and suburban transportation agencies of well over one billion revenue passengers. In this business of supplying services equivalent to the gigantic task of handling the entire population of the United States ten times over in a year, the Chicago Surface Lines stands out predominantly with its enormous traffic of more than 750,000,000 revenue passengers. The Chicago Elevated Railroads come next with a service which was used by well over 180,000,000 passengers. These two local companies handled more than 90 per cent of the billion rides required by the public in Chicago and adjacent territory. Despite these huge totals of the local railways, it is rather startling to note that even with the very excellent service rendered at extremely low rates by these local railways, 14,250,322 persons bought the comparatively high-rate special personal transportation afforded by the Yellow Cab Company, and that probably an equal number used other taxicabs, or a total of perhaps 30,000,000 taxicab riders in 1921 in Chicago—twelve taxicab rides per capita per year.

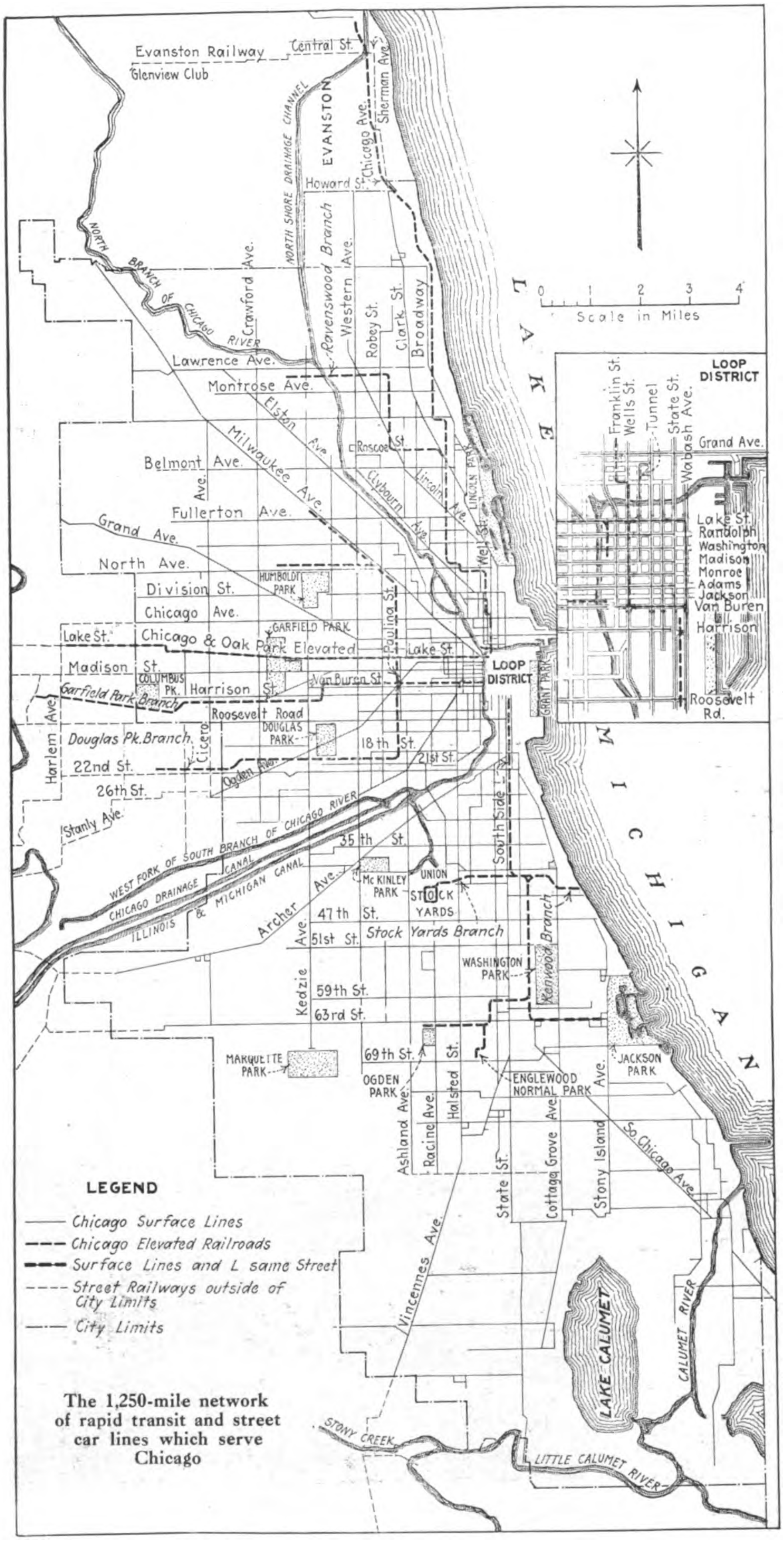
Motor bus lines, principally the Chicago Motor Bus Company, operated by a former street railway man, carried another 8,500,000 passengers. While this is a comparatively new branch of the local transportation services, the traffic available for hauling in buses is increasing at a remarkable rate, and another ten years may easily see this class of traffic climb up into totals perhaps nearing those of the elevated lines. The electric and steam lines serving the suburban riders enjoyed a business numbering more than 100,000,000 passengers, of which the larger share was carried by the steam railroads, as noted in detail in the accompanying table.

The rush-hour condition in Chicago presents the usual difficulties met with in all large cities, but it is especially acute on the elevated system, on which about 65 per cent of the twenty-four-hour traffic is hauled between 6 and 9 a.m. and 4 and 7 p.m. Some of the surface lines have an equally excessive proportion of rush-hour travel, particularly those serving the manufacturing and Loop districts, the entire surface lines system carrying 53 per cent during the above mentioned rush hours. Of the twenty-four-hour total surface lines revenue and transfer traffic, the rides between 7 and 8 a.m. represent about 16.5 per cent, and those between 5 and 6 p.m. around 18.3 per cent. Between 250,000 and 300,000 rush-hour passengers are carried into the Loop in the morning and out in the evening on the surface lines.

Unfortunately for all concerned,



Limited train on the Chicago, Lake Shore & South Bend single-phase railway passing through the sand dunes at the foot of Lake Michigan the elevated is handicapped by a limitation of track capacity in the Loop, for which the remedy is plain but it seems quite remote of execution. Thirteen main-line rapid transit tracks converge into a two-track loop in the center of the city. The track capacity of the loop therefore largely determines the capacity to haul passengers in the rush hours.


Evanston Railway
Central St.
Glenview Club
EVANSTON
NORTH SHORE DRAINAGE CHANNEL
Chicago Ave.
Sherman Ave.
Howard St.
NORTH BRANCH OF CHICAGO RIVER
Crawford Ave.
Ravenswood Branch
Western Ave.
Robey St.
Clark St.
Broadway
0 1 2 3 4
Scale in Miles
LAKE MICHIGAN
Lawrence Ave.
Montrose Ave.
Elston Ave.
Milwaukee Ave.
Roscoe St.
Belmont Ave.
Clybourn Ave.
Lincoln Ave.
Lincoln Park
Fullerton Ave.
Grand Ave.
North Ave.
Division St.
Humboldt Park
Chicago Ave.
Garfield Park
Lake St.
Chicago & Oak Park Elevated
Paulina St.
Wells St.
Madison St.
Columbus Pk.
Harrison St.
Van Buren St.
Loop District
Grant Park
Garfield Park Branch
Roosevelt Road
Douglas Park
Harlem Ave.
Douglas Pk. Branch
Cicero
18th St.
22nd St.
21st St.
Ogden Ave.
26th St.
Stanly Ave.
South Side L
West Fork of South Branch of Chicago River
35th St.
Chicago Drainage Canal
Illinois & Michigan Canal
Archer Ave.
McKinley Park
Union Stock Yards
47th St.
51st St.
Stock Yards Branch
Kedzie Ave.
Washington Park
Kenwood Branch
59th St.
63rd St.
Marquette Park
69th St.
Ogden Park
Englewood Normal Park
Jackson Park
Ashland Ave.
Racine Ave.
Halsted St.
State St.
Cottage Grove Ave.
Stony Island Ave.
So. Chicago Ave.
Vincennes Ave.
Lake Calumet
Calumet River
Stony Creek
Little Calumet River
Loop District
Franklin St.
Wells St.
Tunnel
State St.
Wabash Ave.
Grand Ave.
Lake St.
Randolph
Washington
Madison
Monroe
Adams
Jackson
Van Buren
Harrison
Roosevelt Rd.
LEGEND
Chicago Surface Lines
Chicago Elevated Railroads
Surface Lines and L same Street
Street Railways outside of City Limits
City Limits

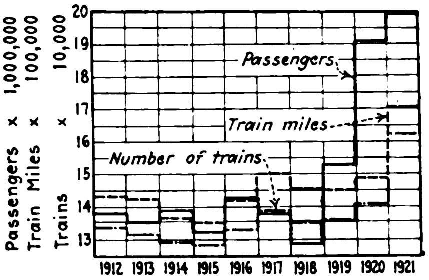
The 1,250-mile network of rapid transit and street car lines which serve Chicago

REVENUE PASSENGERS CARRIED DURING 1921 BY URBAN, INTERURBAN AND SUBURBAN SYSTEMS OF CHICAGO

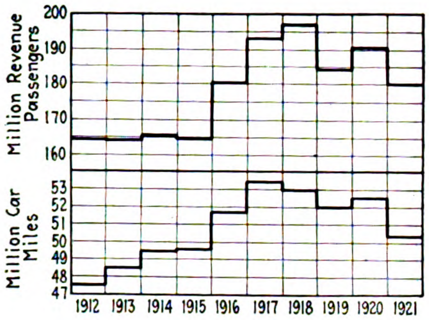
Urban electric:	
Chicago Surface Lines.....	750,515,622
Chicago Elevated Railroads.	180,629,282
	931,144,904
Urban bus and taxi:	
Chicago Motor Bus Co....	7,774,953
Depot Motor Bus Line.....	653,406
Yellow Cab Co............	14,250,322
All other taxi companies....	*14,000,000
	36,678,681
Interurban electric:	
Chicago, North Shore & Milwaukee R.R.	11,944,126
Chicago, Aurora & Elgin R.R.	7,631,528
Chicago & Interurban Traction Co.	2,644,447
Hammond, Whiting & East Chicago Ry.	8,529,706
Chicago & Joliet Electric Ry.	2,813,979
Chicago, Lake Shore & South Bend Ry.	2,429,661
Chicago & West Towns Ry..	13,750,010
	49,733,457
Suburban steam:	
Illinois Central R.R........	19,865,466
Chicago & Northwestern Ry.	20,428,531
Chicago, Burlington & Quincy R.R.	11,274,841
Chicago, Rock Island & Pacific R.R.	7,249,115
Other steam roads........	*7,000,000
	65,817,953
Grand total	1,083,384,995

*Estimated.

Several plans for the improvement of Chicago's local transportation conditions have been made and reports submitted by various engineers and commissions since the Chicago traction properties were given special attention in the Convention Issue of *Electric Railway Journal* when the convention was held in Chicago in 1912. The population of Chicago during this ten-year period has increased from 2,185,000 to 2,700,000, or about 23½ per cent. But its transportation facilities have remained substantially the same, that is, the additional traffic resulting from larger population has been taken care of by the individual expansion of the surface and rapid transit systems. In neither case has the increased capacity been obtained by a material addition to trackage, but almost entirely by the improved operating efficiency and by the addition of more rolling stock. During the period in question the revenue

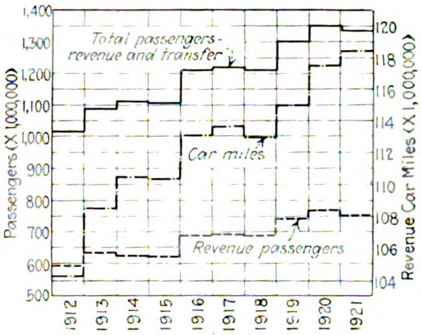


Ten-year chart of suburban traffic on the Illinois Central Railroad



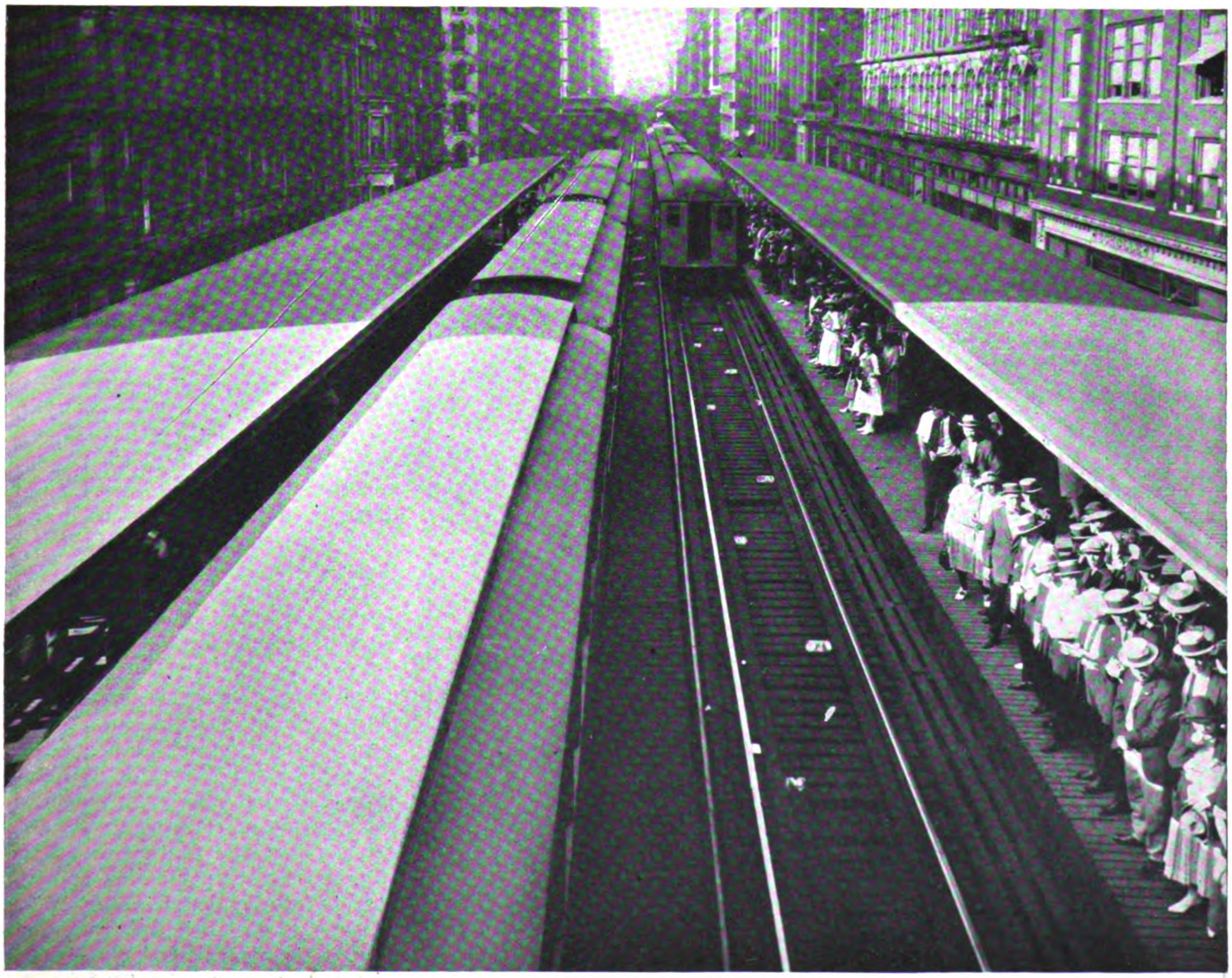
Ten-year trend of traffic on the Chicago Elevated Lines

track mileage of the Chicago Surface Lines has been increased from 884 miles to 990 miles. The trackage of the elevated lines is essentially the same as it was ten years ago. During 1921 the revenue passenger traffic of the Chicago Surface Lines amounted to about 750,000,000 and that of the Chicago Elevated Railroads to approximately 180,000,000. For 1912 these two figures were respectively 594,000,000 and 164,000,000. Thus surface travel shows an increase of 24.6 per cent and elevated traffic slightly less than 10 per cent. It is seen, then, that surface car riding has tended to keep pace with the city's growth, while rapid transit riding has built up at a slower rate. The ratio of the number of revenue passengers on the surface lines to the number on elevated lines has risen from 3.6 to 4.2 over the past ten years. The per capita riding on the surface lines is now 268, which is six more than in 1912. The number of elevated rides annually per capita has decreased from 75 to 64.3 in the same period.



Ten-year traffic chart for the Chicago Surface Lines

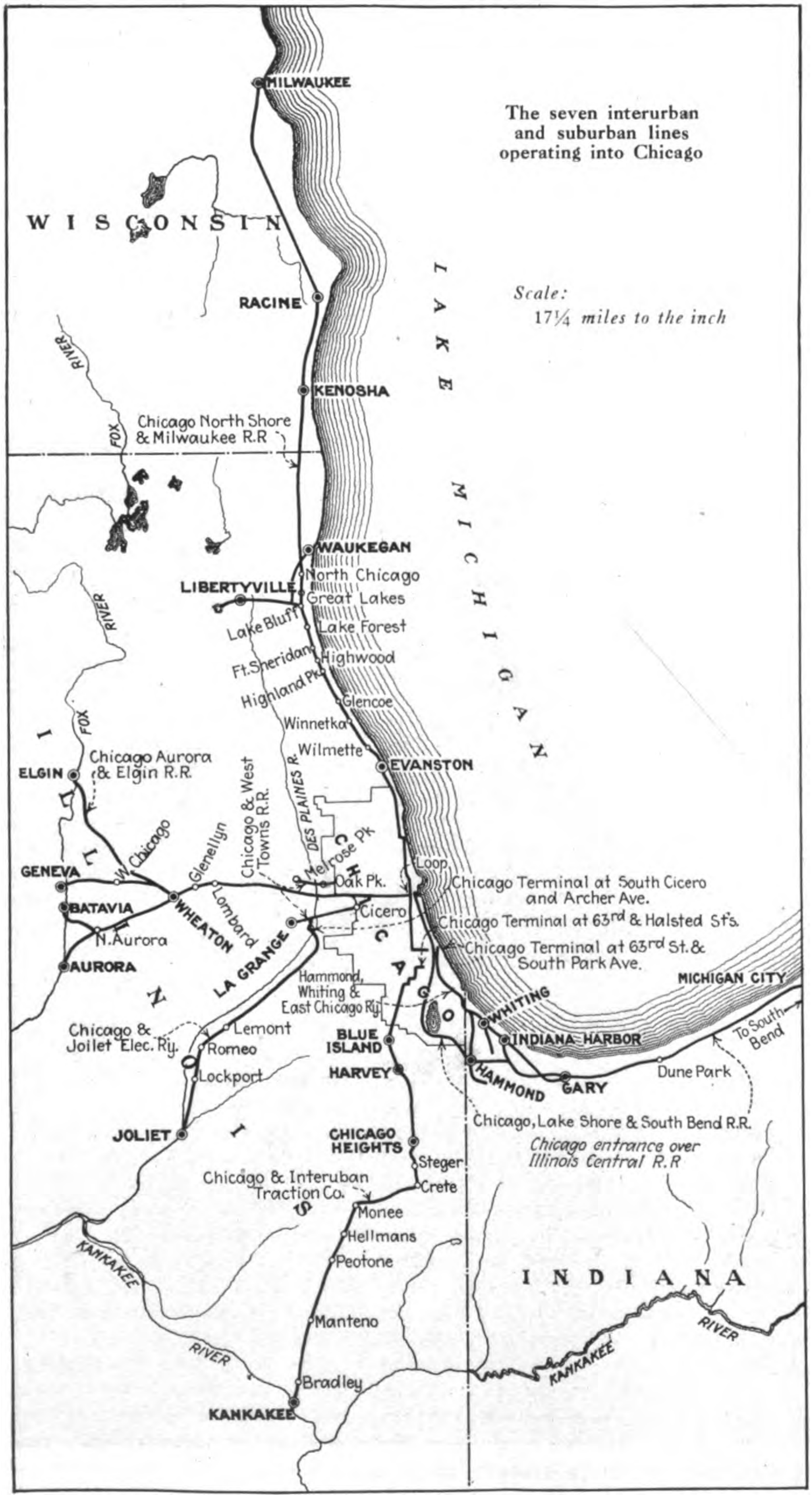
It is probably a fair statement that the Chicago Surface Lines represents the highest development of surface street railway service known to the industry. It is of particular interest and importance not only because of its place as the largest system of its kind in the world, but because of the speed and general excellence of the physical property and the service. This system comprises 1,060 miles of single track, forming a network of street car lines running in general either north and south or east and west with a few diagonal lines intersecting the rectangulr system, which rather completely covers the 199 square miles area of the city. The diagonal lines and a large proportion of the north and south and east and west lines pass through or terminate in what is known as the "Loop District." On all of these surface lines a transfer is allowed at practically every intersection, which results in an annual interchange of



At Adams and Wabash Station of the Elevated early in the evening rush hour over one-half billion passengers at some 575 transfer points.

At the present time the Chicago Surface Lines carry on an average week day about 2,200,000 revenue passengers and about 1,700,000 transfer passengers. There is a 7-cent fare with three tickets for 20 cents. The universal transferring privilege prevails with one, two or more transfers allowed a passenger as long as he travels in the same general direction. This universal transfer system has developed an average haul on the surface lines which is longer than for similar systems elsewhere. The average length of ride per fare of a surface car passenger is about 4.16 miles.

One of the operating features of the surface lines is the high average speed, which in some cases approaches rapid transit running time. In fact, the system average schedule speed, excluding layovers, is probably higher in Chicago than in any other city. This Chicago average speed is 10.64 m.p.h. On some of the outlying lines schedule speeds reach as high as 15 m.p.h., so that now many passengers using the surface lines virtually receive rapid transit service. The reason for the high speeds is partly the wide streets through which many of the cars run, but principally because of the good physical condition of the roadway and rolling stock, the ability of the cars to accelerate and retard at high rates, and the training of the men to make high speed. Owing to the large amount of special trackwork, about 10 per cent of the total mileage, a variety of routings are obtained which permit great flexibility in operation.


The seven interurban and suburban lines operating into Chicago

Scale: 17¼ miles to the inch

MILWAUKEE
WISCONSIN
RACINE
RIVER
FOX
KENOSHA
Chicago North Shore & Milwaukee R.R.
LAKE MICHIGAN
WAUKEGAN
North Chicago
Great Lakes
LIBERTYVILLE
Lake Bluff
Lake Forest
Ft. Sheridan
Highwood
Highland Pk.
Glencoe
Winnetka
Wilmette
EVANSTON
ILLINOIS
Chicago Aurora & Elgin R.R.
ELGIN
Chicago & West Towns R.R.
DES PLAINES R.
Glenellyn
W. Chicago
Melrose Pk.
CHICAGO
GENEVA
BATAVIA
N. Aurora
AURORA
WHEATON
Lombard
Oak Pk.
Loop
Cicero
LA GRANGE
Chicago Terminal at South Cicero and Archer Ave.
Chicago Terminal at 63rd & Halsted Sts.
Chicago Terminal at 63rd St. & South Park Ave.
Hammond, Whiting & East Chicago Ry.
MICHIGAN CITY
WHITING
INDIANA HARBOR
To South Bend
Chicago & Joliet Elec. Ry.
Lemont
Romeo
Lockport
BLUE ISLAND
HARVEY
HAMMOND
GARY
Dune Park
Chicago, Lake Shore & South Bend R.R.
Chicago entrance over Illinois Central R.R.
JOLIET
CHICAGO HEIGHTS
Steger
Crete
Chicago & Interuban Traction Co.
Monee
Hellmans
Peotone
KANKAKEE RIVER
INDIANA
Manteno
Bradley
KANKAKEE

The lowest speeds are reached naturally in the congested Loop district. Even so, the average speed through the Loop from 4:30 until 10:30 p.m. is 6.24 m.p.h. Speeds in the Loop are lowest between 4:30 and 5 p.m., when the average is 4.83 m.p.h., but after much of the trucking has been withdrawn from the streets the speed rapidly rises to 5.57 as an average between 5:30 and 6 p.m. For the following half hour the average Loop speed is slightly more than 7 m.p.h.

ELEVATED LINES PROGRESS UNDER SEVERE COMPETITION

Perhaps the most notable things about the Chicago Elevated Railroads are the substantial progress made in amount of traffic handled and the high quality of service rendered in spite of the severe limitations imposed by the two-track loop in the center of the business district. Furthermore, the excellence of the service on the surface lines had made of them a formidable competitor for the "L," particularly on account of the immensely better availability of the surface lines for so large a proportion of the population.

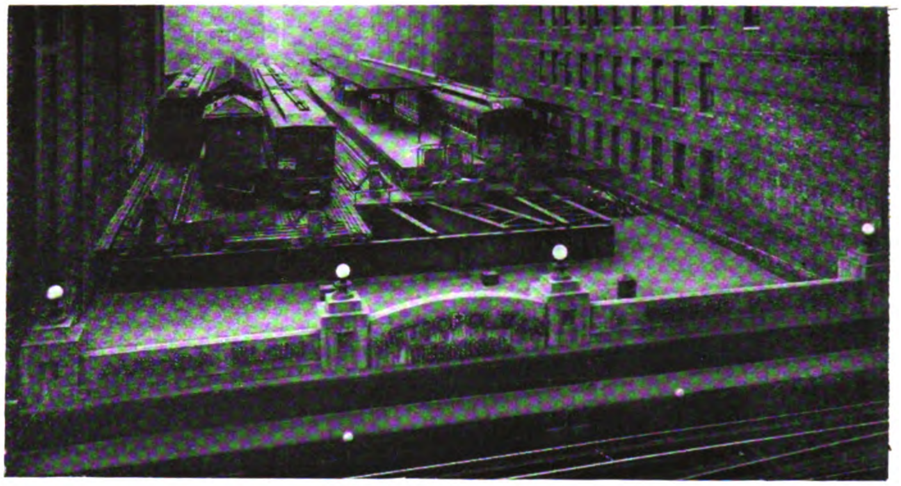
The Chicago Elevated Railroads consist of four originally independent systems of elevated lines. One extends into the south side of the city, another the north side, and two operate into the districts west of the Chicago River. All, however, converge in the central business district, where they operate jointly over the two-track elevated structure known as the Union Loop, and from which Chicago's downtown section derives its reference—"in the Loop."

The consolidated elevated system offers through one-fare service north and south by trains running directly through the Loop district. By means of bridges over the tracks, free transfer privileges afford a one-fare service between the west, north and south sides of the city. Prior to 1911 the elevated railroads of Chicago were operated by different managements. During 1911 the operating unification of all of the elevated railroads was brought about by placing them under one management. In 1913 the through routing from north to south and the transfer privileges between the different roads were instituted. The elevated lines now comprise 197 miles of single track, with more than 200 stations located in general at intervals of about one-third mile. An express service is given on portions of the lines by third and fourth tracks and by a system of skipping stations on some of the two-track lines.

The condition therefore now exists that all of the surface lines and all of the elevated lines have, respectively, been unified with a single fare and universal transfer privilege on either system. Between Wilmette and Jackson Park, a distance of 23 miles, a passenger may ride on the elevated without changing cars for a fare of 13 cents. On the surface lines the longest ride without transfer is 20 miles, while a person may ride in a forward direction by transferring a distance of nearly 33 miles.

One of the most noticeable characteristics of the traffic curve for the elevated lines is the decided slump in riding since 1918. With the increases in fares that came to both the surface and elevated lines in 1919 the differential between them was also increased. In that year there was a sharp decline in traffic on the elevated and more than a corresponding increase on the surface lines. Normalcy in this respect has not yet been reached because the 1 cent fare cut on the Chicago Surface Lines in June, 1922, again widened the gap between the two fares. The type of rider who has been lost by the elevated is of the profitable, short-haul variety. This has meant that the average length of haul on the elevated has increased year by year until now it is approximately 6.75 miles.

In spite of these handicaps the elevated has maintained a very high standard of service and practiced all economies that were possible without a detriment to the service. The continuity and reliability of its service are particularly notable when it is remembered that the only modern equipment in use on the elevated consists of 250 steel cars, of which 184 are motor cars and sixty-six are trailers. The addition of this equipment, which was placed in operation on Jan. 1, 1915, increased the carrying capacity of the roads approximately 24 per cent. To keep the average speeds as high as possible with the older equipments it has been necessary to increase their rate of acceleration to the limit of the motor endurance. In doing this, motors operate continuously at temperatures as high as 275 deg. F., and even so, motor failures are extremely rare occurrences. Delays from power interruptions are practically unknown.



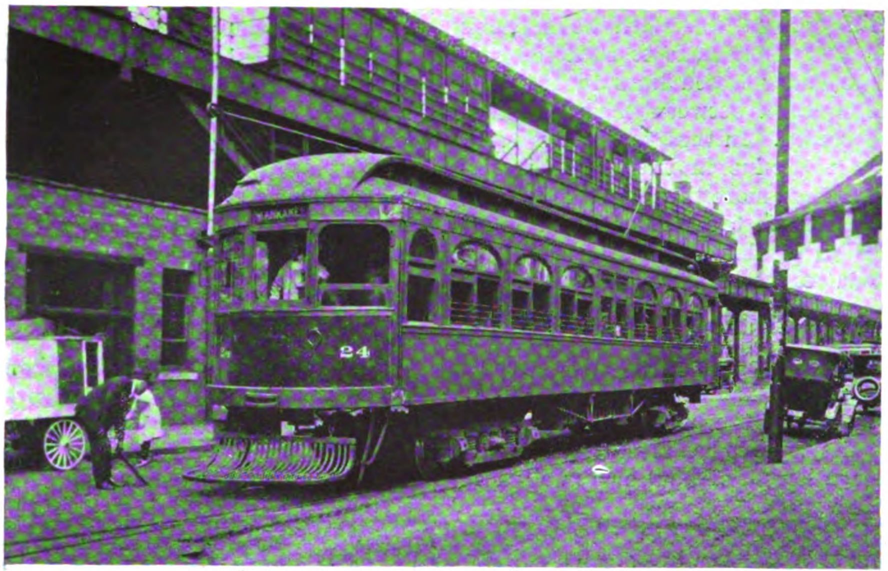
Chicago Loop Terminal of Chicago, Aurora & Elgin Railroad

Modern steel car train of Chicago "L" at a Loop transfer station

INTERURBAN LINES ENTERING CHICAGO

The suburban and interurban electric lines entering Chicago are not as numerous as in some other Mid-Western cities. In all there are seven interurban and suburban electric lines that either enter Chicago or connect near the city limits with either the surface or elevated systems. Only three of these give service directly into the Loop district. The Chicago, North Shore & Milwaukee Railroad, which formerly came only to Evanston, now operates over the tracks of the Northwestern Elevated through the Loop and as far south as Sixty-third Street and South Park Avenue on the south side. The Chicago, Aurora & Elgin Railroad enters the Loop over the Garfield Park branch of the Metropolitan West Side Elevated Railroad. Through an operating agreement with the Illinois Central Railroad the Chicago, Lake Shore & South Bend Railroad, which runs to Hammond, Gary, Michigan City and South Bend, operates trains into the suburban stations of the Illinois Central Railroad, adjacent to the Loop along Michigan Avenue.

Connecting with the surface lines on the southwest side of the city is the Chicago & Joliet Electric Railway, which operates high-speed interurban service into Joliet on an



Chicago & Interurban Traction Company car at terminal connection with Chicago "L"

hourly schedule. In that section also is one line of the Chicago & West Towns Railway, connecting Cicero with La Grange. This company operates another line from Oak Park to Melrose Park. A line to Kankakee, Ill., starting from Sixty-third and Halsted Streets on the south side is operated by the Chicago & Interurban Traction Company. The Hammond, Whiting & East Chicago Railway is a suburban system which extends from Sixty-third Street and South Park Avenue, Chicago, to Hammond, Whiting and East Chicago, Ind. This is operated by the Chicago Surface Lines. All of these lines to the outlying districts have helped materially to build up the suburban communities served. They are all shown in accompanying maps.

DATA ON THE FOUR STEAM ROADS HANDLING THE LARGEST CHICAGO SUBURBAN TRAFFIC, 1921

	Passengers	Train Miles	Avg. Number Cars Per Train	Avg. Length of Ride
Illinois Central	19,865,466	1,709,558	..	8.4
Chicago & Northwestern	20,428,531	1,836,417	7.75	15
Chicago, Rock Island & Pacific	7,249,115	550,000	7	13.3
Chicago, Burlington & Quincy	11,274,841	593,069	6.5	16.3

The total steam suburban service into and out of Chicago amounts to nearly 60,000,000 passengers annually. It will be noticed that of the total, the Illinois Central carries nearly 20,000,000 passengers per year, while the traffic curve for the past ten years shows that the riding reached this figure after a phenomenal increase during the past three years.

The suburban service of the Chicago & Northwestern Railway, the Chicago, Burlington & Quincy Railroad, and the Chicago, Rock Island & Pacific Railway is perhaps more accurately speaking truly suburban, while that of the Illinois Central approaches closely rapid transit city transportation. The tracks of the first three roads mentioned pass through a large non-productive territory within the city limits, while the major part of the Illinois Central traffic is within the thirty-minute zone from Randolph Street. The suburban stations on the Illinois Central are scattered frequently along its right-of-way and the average length of ride is 8.4 miles, bringing the center of traffic near Jackson Park. The average length of ride on the three other roads is considerably greater.

The average number of passengers handled on a week day is about 73,500 and on Sundays it amounts to about 25,700 passengers. During an average week more than 2,000 trains are operated or about 320 to handle the normal week-day traffic.

On a normal business day the average number of passengers carried in and out of Chicago by the suburban trains of the Chicago & Northwestern Railway is approximately 60,000. To handle this business 166 trains are necessary.

The suburban business of the Chicago, Rock Island & Pacific Railway has also shown a steady increase year by year. Last year the suburban traffic amounted to approximately 22,000 passengers on an average week-day. The increase in street railway and elevated fares in Chicago several years ago diverted a large number of people to the Rock Island service and many of these have continued to be regular patrons of the steam line.

As an indication of the growth of the suburban traffic on the Chicago, Burlington & Quincy Railroad since 1913, it may be cited that the gross passenger revenue of that road in the Chicago suburban districts increased from $666,660 in 1913 to $1,143,425 in 1921, or an increase in round figures of 72 per cent. The total number of suburban passengers handled in 1921 was 11,274,841. The annual suburban train mileage, which in 1921 was about 593,000 train-miles, showed an increase of about 65,000 train-miles over 1918, or about 12 per cent. The average length of ride per passenger on the Burlington is 16.3 miles.

Trailers have greatly improved the rush-hour capacity of the Chicago Surface Lines

Dealing with the Labor Problem

By

BRITTON I. BUDD

President
Chicago Elevated Railroads
Chicago, North Shore & Milwaukee Railroad
Chicago & Interurban Traction Company

Mr. Budd snapped at a suburban North Shore station as a Limited train whizzed through

HOW to improve the human relationship between electric railroad companies and their employees, how to bring about a better understanding of the problems of the other by each side and how to secure greater co-operation for mutual benefit are questions transcending in importance any other in the industry today. It is a question which calls for the best thought of the executives who represent the companies and of the representatives of the employees.

The electric railway industry in recent years frequently has been referred to as a "sick" industry. This characterization had reference particularly to the financial side of the business. Costs of operation kept steadily mounting higher and higher, while net revenues fell lower and lower, with the result that a "sickness" developed to which many of the lines succumbed, while most of the others were reduced to a condition of weakness from which they have not yet recovered.

When the "sickness" became acute, a consultation of doctors was called to diagnose the case and, if possible, prescribe a remedy. The doctors agreed that the industry was being slowly starved to death through ignorance of the facts on the part of the public upon which the railroads depend for sustenance. Obviously, if the diagnosis was correct, the remedy was to give the public the facts, which was done through the Federal commission, created to conduct an inquiry and make known its findings and recommendations.

To continue the simile, are there not some symptoms of "sickness" in our industry in its relations with its employees? These symptoms may not be as widespread as were the financial symptoms, nor are they as easily discernible, but the outbreaks which we occasionally see prove that they are with us and call for a remedy.

THE editors of *Electric Railway Journal* felt that an issue devoted entirely to Chicago would fall short of its mission if it did not tell something of the experience of the Chicago companies in the foremost consideration of the business—employee relations—particularly when the operating forces of these railways number so many thousands. Mr. Budd was therefore asked to contribute an article on this subject, the notable success he has had along this line being well known. Much of the reason for the success or failure of relations between management and men is a matter of intangibles. Something about the management begets the confidence of the employees—or lack of that characteristic inspires suspicion and disrespect. In this article Mr. Budd gives some pertinent thoughts from his experience on the tangible phases of how to better employee relations. That there is also present in his relations with the men that intangible something which supplies the element of confidence necessary to make the tangible remedy effective can best be judged by riding on the Elevated Lines or the North Shore Line and observing the courtesies shown to passengers and the general manner in which duties are performed.

—Editors

Both forms of "sickness" to which I have referred have a common root. Both spring from ignorance of the actual conditions, from failure to see all sides of the problem, from a lack of correct information, which latter invariably leads to acceptance of misinformation and the drawing of wrong conclusions. The remedy applied in the first case, which resulted in at least a measure of relief, may be applied with equal success in the second place, and the companies are the doctors who must apply it.

In the age before the introduction of machinery in industry, and the resultant concentration of capital, there was no acute labor problem. The employer and the employee worked side by side. The human contact was ever present. The journeyman looked forward to the day when he would become a master. There was little room for misunder-

Under the complexities of our modern industrial system all that has been changed. The employer of today, at least in our industry, is not an individual but a corporation composed of hundreds or thousands of individuals, who may possess little or no knowledge of the business, and who have no interest, other than a financial one, in the enterprise. The human contact so necessary in the way of establishing and maintaining friendly relations is impossible when the owners of the property on the one hand and the employees who operate it on the other number in the thousands. A wide chasm has been opened between the owners and the employees out of which arise all the mists of misunderstanding which cloud the vision and destroy the mutual confidence which is so desirable.

How is that chasm to be bridged and the human contact and mutual confidence restored? Manifestly it must be done through chosen representatives from each side, meeting and discussing frankly the problems in which both are equally concerned. If we agree that most of our industrial troubles come from a lack of understanding of each other's problems, from inability to see the other's viewpoint, it follows that we can never remove the cause by remaining apart. Frank discussion across the table I have found to be the best method of removing misunderstanding. But such discussions must be frank and straightforward. The game must be played with all the cards on the table face up. When it is so played mutual confidence is established, and grievances, real or imaginary, which appeared so large when the conference began, gradually diminish in size and importance or disappear entirely.

In every large plant where thousands are employed it is inevitable that grievances of one kind or another will arise. Many of them may be trivial in character, but if they are allowed to accumulate, if they are ignored by the management, they will grow in size and importance in the eyes of the workers and eventually result in an explosion. The better way is to dispose of them as they come up. When employees know that they can bring a grievance to the management, with assurance that it will be given fair consideration and be decided on its merits, it has a wonderful effect on their attitude toward a company. They feel they are being given a square deal and that feeling is reflected in their spirit of loyalty.

Employees of a large corporation are, as a rule, totally ignorant of the financial side of its operation. This is not to be wondered at, because they have not been given an opportunity to learn anything about it. That phase usually has been considered as none of the business of the employees. I do not agree with that view. I believe it is to the interest of a company to let its employees know more of its financial affairs. There is nothing secret about the financial affairs of public service companies because they are under public regulation.

Employees are ready, even anxious, to be educated on subjects which are of vital interest to themselves and to the companies, if only they are given an opportunity. My contention throughout is that in order to remove misunderstanding we must have understanding. I know of no way in which this can be done except by letting the employees know the facts in open, frank discussion.

There is a general tendency grossly to exaggerate the earnings of every utility company, especially electric railways. Newspapers frequently print stories of the large profits being made by this company or that, without the slightest regard for the facts.

Such stories are read by employees among others and they form an idea that they are not receiving a fair share of the fruits of their labor. A spirit of hostility is engendered as they talk among themselves of the alleged profits, in which they do not share to the extent they think they should. Misconceptions of this kind could not arise were employees more familiar with the financial side of our operations.

DEFINITE PLAN TO TEACH FINANCIAL CONDITIONS

Some time ago in talking with a few of our employees I was amazed at the lack of knowledge they displayed with regard to the financial conditions existing on our properties. They were men, too, who might be expected to know more. As I thought over the matter the conclusion was forced upon me that the company was to blame rather than the employees, as it never had taken steps to educate them in that direction.

We now make provision for a depreciation of physical property. Why should not provision be made for human depreciation? The public would not, in my opinion, object to such a charge in the rate of fare to be paid for transportation service.

Out of that short conversation came an idea for educating the employees on the financial and business side of our operations. We looked around and selected Prof. Ralph E. Heilman, dean of the school of commerce of Northwestern University, to conduct a series of ten lectures on the subject. He is a man with a national reputation for such work and his years of experience as a teacher enable him to put his message across in plain and simple language, easily understood by the ordinary layman.

Notices were sent to all our men employed in a supervisory capacity of any kind, on the road, in the shops and general offices. They were offered an opportunity to attend these lectures at no expense to them, other than an evening's time once a month. While it was made known to them that their attendance would be gratifying to the management, there was nothing compulsory about it.

The result of this experiment was better than we expected, or even hoped for. Nearly three hundred men attended the opening lecture and an average of nearly two hundred attended the entire course. At the close of each lecture an hour was devoted to a general discussion of the subject, during which questions were asked and answered. The questions asked showed the interest the men took in the subject and how closely they had followed the speaker. Our idea was that if we could interest and instruct the men employed as foremen and superintendents, the information they received would be disseminated among others as occasion might arise.

We feel that our experiment in that direction was well worth while and we are considering ways and means of extending it. I make mention of this merely to show that employees are ready, even anxious, to be educated on subjects which are of vital interest to themselves and to the companies, if only they are given an opportunity. My contention throughout is that in order to remove misunderstanding we must have understanding. I know of no way in which this can be done except by letting the employees know the facts in open, frank discussion.

In my experience in dealing with committees representing the employees I have many times observed a complete change in their attitude after a full discussion in which all the facts and conditions were laid bare. It will not do to dismiss their demands with the short statement that they are impossible, although that may be the truth. They must be shown why it is impossible for a company to accede to their demands. If that is done in a perfectly frank manner, I have found that as a rule they are ready to listen to reason. That method may not always result in complete success, but it is always worth the effort, even though it occasionally fails.

PROVIDING FOR HUMAN DEPRECIATION

Sometimes I feel that there is something wrong fundamentally in our present methods of dealing with the labor problem in our industry. Even on properties where there is the closest contact between the management and the men, where the most harmonious relations obtain, there is something lacking.

It does not seem quite fair to me that an employee who has spent his life in the service of the public, for that is what it means in our industry, should be cast aside without any consideration when he becomes too old to perform his work efficiently. Provision should be made for setting aside a fund from earnings, if possible, to pay old-age pensions to faithful employees, and the setting up and maintaining of that fund should be accepted by regulative authorities as a legitimate expense of operation.

We now make provision for depreciation of physical property. Why should not provision be made for human depreciation? The public would not, in my opinion, object to such a charge in the rate to be paid for transportation service.

There is another weakness in our present system which I believe should be overcome and eventually will be. To bridge the chasm which now yawns wide between the owners of a corporation and the workers who operate the properties there should be co-partnership in the enterprise. The workers should be given an opportunity to share in whatever profits there may be through stock ownership. It should be made easy for them to acquire stock in the corporation for which they work and to give them a financial interest in the enterprise, wherever the earnings of the corporation are stable enough to insure dividends.

Such a plan would go far toward removing misunderstanding and increasing the loyalty of employees. It would furnish an incentive for greater economy and efficiency on their part, as they would feel that in some degree they were working for themselves. It would give them a better idea of some of the problems which confront those responsible for the management of the properties and would, in my opinion, result in benefit to the industry.

As long as we continue to view each other across the chasm as occupants of rival hostile camps, we are certain to have occasional outbreaks of hostilities. Even when the chasm has been bridged and the human contact has been established by emissaries under a flag of truce the result is more or less in the nature of a temporary expedient. The causes which lead to conflict still remain.

Stock ownership would be a long step in the direction of removing the cause of misunderstanding and of filling up the chasm. It is a subject which I believe deserves the most careful consideration of our industry.

How Car Design Has Progressed on Chicago's Rapid Transit Lines

By H. A. JOHNSON

Assistant to General Manager
Chicago Elevated Railroads

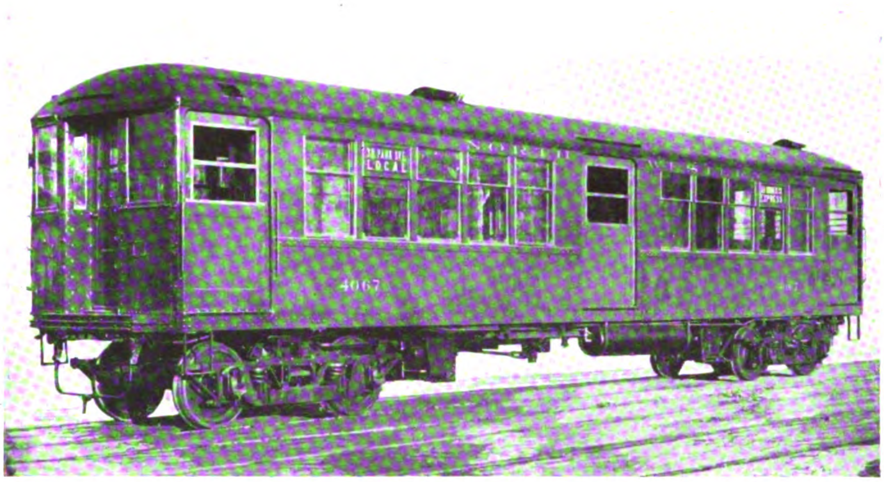
Developments in Body, Platform and Door Design, Seating Arrangement and Interior Appearance as Dictated by Experience and Study Are Brought Out--Comfort and Attractiveness to Be Features of Latest Cars—How Reliability and Lower Maintenance Costs Have Been Achieved Is Also Told

THE original elevated line in Chicago was placed in service in 1892. The structure and stations were designed and built to use a car of approximately the same size and dimensions as was then being used on the Manhattan Elevated Railroad in New York City. As additional elevated lines were built and as all of the elevated lines operated their cars around the Union Loop in the downtown section in Chicago, it was reasonable that the physical dimensions of the stations and structure clearances should be made practically the same, so that from the beginning of the system down to the present time the same length, width and height of the cars have been maintained.

The weight of the cars has been increased on account of the first ones being trail coaches operated by steam locomotives. The structure was designed sufficiently strong to support the weight of the steam locomotives and the coaches were comparatively light weight, as low as 32,500 lb. As some of these coaches were equipped with electrical equipment and as new motor cars were built to pull two and three trail cars, the weight of motor cars increased, so that the latest type, equipped with two 165-hp. motors, weigh approximately 70,000 lb. each. On account of the restrictions imposed upon the size of the car by the structure and station dimensions, all of the developments in design since the original cars were put in service have been made in the details of the car construction, as there has been no opportunity to change the over-all dimensions.

TRANSITION IN PLATFORMS AND DOORS

The cars as originally constructed were equipped with open platforms on each end and with one door in each bulkhead. The entrance and exit to the platforms was controlled by iron gates approximately 26 in. to 28 in. in width. The next general step in the arrangement of the platforms was to maintain the bulkheads in the ends of the cars with bulkhead door, but to vestibule the platforms, using full length wooden doors of approximately the same width as the iron gates. The next



Type of modern steel car now in use on Chicago Elevated Railroad

general step in advance was to build a fully inclosed car with the car body and the vestibule together, omitting the bulkhead. At each of the four corners of the car there was installed a door sliding back into a door pocket and controlled with an air engine. The width of this door was slightly increased, changing the door opening from 26 in. and 28 in. to 36 in.

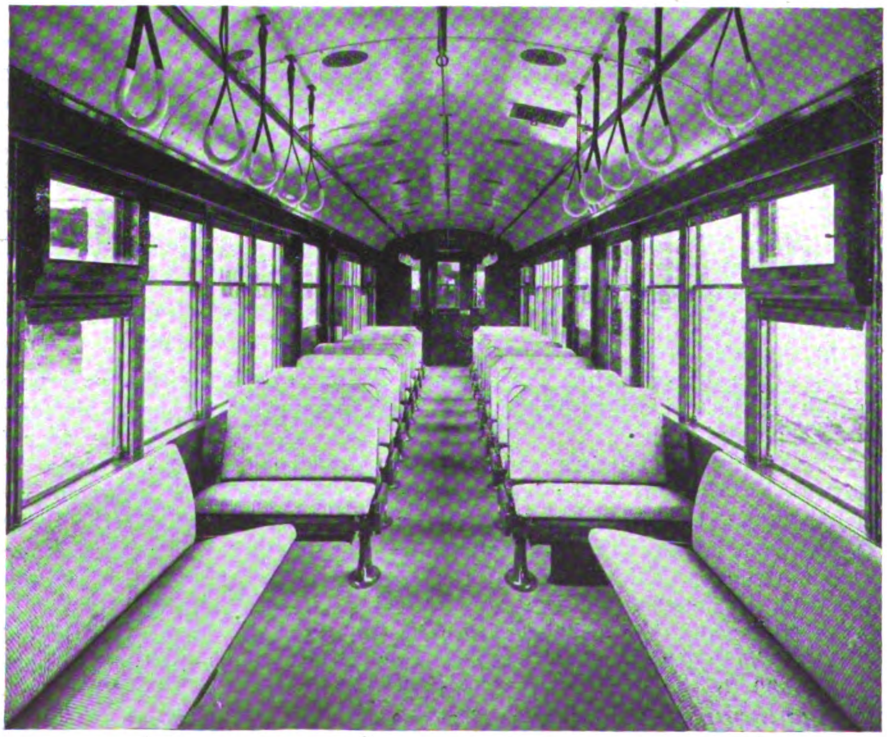
The next cars maintained this same general type of construction, except that the width of the four sliding doors was increased from 36 in. to approximately 48 in. This was the arrangement of doors when the first steel cars were designed in 1913. At that time it was anticipated that there might soon be a subway in the city of Chicago, and in that case very heavy passenger loads would be concentrated at a few stations. The steel cars were designed to be suitable for the proposed subway operation, and accordingly were provided with sliding doors at the center of the car as well as at each end, making three doors on each side of the car instead of two. The width of the center door was maintained at 48 in. and the width of the four end doors was reduced from 48 in. to 44 in. These cars were equipped with longitudinal seats, as it was considered that the center doors would soon be put in operation.

A year later an additional number of these steel cars were put in service, built on the same plans with the center door installed, except that reversible Walk-Over seats were installed at the center portion of the car with longitudinal seats at the four corners. As the center doors had not been used in any of the steel cars and as the tendency in the city of Chicago was to change from longitudinal seats to cross-seats it was necessary to install the Walk-Over seats in the second lot of steel cars to meet the wishes of the public. We still thought, however, that the center doors would some day be used, and so the doors were installed in the sides of the cars with the understanding that when they were placed in operation the cross-seats set in front of them would be removed and longitudinal seats substituted.

During the last few years the traction situation in Chicago has developed along lines which indicate that center side doors in the elevated cars will not be needed for a good many years, and as the public much prefers the cross-seats to the longitudinal seats, and as the installation of these seats across the center door does not afford the same comfort and convenience to the passengers that the seat installed opposite the regular car window affords, the management decided that on the 100 new elevated cars which are now under construction the center doors would be omitted. The steel framing of the car, however, has been designed in such a manner that center doors may be installed at a later date at a minimum cost.

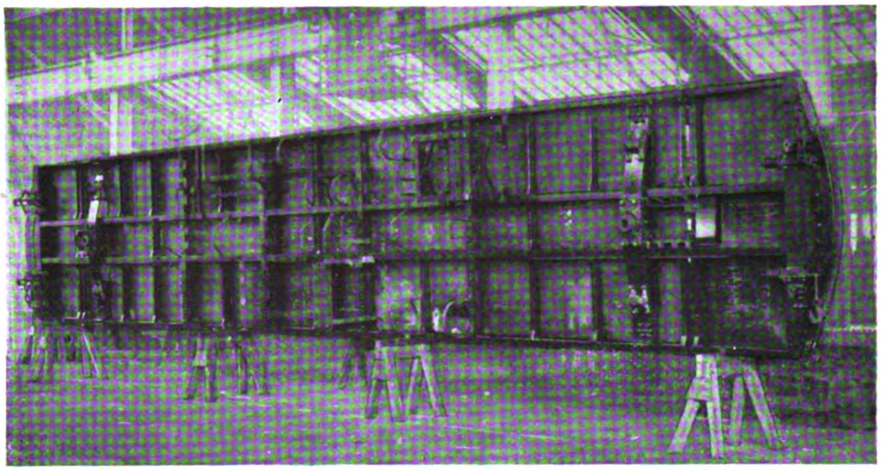
PROGRESS IN SEAT ARRANGEMENT

The original coaches placed in service on the elevated roads had four stationary cross-seats at the center of the car with longitudinal seats throughout the remainder of the car. This seating arrangement was maintained in the coaches for a good many years. When electrically operated motor cars were first installed, they were equipped with longitudinal seats throughout. This condition existed a good many years until finally all motor cars were equipped with the four stationary cross-seats at the center of the car and longitudinal seats for the remainder, the same as the original coaches. This arrangement was maintained until the sentiment for the cross-seats became so strong in Chicago that these were installed on all new equipment. A short longitudinal seat at each of the four corners of the car is used with the



Standard seating arrangement and interior appearance of steel "L" cars cross-seats to provide a well near the end doors of the car. With the exception of the return to the longitudinal seats on account of the center doors installed in the first steel cars built in 1914, the plan has been to install all cross-seats in all cars. Seven reversible seats were first placed on each side of the car, then eight, and in the new cars now being constructed there will be nine.

From the commencement of the elevated roads down to the present time it has been the general practice to use canvas-lined rattan as upholstering material for all seats. The seats for the new cars, however, will be upholstered with green plush of the best grade. This step is being taken to please the passengers, as plush upholstered seats are more comfortable and have the appearance of greater luxuriousness.



The underframing and steel under-floor of Chicago Elevated steel cars

CAR FRAMING AND FLOORING

The original cars on the elevated roads were built entirely of wood. The next step was to introduce a partial steel subframe in addition to the wooden subframe. This was followed by cars built with steel subframes and steel and wood cars were introduced in the elevated service. The cars which are at present on order will be of all steel design with several modifications over the cars built in 1914 and 1915. For instance, a double wooden floor will be installed instead of the composition floor used in the earlier steel cars. The wooden floor is warmer and has a much longer life than the composition floor. A great deal of complaint has been received from patrons, since the original steel cars were placed in service, on account of the coldness of the composition floors. Although these cars are the best heated cars on the system we are unable to keep the floors warm and it has been necessary to install leather floor mats during the midwinter months. The wood floors will overcome this criticism as well as last longer and be cheaper to maintain. The wood floor has been fireproofed by the installation of a sheet steel subfloor as part of the steel underframe of the car.

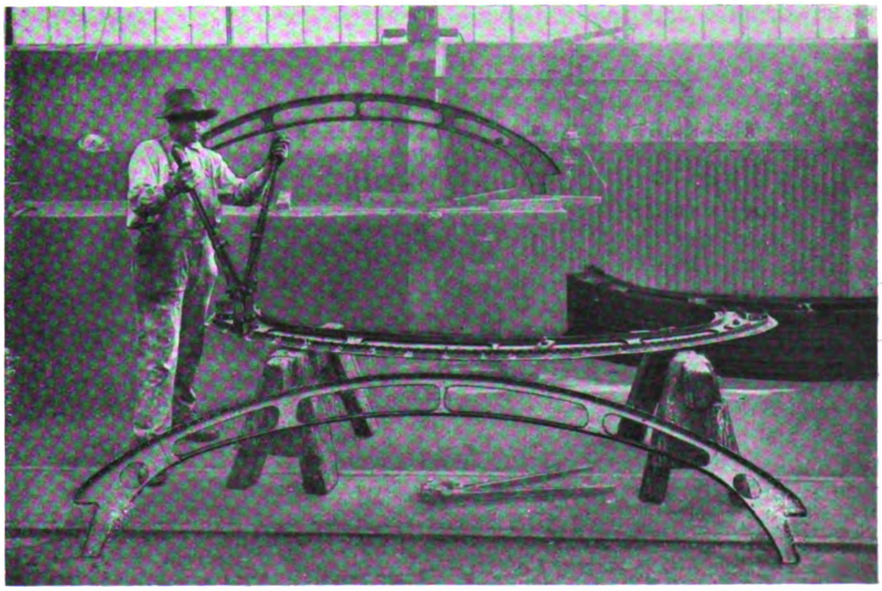
The first steel cars were equipped with steel roofs, and these cars have been operated only on tracks where third rail was installed. But the new cars will be operated partially over tracks where overhead trolley wire is installed. Hence it will be necessary to equip them with overhead trolley devices as well as third rail devices. As serious consequences might result from a trolley wire falling upon the steel roof of the passenger car, it was thought advisable to protect the roof against this contingency. It was decided to install a wood and canvas roof which would provide the proper insulation. Steel carlines and steel headlining will be installed and connected to the steel side structure of the car so that the interior of the car will be fireproof from without.

On the first lot of steel cars the entire interior finish was made up of steel or Agasote. The cars which are now being built will be trimmed with steel, Agasote, and, in some places, mahogany. The mahogany will be used for arm rests, post covers and in a few other places which come into more general view of the passengers. It is considered that mahogany will present a better finish and a more pleasing appearance to the passenger than the steel and Agasote, the idea being to produce the most attractive car possible as one step in merchandising the service.

MOTOR AND TRAILER PRACTICE LARGELY FOLLOWED

The original motive equipment on the elevated roads consisted of steam locomotives hauling a number of trail coaches. After these steam locomotives had been in service for a few years on the South Side and Oak Park roads the Metropolitan Elevated was constructed and started in operation with electrically operated motor cars used as locomotives to haul one, two, three and four coaches. A few years later the steam locomotives on the South Side Elevated were abandoned and multiple-unit motor cars substituted.

The next step was to install multiple-unit control equipment on



Pressed steel carlines for arch-roof steel "L" cars all of the roads. The South Side still maintains all motor cars while the other roads equipped their motor cars with large motors and operate trains composed of motor cars and trailers. The tendency has been to maintain a train make-up of motor cars and coaches, with the motor cars equipped with two motors of approximately 165-hp. capacity. As there have been more coaches in service than there were motor cars, the tendency is also to increase the number of motor cars so as to increase the motor capacity per train, which will result in faster acceleration and better schedule speeds. Accordingly the new cars which are now under construction will be motor cars.

TRUCKS IMPROVED FOR RIDING QUALITIES AND WEAR

The construction of trucks as used on the elevated cars has been considerably improved from time to time. This has been done mostly by making a close study of all parts which have caused failure or have rapidly worn, to terminate the cause and make such changes or redesign the parts in such a manner that the failure or rapid wear would be eliminated. By improving one detail after another the trucks as now used have been developed to the highest point of reliability. They are entirely free from trouble outside of the replacement of usual wearing parts. All of these wearing parts have been equipped with case hardened wearing shims to reduce the wear to a minimum, and these shims are installed in such a manner that when they do require renewal they can be changed with a minimum amount of labor and time. Although considerable attention has been given in years past to the spring arrangement and riding quality of the trucks under our elevated cars, no particular advancement had been made on account of the limited space for springs, occasioned by structure clearances and the size of the motors installed in the trucks. The trucks for the new cars which are now being built, however, have been redesigned to make more room for the springs so that more flexibility can be provided. The whole spring arrangement on these new trucks will be approximately 10 per cent more flexible than the springs on previous trucks. This will make them easier riding and more comfortable for passengers.

The first cars on the elevated system were equipped with straight air brakes. From that time we have progressed with the general advancement in the art and installed quick-action automatic brakes, then quick-action graduated release automatic brakes, and finally, the universal type of air brake.

For years the mechanical department of the elevated roads of Chicago has devoted a large proportion of its time to the details of equipment failure which caused delays on the road, necessitated sending cars to the shop and required the replacement or renewal of parts. In the case of any part which was giving an undue amount of trouble, whether it was a spring in the door latch, a bolt in the motor frame, or some part of the control equipment, a careful study has been made to find out how to increase the life of that particular part, or eliminate it entirely by redesigning a new part. In many cases a better grade of material has solved the problem. In other cases the parts have been redesigned or reconstructed, or the wiring of some piece of electrical apparatus changed, or the part eliminated entirely.

During the last few years one after another of these troublesome details have been corrected and all during this time the reliability of the equipment has been steadily improved. All such changes which have been found necessary have been incorporated in any new equipment which was purchased. This has applied to all parts of the equipment whether it be control equipment, motors, trucks, air brake or car-body parts.

By the time the steel cars were designed and built in 1914 and 1915, so many of these detail troubles had been overcome, and the design of the various parts of these cars relating to each other was so carefully gone into that when the cars were received they went into operation and performed in regular service without any difficulty whatever. It was not necessary to put them through a period of breaking-in, as is often done.

During the seven or eight years that they have been in service the results have fully met all expectations. The car-mileage per delay on these steel cars is several times as much as the car-miles per delay on the old types of equipment. However, such troubles and conditions as have developed on these cars in service will be corrected in connection with the cars now being built, so that as far as reliability is concerned the new cars should be even better.

Maintaining the Chicago "L" Structure

By G. M. ANDERSEN
Engineer Structures and Buildings
Chicago Elevated Railroads

THE oldest structure of the elevated railroads in Chicago was built some thirty years ago of wrought iron. The later structure was built of low carbon structural steel. The structure is inspected twice a year and records of these inspections are kept on a form sheet. These inspections are made by a structural iron worker and an assistant and are very thorough. All defects, such as loose rivets, etc., are recorded and are followed up and repairs made by the structural iron gang. It is interesting to note that wrought iron has much greater resistance against corrosion than structural steel. Wrought iron in this respect acts very much like copper bearing steel; it rusts on the surface but does not pit.

The painting of our structures is done on a seven-year program. It has been found that seven years is the maximum protection we can get in this climate with a good grade of paint. This does not, however, apply to locations where the structure is subjected to unusual conditions, such as gases, etc., where it is necessary to do painting every two or three years. Tests are carried on in these bad locations in order to determine the merit of paints. The painting work is generally done by our own forces, although some of it is let out by contract. The standard paint used on our structures is made up from our own specifications and consists of two parts of Double Label Prince's Metallic, one part red lead and one part graphite. This pigment is ground in 25 per cent of its own weight in raw linseed oil and then reduced with linseed oil to a liquid consistency, weighing 13 lb. per gal.

Many of our structures run over alleys or back streets. These alleys are also used or rather mis-used by the neighbors as dumps for ashes and garbage. Consequently the surface of the alleys grows higher and covers our column bases. To protect these column bases has been quite a problem, but this trouble has been successfully overcome by covering the column bases with concrete 1 or 2 ft. above the foundations. This concrete is built directly on the column base and in this way moves with the column and is really a part of it. A slight movement in the column will thus not crack the concrete. Light woven wire reinforcement against cracking is also used.

The present-day designer of an elevated structure can obtain valuable information by a study of existing structures. Ample and proportionate strength, ease of manufacture, ease of erection and cost are the main features to be considered. The very important item of maintenance was given very little thought in connection with the design of present structures. My advice to designers is to keep clearly in mind that ultimate cost is more important than first cost.

Signaling Trains on Chicago Elevated Railroads

By J. W. STEPHENSON

Signal Engineer
Chicago Elevated Railroads

SOME of the most recent developments in connection with the protection of train movements on the Chicago Elevated Railroads are the installations at bridges. The signal systems on the new Wells Street Bridge and the Lake Street Bridge are practically identical. These are the result of experience extending over a period of years. The old drawbridges were replaced by modern double-deck trunnion bascule-type bridges. It was found possible to eliminate one tower and operate both sides of the interlocking from one shore, effecting a saving of one towerman. This is done by controlling the far side through a submarine cable and by the use of track circuits. The plant is electro-pneumatic throughout. Alternating current is used to eliminate interference by d.c. propulsion return. In addition to the automatic stop at home signals, a diverting or bumping post switch has been added to insure a stop in case a motorman runs by the home signal.

A special feature developed for these bridges is the circuit control contact boxes which insure that all railbreaks are in place and properly aligned. Should any railbreak be out of line the contactor remains open and the indicator relay in front of the towerman will not clear. Neither will it give current to release the master control lever in the machine, which in turn will not give power to operate the bridge locks and motors. In other words, the control, locking and signaling of the bridge are all interlocked and backlocked so that the operator cannot make false moves. Everything must be done in sequence and all apparatus must be in proper place.

BLOCK SIGNAL SYSTEM BEING SYSTEMATICALLY EXTENDED

There are of necessity many curves on the elevated railroads. These are being protected according to a fixed program by means of three-position color light signals. Alternating-current single-rail track circuits are in use, and have proved highly successful. When a curve is to be protected, a speed-time curve is made up to suit the headway of trains, and the speed allowed over a given curve. Allowance is made for growth of traffic. When signal locations are made, taking into consideration braking distance and motorman's view, the general superintendent checks the locations, giving the signal engineer the benefit of years of experience on the front end of trains. Thus the installation may be classified as "tailor made" rather than "ready made."

The busiest railroad crossing in the world is at the intersection of the Chicago Elevated Railroads at Lake and Wells Streets. In the hour of maximum travel on the elevated, 218 trains comprising 1,100 cars pass this corner, or at the rate of 3.6 trains per minute averaging five cars per train.

METHODS OF INSPECTION FOLLOWED

In making new signal installations, brackets for signals are set in place, track bonding, alternating-current leads and meters are installed, and signals, relays, wiring and housings placed by the signalmen. All work is so co-ordinated that when tests are made and approved, the transportation department immediately gets out its bulletin and within the next twenty-four hours the signals are in service and the investment is making money for the company, not only by protection of trains, but in added track capacity.

The main object of inspection is to catch trouble before it happens. First of all, we depend upon the signal maintainer, who is closer to his plant than any one else. A weekly interlocking inspection report is filled out by him every Saturday and sent to the signal foreman. Each month the signal foreman and track foreman make a joint inspection of interlock plants and insulated rail joints. A written report goes to the engineer maintenance of way.

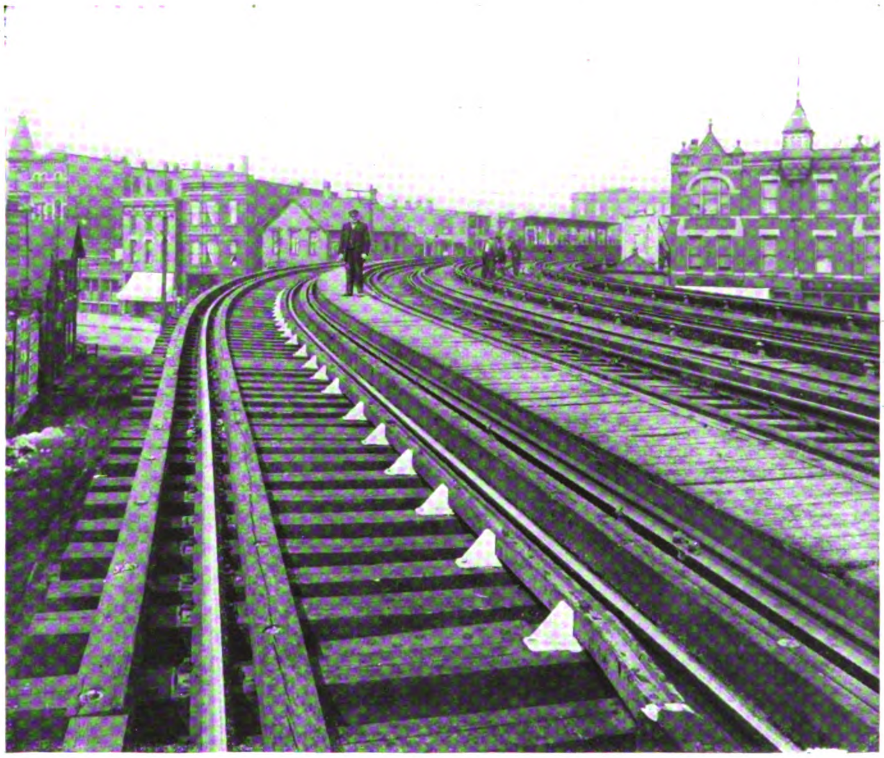
Twice a year, in the spring and fall, the signal supervisor makes a detailed inspection of all interlocking plants and block signals. His report is made to the engineer of maintenance of way, with copies to the signal engineer and general foreman of the respective roads. The general foreman turns over the findings to his signal foreman, and he in turn to his maintainers, who correct defects and carry out recommendations, reporting back when completed. Then all reports are collected and sent back to the engineer of maintenance of way, where they are checked and filed for reference on the next seasonal inspection. This entails considerable work, but recurrent troubles are kept at a minimum and the failures as plotted show a steady decrease.

All failures are thoroughly investigated. No unsolved mysteries are allowed to stand, as it has been our experience that there is a determinable cause for all failures.

How "L" Track Is Built to Handle 900,000 Cars a Year

By H. P. SAVAGE

Track Engineer
Chicago Elevated Railroads



New type guard rail on Chicago Elevated curve in the foreground with old type in the background

THE problems of maintaining the tracks on a system of this kind are many. Probably the greatest problem is to get special work and rail of a suitable nature to withstand the great frequency of train operation. The 4.72 miles comprising the Union Loop is divided into 2.36 miles of track known as the Inner Loop and 2.36 miles of track known as the Outer Loop. Over each of these two tracks during the course of one year, 900,000 cars pass. Originally the track construction on the Loop was the same as elsewhere on the elevated lines—No. 1 yellow pine ties placed at 18-in. centers with 80-lb., 33-ft. open-hearth A.S.C.E. rail. This was changed about 1911. The ties were placed much closer together, the centers being 11 in. instead of 18 in., making almost a solid bed of ties. The rails were replaced with 60-ft., 90-lb. high-carbon open-hearth rail. The special work, that is, the frogs and switches, were all changed to 90-lb. rolled manganese rail with heavily sideguarded switches. With this new construction the life of the track has considerably lengthened, and the life of the switches has been increased from ninety days to two and a half years.

On the lines adjacent to the Loop where the volume of traffic is also very heavy, it has been necessary to rearrange our standards and use 90-lb. high-carbon open-hearth rail, A.S.C.E. section, larger tie plates beveled one in forty, apply anchors in the center of each rail, use high-carbon heat-treated angle bars with heat-treated track bolts, and joint screw spikes to hold the rail from creeping or minimize creepage. We have 947 switches and eighty crossings, and 20.62 miles of the total 190.03 miles is curved.

The ties used on the elevated structure are 90 per cent heart, or better, long-leaf yellow pine. These are untreated, as we find that they wear out by abrasion before they rot. The life of the ties is from fifteen to eighteen years on tangent and twelve to fifteen years on curve track, depending largely on traffic. We use white oak and treated red oak ties on surface tracks.

We use a high-carbon 90-lb. rail on tangent and on long, radius curves. This was found necessary on account of the frequency of traffic which will rapidly cold roll an ordinary open-hearth rail. The carbon runs from 0.75 per cent to 0.88 per cent. Rail on tangent lasts about fifteen to eighteen years, depending on traffic. It fails by the joints cupping. In many cases we have taken out rail, sawed a foot off each end and relaid. This can be done for about half the cost of new rail. On curves of shorter radius we use rolled manganese, as we have found it to outlast the open hearth by about 8 to 1. Rails fail on curves due to corrugation.

MILEAGE OF CHICAGO ELEVATED SYSTEM

Road	Elevated	Surface	Total
Metropolitan..........	43.04	11.70	54.74
Northwestern..........	47.39	14.22	61.61
South Side............	42.49	3.81	46.30
Oak Park.............	16.30	6.36	22.66
Union Loop...........	4.72	.....	4.72
Totals..............	153.94	36.09	190.03

All curves are measured and made up by a special gang of five men, which has its headquarters and equipment at one of the yards. The equipment consists of a big bulldozer strong enough to bend a 100-lb. rail head on, drill presses, rail punches, rail saws and overhead carriers.

Footwalk renewals are made up in 16-ft. and 18-ft. sections in the yards and are placed with a derrick car.

When tie renewal becomes necessary at any point, the deck is renewed completely for long stretches; that is, there is no spotting of ties or patching, as we have found that this gives a very bad track on account of uneven bearing. Ties are not countersunk for rivets but are allowed to set down from the weight of the trains. Electric tools for boring are used extensively. Countersunk holes in guard rail are filled with mastic asphalt. Renewals of deck are made under traffic on six-minute intervals. Closer interval track is cut out.

Curved rail is laid with traffic cut out. Tangent rail is hooked up in long stretches and thrown in with traffic cut out. All track is patrolled once a day by section men. Curves are greased with heavy graphite grease as frequently as needed.

We have found that wooden plank will not stand up under the heavy traffic that we get at our surface crossings and are therefore using Tarvia, concrete and concrete plank with good success.

Utility Insurance an Exacting Science Now-a-Days

By WILLISTON FISH

General Manager Chicago Surface Lines

Providing full protection with the lowest possible expenditure requires systematic and experienced handling. The system in use by the Chicago Surface Lines and the reasoning which lies behind it are succinctly and interestingly told

IN THE good old days any man by demonstrating — fully — that he was good for nothing else was held to have demonstrated—fully—that he was born for the insurance business, and when, thereupon, he got in some blank policies and put out a sign he became an ordained insurance agent, and any property owner who was a personal friend of his would immediately and naturally rely upon him implicitly, in insurance matters, for advice and guidance.

Certainly it was a happy time when no man needed to be disheartened by failures in business or by being derailed in his chosen lifework, understanding that when his failures were sufficiently numerous and complete he would be ready to act as a trusted counselor in every branch of insurance, and grab off the regular commissions, do well and be highly regarded in the community.

And the old times were happy times not only for the insurance broker but also for the public utility manager, who then could "give the insurance" to his personal friends and be a tremendously good fellow, or "divide the insurance" among the agents in the territory and be a tremendously politic fellow. This satisfaction of the management was supposed to be gained without any cost, it being assumed that insurance agents had no other function than to sign policies and collect commissions, and that when once signed one policy cost no more and no less than another and served the purpose no better and no worse.

Simple, happy Arcadian days—sometimes, of course, sadly interrupted by discovery that a public utility company had been wasting money for years by paying premiums on account of hazards that could have been cheaply eliminated. or more sadly interrupted, after fires, by the shocking discovery that values had not been properly estimated or that they had materially changed or that the insurance form had not been properly drawn or that guaranties had not been kept or that responsible insurance companies had not been chosen. But on the whole, simple, happy Arcadian days.

However, they are days that are gone. Various causes have combined to bring about a radical change in the whole attitude of public utilities toward insurance. Some of these causes are indicated below:

WHY UTILITY INTEREST IN INSURANCE IS INCREASING

1. The utility properties have greatly increased in size and importance, and each department of the business receives closer and better attention. A large utility company's insurance is no longer held in the hands of the head men as a mere matter of patronage, nor is it turned over to the least occupied clerk as mere matter of form and record.

2. Utility rates are made by commissions, and it is understood that fair rates include the reasonable cost to a utility of full insurance protection.

3. As a development beginning about 1900 there has been an enormous advance in the art and practice of valuation so that there has come to be a far better understanding by the management of utilities of the values of the various items of their properties.

4. Since 1914 the great and rapid rise in cost of labor and material has roused companies to inquire more carefully and more frequently into their insurance valuations, and at the same time the increasing premiums based on increased valuations have led managements to inquire how rates may be reduced.

5. A shortage of plant and equipment to meet increasing demands of service has led managements to study fire protection and fire insurance.

6. The increased care of trustees under utility mortgages to see that the provisions of mortgages include ample insurance protection, and that these provisions are carried out, has been an important factor in bringing about an improved insurance situation.

7. Especially there has grown up, with the rapidly increasing operating factor, a vivid realization of the need of care and economy in the administration of each department of each public utility.

8. During a course of years, beginning perhaps around 1900, insurance brokerage concerns have been very highly developed so that they have become capable of giving the wider, wiser, fuller and more scientific service and the all-the-year-around service that the magnitude of the property interests involved and the demands of modern management have gradually come to require.

The *Electric Railway Journal*, understanding the great and growing importance of the modern subject of insurance, wished to give space to the matter in its Convention Number, and out of courtesy it has asked the Chicago Surface Lines, as one of the representative members of the association in the convention city, to furnish a statement setting forth the manner in which its insurance is now handled. The Surface Lines is very willing to furnish the statement, but of course with the understanding that it is speaking only among friends and fellow members of the association and is not attempting to pose as an instructor or as an authority or guide in insurance.

HOW CHICAGO COMPANY FOLLOWS INSURANCE DETAIL

The Surface Lines plan of caring for insurance and fire protection—two matters which are inseparable—includes the following:

1. A detail inventory and valuation is made of all insurable property. The valuation is based on present reproduction cost new, with depreciation therefrom figured on sinking fund basis. From the detail inventory and valuation there is made up an abridged volume which shows each separate insurance risk with reproduction cost new and depreciated values of the main items making up the risk. The figures for non-insurables are shown and deducted. A copy of this volume is furnished to our general insurance agents.

Redeterminations of insurable values are made each insurance year, or oftener, when necessary to meet changes in base costs.

2. The general insurance agents cause to be made up by their insurance engineers a complete insurance survey and report of all buildings, yards and insurance locations. The report gives a plat, description and study of each separately rated risk. Among other things, it shows the insured values at each such risk in building, contents and rolling stock, respectively; the make-up of the rate on the risk, the cost in premium due to each item of the rate, a discussion of the improvements that could be made in each separate risk, with resulting premium savings; suggestions for eliminating fire dangers or providing for better protection against fire in cases in which rate and premium are not affected.

3. The Surface Lines departments concerned are furnished with copies of the insurance survey and report. These departments make studies and estimates to determine what improvements among those suggested are feasible, the best way of carrying them out and the probable cost. Each case is then considered and decided—the estimated cost of the improvement being set against the saving in premium, the lessening of fire risk, etc.

4. All of the Surface Lines properties are inspected regularly by experienced and capable insurance engineers furnished by our general insurance agents. Our own forces maintain a constant supervision over the risks to see that our guaranties are maintained, that fire-fighting apparatus is kept in place and in condition, that automatic doors are kept free and in operating order, that no new fire risks are introduced without authority, and generally that "good housekeeping" is maintained.

5. Designs for new buildings or for building changes are submitted to our general insurance agents for suggestions looking to maximum fire safety and minimum rates.

6. We have appointed Marsh & McLennan to be our general insurance agents and we have placed upon them, and in the regular course of their business they have assumed, full responsibility for all the above work except the making of inventory and valuation and the estimates of costs of improvements, and our own inspection.

SOME OF THE COMPANY PRACTICES IN FIRE PROTECTION

Nearly all our carhouses are fireproof or fire-resistive construction. We have several operating car storage yards with bays divided by fire walls. Our aim is to give bays in carhouses and yards a maximum trackage of 1,500 or 1,600 ft. so as to limit the loss of rolling stock in case of a fire to the equivalent of about thirty double-truck cars.

All our properties of any size are equipped with central station watchman service, standpipes and hose, barrels of water and buckets, sand pails and chemical extinguishers. Fire apparatus is painted red.

Our men are drilled at short intervals in fire fighting. Call to drill is by gong sounded at any time night or day. On the sounding of the alarm all the men at the car station or shop accustomed to handling cars hasten to move the cars out and to a proper distance away. The rest of the men run to their places to make use of the fire-fighting apparatus. In case of actual fire the first man to discover it turns in the alarm for the public fire department and then the call for the company brigade. At all locations Chicago fire alarm boxes are close by. For a considerable time past the calls of our employees in cases of actual fire and the responses of the Chicago Fire Department have been almost or altogether perfect.

In the construction of our cars we require that the wiring and the car heaters be installed according to the National Electrical Code. At car stations we allow smoking in crew rooms only. We have the hearty co-operation of trainmen and other employees in the work of good housekeeping and safeguarding the properties against fire. Our stations designed since 1907 afford track facilities for getting out rolling stock in case of fire. Where practicable the bays are double-end.

The average total cost of heating the cars of the Chicago elevated railroads is $166,800 per year.
The energy consumed in heating is 10.65 per cent of the total energy used by the system.

CONSTANT ATTENTION NEEDED TO KEEP UTILITY PROPERLY INSURED

Our total fire insurance is now something over $55,000,000, nearly all of which is carried on one general blanket form with a 100 per cent co-insurance clause. This form is of course carefully drawn under the advice of our general insurance agents, with the approval of the legal department and of other departments of the Surface Lines that are concerned.

We understand that fire insurance is a science; that it consists of many items, none of which may be overlooked without penalty great or small. We give constant attention to our insurance ourselves, but we demand and obtain from our general agents unlimited, all-the-year-around service. We feel that our insurance is safe. We feel that we are getting good results in (1) reduction of rates and (2) protection of our income by minimizing fire risks. During the last twelve months, with the services of our agents and under the plan above outlined, an annual premium reduction of over $50,000 was effected, and other improvements suggested in the survey and report of the agents will give us a considerable further reduction. The cost of the improvements necessary to secure these reductions will hardly exceed the premium savings for one or two years.

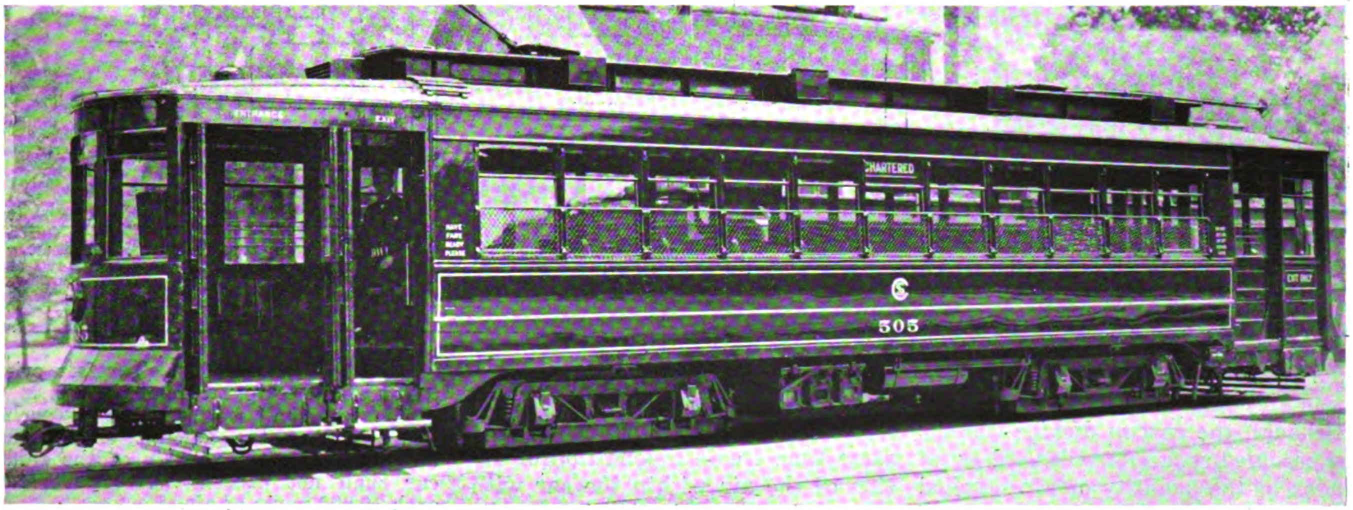
It is to be expected that the importance of the subject of insurance of various kinds, and the attention that public utilities are now giving it, will effect highly valuable improvements in general and also in detail.

But of course the old, simple, happy Arcadian days are gone.

Systems and equipment used in Chicago were determined upon only after extended study and tests, the results of which are here presented for the first time, together with the experience in various phases of this perplexing problem

Heating and Ventilating Chicago Street Cars

By CHARLES GORDON
Engineer of Equipment
Chicago Surface Lines



Standard exhaust and intake automatic ventilator installation as installed on monitor deck Chicago car

THE subject of heating and ventilating of street cars has become an increasingly important problem to the managements of electric railway properties as the industry has progressed. At one time a layer of straw on the car floor was considered a satisfactory provision for the comfort of urban passengers. The introduction of stoves represented the first serious attempt at providing artificial heat, while ventilation was obtained through the deck sash provided in the deck roof construction. This was carried over into street car design from coach practice.

The necessity for more scientific methods of ventilation has been a development incident to the demand for better heated cars. Before the advent of the inclosed vestibule, car heating practice, although it had developed to the stage of providing a source of heat within the car, did not even attempt to maintain any given temperature. So much cold air was admitted around doors and crevices that there was no particular demand for ventilation. Deck sash were provided which could be opened when the car became "stuffy" due to rising outdoor temperature or an extremely crowded condition.

With the advent of the inclosed vestibule and the demand for better heating facilities and higher car temperatures, the problem of ventilation, considered from the standpoint of passenger comfort, may be said to have really taken concrete form. The two subjects are inseparably associated and are both of importance only in the winter when the windows are closed and the heat turned on.

PROBLEMS OF VENTILATION PHYSICAL RATHER THAN CHEMICAL

Before proceeding to a description of a number of the studies which have been made in Chicago, it may be well to summarize briefly some of the general principles connected with the subject, upon which there was for many years a general misconception among those generally regarded as authorities, and there still is in the popular mind.

After a great deal of exhaustive research on the part of many investigators, it is now generally agreed that the problems of ventilation are essentially physical rather than chemical. In attempting to provide for the comfort of passengers in a street car, therefore, through the design of a system of ventilation, it must be borne in mind that the feeling of comfort engendered by the quality which is generally referred to as "freshness" in the air within the car results from the physical contact of the air with the skin and the psychological reaction from the effect on the sense of smell, rather than from any chemical result through respiration.

Unless the air in contact with the skin is of proper temperature and humidity and is in a sufficient state of motion effectively to absorb the required heat and moisture from the body, the passenger will be uncomfortable regardless of the chemical purity of the air. Conversely, with the temperature, humidity and state of motion of the air properly controlled, a person may remain in an atmosphere containing a relatively large percentage of the products of respiration without feeling any discomfort whatever.

These facts have been amply demonstrated by many investigators. The early theories which assumed that ventilation systems should be designed for the purpose of eliminating the so-called harmful and poisonous products of respiration have been ably and conclusively disproved. Although the carbon dioxide content of occupied spaces is still used as an index of the quantity of air supplied to the breathing zone, it is in itself no longer considered a harmful ingredient of the air, even when present in quantities far in excess of that obtained in crowded spaces where little air supply is provided.

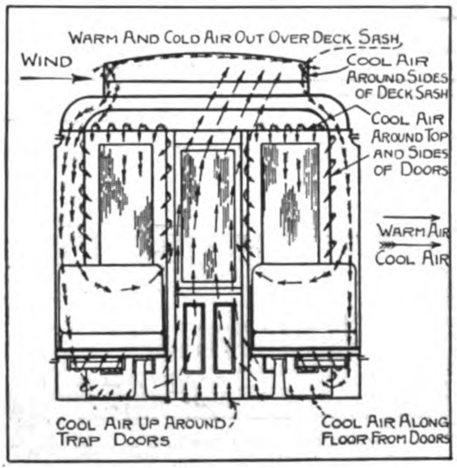

Warm And Cold Air Out Over Deck Sash
Wind
Cool Air Around Sides of Deck Sash
Cool Air Around Top and Sides of Doors
Warm Air
Cool Air
Cool Air Up Around Trap Doors
Cool Air Along Floor From Doors

Fig. 1—Monitor deck car, deck sash open, cross wind blowing.

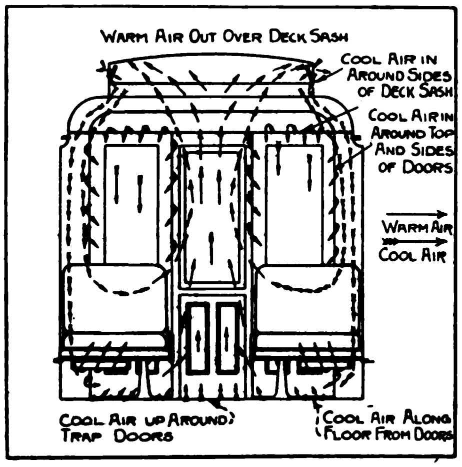

Warm Air Out Over Deck Sash
Cool Air in Around Sides of Deck Sash
Cool Air in Around Top And Sides of Doors
Warm Air
Cool Air
Cool Air up Around Trap Doors
Cool Air Along Floor From Doors

Fig. 2—Same as Fig. 1, but no cross wind.

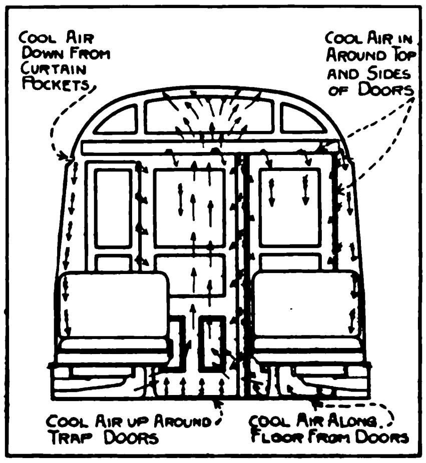

Cool Air Down From Curtain Pockets
Cool Air in Around Top and Sides of Doors
Cool Air up Around Trap Doors
Cool Air Along Floor From Doors

Fig. 3—Arch roof car with exhaust fan ventilation, no wind.

Air circulation in cars standing with electric heaters on

In attempting to provide a satisfactory combination of heating and ventilating, the car designer and operator, working under the general misconception of the subject, were faced until comparatively recent years with an almost impossible combination of requirements. The entire efficacy of the ventilating system was judged on the basis of volume of air admitted to or extracted from the car, and the success of the heating system was judged on its ability to maintain a given minimum temperature without regard for limitation against excessively high temperature. Where electric heaters were used this practice resulted in a needless waste of heating energy. In addition, when sufficient heating capacity was installed to maintain a comfortable temperature in severe weather, a moderate day would produce extremely "stuffy" cars, which seemed to require larger volumes of "fresh" air to be provided by the ventilating system. Where an attempt was made to avoid needless waste of heating energy by providing heater capacity suitable for average temperature conditions only, an unusual cold spell would result in poorly heated cars. By providing means for automatically controlling the car temperature, by giving more attention to the methods of producing the required air interchange so as to give a degree of dilution which would rapidly dispel odor and at the same time create a condition of motion of the air within the car without producing objectionable drafts, and by introducing and diffusing sufficient quantities of "fresh" air at a point near the roof in such a way as to give the stimulus of cool air in contact with the skin, a great deal of progress has been made in perfecting a combination of satisfactory apparatus for heating and ventilating of street cars.

The above résumé of the underlying principles involved is presented not so much for the purpose of reviewing the subject, but for the purpose of outlining the point of view from which the task of properly heating and ventilating street cars in Chicago has been approached.

REQUIREMENTS SET UP FOR CHICAGO COMPANIES

The ordinances of the city of Chicago contain the following requirements relative to the heating and ventilating of cars:

> A minimum temperature of 50 deg. F. above zero shall be maintained in all cars in service carrying passengers when the outside temperature is at 10 deg. F. above zero or higher.
>
> A minimum temperature of 45 deg. F. above zero shall be maintained in all cars in service carrying passengers when the outside temperature is below 10 deg. but not below 5 deg. F. above zero.
>
> When the outside temperature is below 5 deg. F. above zero, the temperature in all cars in service carrying passengers shall be maintained at 45 deg. F. above zero, or as near this point as the continuous operation of all the heaters in said car to their full capacity will allow.
>
> There shall be maintained and conspicuously displayed in such car a standard Fahrenheit thermometer so located that it will furnish a fair criterion of the temperature of the car.
>
> The air shall be supplied in such quantity that the amount of carbon dioxide present in the air of the said car shall not exceed twelve parts in each 10,000 parts of air.

Electric heaters became standard equipment on all surface cars in Chicago during the rehabilitation of the property after 1907. Their use was dictated primarily by their cleanliness and the resulting reduction of fire risk. Ventilation at this time was entirely by the use of deck sash. On some of the first groups of cars constructed during the rehabilitation period, a simple type of intake was installed in the front deck opening, arranged with deflectors to exclude weather and registers on the interior of the car to regulate the quantity of air admitted. This was a long step in advance, but in service these intakes were generally kept closed because they produced objectionable drafts when the car was operating at full speed.

Tests of various forms of ventilating devices were conducted from time to time, beginning about 1908 and extending through 1909, by the engineers of the street railway companies, co-operating with the Board of Health of Chicago and the Board of Supervising Engineers. These tests were carried out upon various types of "natural exhaust" ventilators installed in the monitor decks, with openings for intakes arranged in various ways, usually in the floor of the car, and designed to supply outside air in proportion to that eliminated through the ventilators.

The various ventilators were compared on the basis of the results obtained from anemometer readings taken at the exhaust openings. In the progressive study of this subject, tests were also conducted upon cars equipped with the "vacuum system" of ventilation, in which a duct was provided along the ceiling of the car opening through registers into the car body, and from which the air was exhausted through a blower fan placed in a housing on the hood and opening into the duct through the end of the deck.

Depending only upon the size and speed of the fan, the tests of this system showed it to be capable of circulating almost any quantity of air desired. A group of 350 monitor deck cars was therefore equipped by building a false ceiling in the deck to provide a duct, allowing the deck sash to be operable if they should be required.

Numerous tests showed that this system would exhaust considerably larger quantities of air than was possible with the best of the various forms of "natural exhaust" ventilators available up to this time. As the sole criterion of good ventilation at this period was generally considered to be the number of cubic feet of air exhausted per hour from the car, the railway companies in Chicago looked upon this arrangement as a means of providing the large volume of air exhaust desired and at the same time permitting the elimination of the heavy and expensive monitor deck through the use of the lighter and cheaper arch-roof construction for cars.

As a result of these conclusions, the next groups of cars built were of the arch-roof type and included the "vacuum system" of ventilation. In the early installations it was considered necessary to provide special intake openings for the admission of air to supply that exhausted by the fan system. These openings at first consisted simply of holes cut into the floor, usually under either the cross-seat or longitudinal seat heaters or both. These openings were later inclosed by ducts so as effectually to conduct the incoming air around the heater before it was admitted to the car. Experience with this arrangement soon demonstrated that an objectionable quantity of dust was drawn into the car, and later constructions provided for the admission of incoming air through louvers in the side of the car body between the sill and the belt rail. This arrangement was an improvement from the standpoint of eliminating excessive entry of street dust.

The "vacuum system" in service developed certain disadvantages, among the most important of which were the following: (1) High first cost; (2) noise; (3) necessity for maintenance of a motor-driven fan equipment; (4) necessity of supervision of operators to make sure ventilating fans were kept turned on; (5) large quantity of air exhausted when comparatively light passenger load is present in car, thus resulting in needless waste of heating energy.

Nevertheless, it was at this time the only practical method of obtaining the large volume of air interchange which was considered the primary requirement for satisfactory ventilation. In addition, it seemed to be the only means of providing any suitable ventilation with the desirable arch-roof construction.

Although up to this period many tests had been conducted on the monitor deck cars, in an attempt to find a better method of providing ventilation than that obtained by opening the deck sash, no system which would give a real improvement had been found. In the progress of these tests, a large number of readings on various cars in service during the rush hour were taken, both on cars equipped with ventilators and those equipped with deck sash only. The quantities of CO_2 obtained during these checks were not found excessive in the monitor deck cars without ventilators, when the deck sash were kept properly open, but these cars were generally unsatisfactory because of objectionable drafts produced in cold weather and the consequent difficulty in keeping the sash open.

The City Health Department cooperated with the engineers of the railway company and the Board of Supervising Engineers in a careful study of the subject, and it was finally decided that the results obtained with a properly designed natural exhaust ventilator would result in a sufficient improvement in the conditions to warrant the expense of installing ventilators of this type in all of the then existing monitor deck cars. During the progress of these investigations, Dr. E.

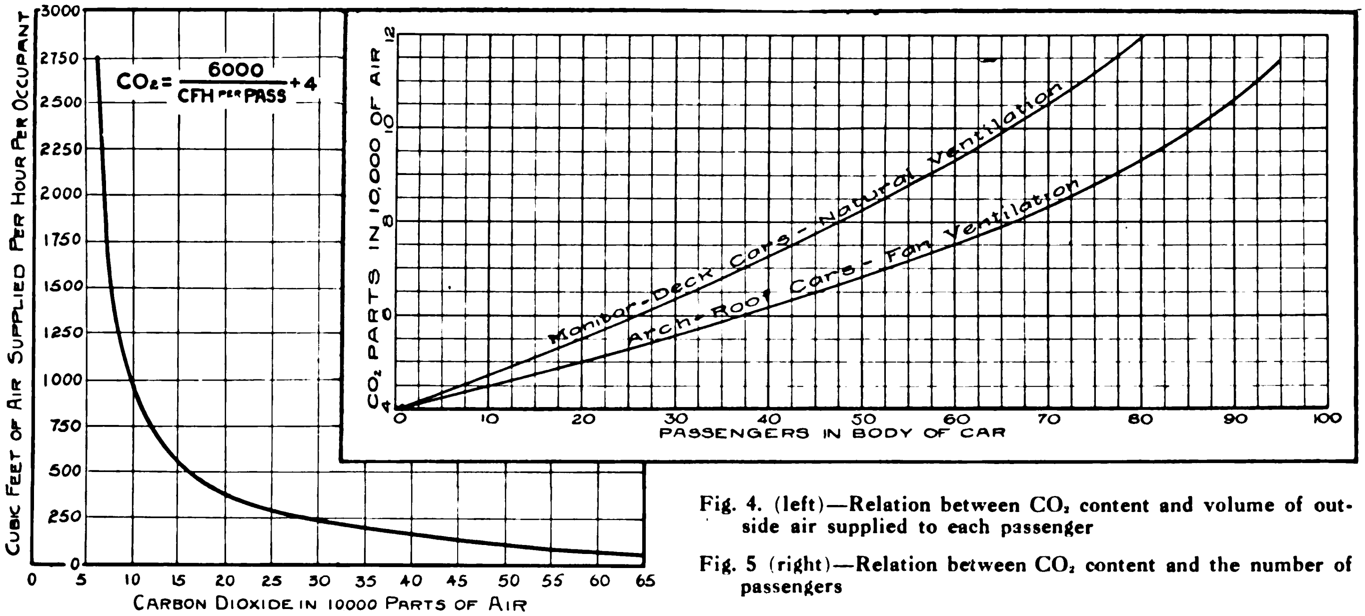


Fig. 4. (left)—Relation between CO_2 content and volume of outside air supplied to each passenger

Fig. 5 (right)—Relation between CO_2 content and the number of passengers

V. Hill, ventilating inspector in charge for the Department of Health, advocated the use of some form of intake in conjunction with the exhaust ventilators for the purpose of supplying a fixed or uniform quantity of cool air to the interior of the car, in such a way that this cool air would reach the breathing zone in sufficient quantities to give the feeling of "freshness" resulting from direct contact, and also would be at all time sufficiently limited in quantity to prevent objectionable drafts.

A compensating type of intake to be placed in the end deck opening was developed by one of the manufacturers. This device was arranged with a movable vane, which was designed to compensate for the car speed or for head winds by reducing the intake opening as the car increased in speed and enlarging this opening as the car slowed down. Deflectors were arranged so as to direct the incoming air toward the headlining of the car and allow it to descend to the breathing zone, without causing an objectionable draft. This arrangement was a considerable improvement in car ventilating apparatus.

The success attending the installation of this combined system of intake and exhaust ventilators to the monitor deck cars encouraged the development of ventilators of this type for application to arch-roof construction. This development has been successful and the ventilating equipment being installed on new cars of the Chicago Surface Lines is of this type. A compensating intake, similar in principle to that used for monitor deck cars, has been developed for the arch-roof construction, and as the system is being applied compensating intakes are installed at the four corners of the car body, with exhaust ventilators spaced on either side of the roof between the intakes. While the car is operating in a given direction, the two rear intakes usually function as exhausts. From the results obtained, it seems that the most serious objection to the arch-roof construction has been overcome.

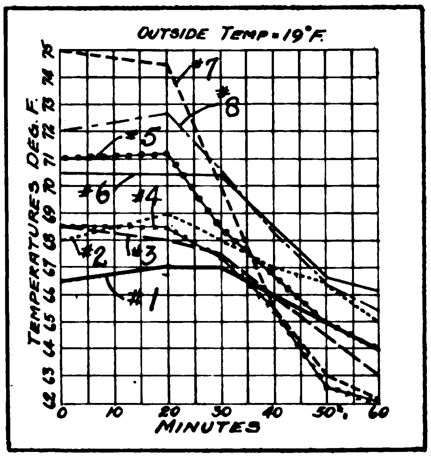


Fig. 6—Graph of temperature variations at locations indicated in Fig. 7; car outdoors, heat and ventilating fan on

During the progress of the various tests conducted and studies made in connection with this interesting subject, a large volume of data have been accumulated, some of which may be of general interest. An attempt will therefore be made to summarize some of the more interesting results and present typical sheets showing how the data of some of the tests were compiled, summarized and interpreted.

CIRCULATION OF AIR IN MONITOR DECK AND ARCH-ROOF CARS

Figs. 1, 2 and 3 represent the paths of air curents in monitor deck and arch-roof cars, the results having been obtained by introducing smoke and white fumes to the interior so that the paths of the various air currents could be observed. Fig. 1 represents these currents in a monitor deck car standing in the open air with the deck sash open and heaters turned on, when a cross wind was blowing directly against the car side. It will be noted that a considerable part of the air entering directly over the sash on the windward side blows across the headlining and out on the other side. Some of this cold air, however, descends along the walls of the car to the floor, where it is caused to rise by the action of the heaters. Another portion of the entering cold air is caught in the rising stream of warm air before it reaches the floor.

On the opposite side of the car, a smaller quantity of cold air also enters through the open deck sash, particularly at the ends of the sash. It is these direct streams of cold air that produce the objectionable drafts that make ventilation through open-deck sash unsatisfactory. The main body of warm air rises through the center of the car, and in Fig. 1 is deflected to the side away from the wind, while in Fig. 2, it is exhausted on both sides, generally over the top of the deck sash. The smaller streams of cold air which enter around the car doors, trapdoors and other crevices are also indicated. The various streams are intermingled and considerably diffused, particularly when the car is in motion. In general, however, the main streams of cold air descend close to the walls and the warm air from the heaters rises at the center of the car.

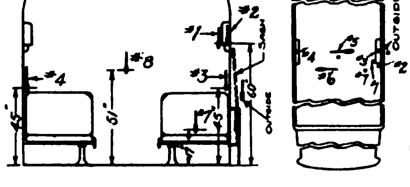


Fig. 7—Locations of thermometers for temperature readings of Fig. 6

In the arch-roof car with exhaust fan ventilation, the convection currents resulting from the action of the car heaters are aided by the action of the fan, while the cold air enters through the various cracks and crevices in a more diffused condition than that which enters through the deck sash openings in the case of the monitor deck car.

A study of these diagrams will indicate the importance of mounting heaters as close to the floor as practicable for the various types of heater construction available. The ideal method would be to mount the heaters in a position on or in the floor, so that passengers can place their feet directly on the heater. The adoption of this scheme of mounting will probably follow rapidly on the development of a suitable heater for the purpose. Such a heater would require ample provision against mechanical damage by passengers and damage from water during the process of car cleaning and in wet weather.

CARBON DIOXIDE CONTENT IN CARS

Measurement of the carbon dioxide content in the air of an inclosed space has been a common means for determining the effective air supply for ventilation. Contrary to previous theories, the carbon dioxide in itself is no longer considered a harmful ingredient, but forms a ready index for determining the efficacy of the ventilating equipment in maintaining a proper interchange or dilution of the air within the investigated space. Fig. 4 is a curve which is very useful in interpreting carbon dioxide readings. It is taken from a preliminary report of the street car committee of the Chicago Commission on Ventilation, and shows the number of cubic feet of outside air that is actually effective in producing dilution corresponding to various carbon dioxide determinations which in practice are obtained from samples taken from the air under investigation. This curve is based upon the formula:

$$CO_2 = \frac{6000}{\text{CFH per Pass.}} + 4$$

in which CO_2 represents the carbon dioxide content obtained in a sample of the air expressed in number of parts by volume in 10,000 parts of the sample. The term 4 represents the average carbon dioxide content in 10,000 parts of outside air under average conditions, and the factor 6,000 is based upon the production of 0.6 cu.ft. per hour of carbon dioxide by each occupant. CFH is an abbreviation for cubic feet per hour.

In practice the common method of making carbon dioxide determinations is to collect samples of the air in small sterilized bottles and to determine the carbon dioxide content of these samples by means of the Peterson-Palmquist apparatus. This aparatus, however, has several objections attached to its use.

A method of determining CO_2 developed by Professor McCormack of Armour Institute was used in a great many of the carbon dioxide determinations made by the railway companies, and was found to give consistent results and to be easily manipulated. The sample was obtained by pumping a given quantity of air from the car measured by means of a gas meter through a gas wash bottle containing a standardized barium hydroxide solution and then transporting the solution thus formed to the laboratory for analysis.

The curves shown in Fig. 5 represent an average of a great many observations made on both monitor deck cars with deck sash ventilation and arch-roof cars provided with exhaust fans. These curves represent the variation in the carbon dioxide content found with variable numbers of passengers in the car. In each observation, a complete record of all related data was made, and in a number of cases several determinations of carbon dioxide were made during a trip, in order to determine the maximum content which was reached at the point of heaviest congestion. The data recorded included the following items:

Date of test; car number; style of car (monitor deck or arch roof); route; direction of operation; location on trip; condition of ventilators (example, four deck sash open 4 in.); direction and velocity of wind; heater capacity in service; number of passengers in body and on platforms; time of taking sample; height above floor at which sample was taken; outside temperature; barometer reading; car temperature; quantity of air used for test, corrected for pressure and temperature; relative humidity.

Individual observations, of course, varied largely from the average curve shown. In each case these variations were due to factors which were indicated by the conditions observed at the time of making the test, and the curves presented represent the general average of the results.

TEMPERATURE AT VARIOUS LOCATIONS WITHIN CAR

In Fig. 6 are shown the results obtained from an investigation to determine the air temperature at various locations within an arch-roof car. The readings of temperature were taken with chemical thermometers mounted in locations as shown in the cross-section and plan sketch of the illustration. In these sketches the location of the thermometers is indicated by numbers which correspond with the numbers applied to the graphic record shown at the right. This graphic record shows the results of readings taken for an hour on the various thermometers after the car had been run outdoors with the heat and ventilating fan on full.

The primary purpose of this investigation of temperatures at various locations was to determine how fair an approximation of the average temperature of the air within the car body was given by the service thermometer mounted on the body sign box. In the diagrams No. 1 represents the car thermometer mounted on the body sign box. No. 2 represents a test thermometer suspended at the end of the sign box. No. 3 represents a thermometer suspended about 4 in. from the body side sash and 45 in. above the floor. No. 4 represents a similar thermometer placed in a similar location on the opposite side of the car. No. 5 was placed directly in the center of the car about 4 in. below the headlining, and No. 6 directly under one of the openings leading from the car body into the exhaust ventilating duct. No. 7 was placed over the center of a cross-seat cushion 17½ in. above the floor. As indicated by the graphic record of temperatures observed, there is a considerable variation for different locations. It will at once be noticed that as the sign box thermometer, from which all observations of temperatures of cars in service are made, is in the stream of descending cool air adjacent to the sides of the car, it is really in a very poor position to give a fair indication of the actual average car temperature. The difficulty of mounting a service thermometer in any better location, however, has made it impractical to improve on the condition.

A number of tests of this kind, all made with the same object in view, on various types of cars, including monitor deck as well as arch-roof construction, indicated in general the same results. Lack of space prevents including a great deal of interesting data which have been collected. It is apparent, however, that if it were possible to mount a thermometer in the locations shown for No. 8, an average indicated body temperature between 3 deg. and 5 deg. F. higher would result.

ALLOWANCE MUST BE MADE FOR LOCATION OF THERMOSTAT

Where thermostats are used for regulating car heaters, they are usually mounted either on the sign box or on a body side post, where the condition is even worse, as shown by the final temperatures obtained on thermometers 1, 3 and 4. This results in maintaining a temperature at location No. 8 anywhere from 3 to 5 deg. above that for which the thermostats are set and makes a considerable difference in the heat energy consumed. In calculations carried out to determine the effect of changing the thermostat setting 3 deg. under average winter conditions, it has been found that an increase in the thermostat setting from 52 deg. to 55 deg. or a difference of 3 deg. F. would result in a reduction in the saving made by the thermostat of approximately 15 per cent.

The experience of the surface lines in making a scientific determination of the proper heater capacity for various type cars, the study made of the radiation constant of cars under all the varying conditions, and the actual functioning and results of thermostatic control of heaters, are related in the remainder of this article, which will be published in next week's issue.

Developing Chicago's Street Cars

By WRAY T. THORN
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Board of Supervising Engineers, Chicago Traction

The Good Features and Imperfect Points of the Successive Types of Cars Are Related—The Performance Experience, Coupled with Constant Engineering Study, Have Produced Many Changes—The Whys of These Are Told from the Experience of the Largest Street Railway System

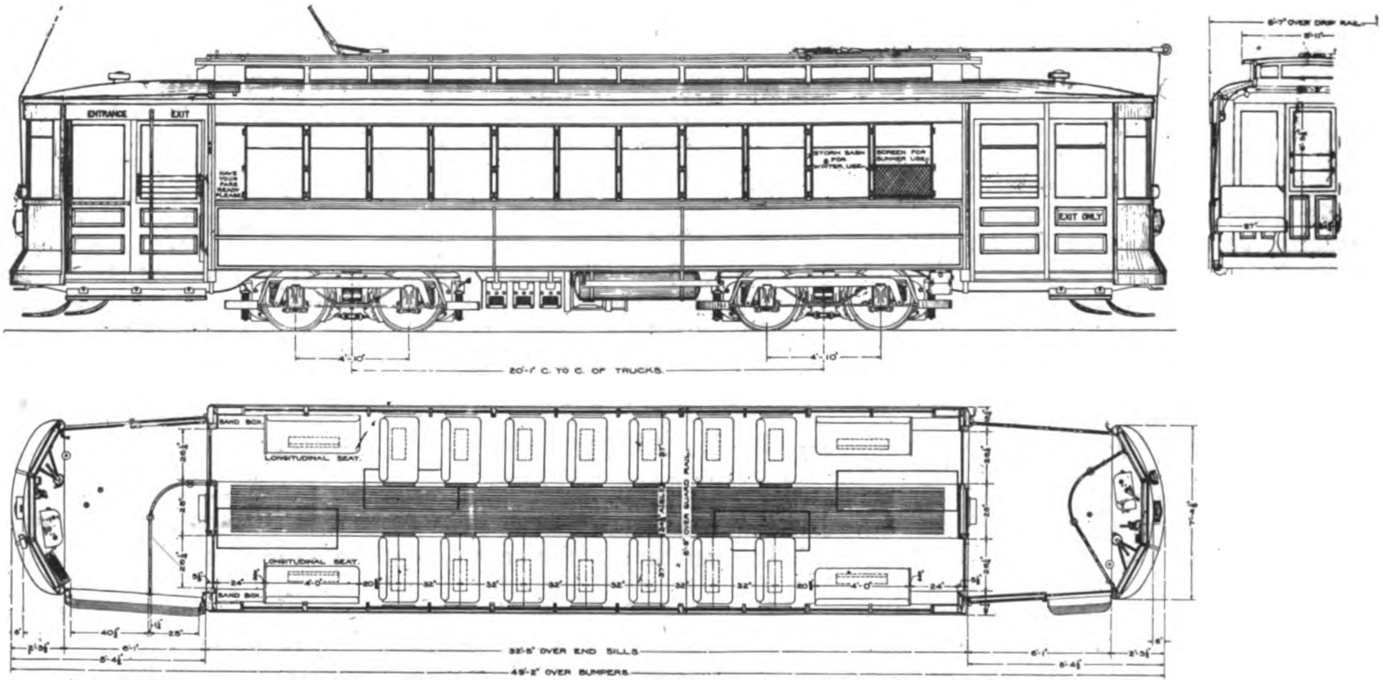

Fig. 1—General drawing of the first car design made by the Board of Supervising Engineers in 1908

THERE has been progressing in Chicago a continuous study of the elements of street car design since the 1907 franchises established the Board of Supervising Engineers, giving to that board complete charge of all work during the first three years constituting the rehabilitation period, and supervision of all work thereafter during the life of the grants. The ordinances named Bion J. Arnold as chairman of the board, and hence the work hereinafter related in connection with the progress of car design through the successive purchases since 1907 may be said to have been done under his general supervision. For the first three years, Mr. Arnold was also chief engineer of all new work. During this period 1,050 new cars were added to the system in three lots—600 composite cars in 1908, fifty all-steel cars in 1908-1909, 350 composite cars in 1909 and fifty composite cars in 1909-1910. This number was in excess of the franchise requirements, but was needed to care for the rapidly growing business of the companies.

Probably the most comprehensive idea of this car design work in Chicago can be gained from a study of the accompanying large table. Into this has been compacted what in effect reveals almost at a glance the complete story of the dimensioning and equipment of Chicago street cars, and the trend of development of each important detail. It covers the 2,445 cars added to the Chicago properties since and including 1907. By running down any of the columns the reader can quickly note what the trend has been as to the particular item. By such a study it will be noted, among other things, that the per seat weight of car body has been progressively decreased from 520 lb. to 219 lb., or per cubic foot of contents from 7.9 to 5.64 lb.; that the weight of the car completely equipped has shown the notable decrease per cubic foot of contents from 20.5 lb. to 11.7 lb.; that the weight of the trucks in per cent of total weight of cars has decreased from 35.5 to 19.6; that the weight of the motor equipment per horsepower has decreased from 60.5 lb. to 38.3 lb., etc. This brings out the fact that the general progress in car design is the result of the engineering and study put upon the subject by manufacturers and railway engineers alike, for both have contributed materially toward improving the efficiency and strength of the cars per unit weight.

The table discloses some interesting tendencies with respect to car body dimensioning. The car platform length, set at approximately 8 ft. with the first standardization of cars, thereafter was brought down to as short as 6 ft. 11 in., whereupon the trend was again back toward 8 ft. In fact, the newest cars of the two-man type now on order will have platforms 8 ft. 1 in. long. The value of the large platform in prepayment service has been thoroughly established. Since the adoption of the arch roof in 1912, the over-all heights of car bodies have been somewhat reduced. This has tended to lighten the weight, though ample headroom and volume of car body has not been sacrificed. Step heights have been gradually reduced as more compact motors have become available. The improvements in the weight per cubic foot of car body became effective when the change in car side construction was introduced in 1913-1914. At this time a straight steel girder side was adopted as standard construction and this avoided much duplicate weight in the car side as compared with the previous construction employing a girder inside of the car wall and a curved construction on the exposed side. The improvement in the relative weight of the truck in comparison with the total car weight is of course the result not only of the use of better materials and more careful designing, but also the advance in motor construction which made possible the use of wheels of smaller diameter. A further study of the tables will reveal many more interesting comparisons tending to show the trend of the art of car designing as it has been worked out in Chicago.

At the time of the passage of the 1907 ordinances the companies had available for operation 905 double-truck cars, most of which were of the best design then known to the art, as they had been but recently purchased in 1905 and 1906. The remaining cars were of such construction and dimensions that practically all of them could be, and later were, rebuilt to conform as far as possible to good practice in car design as then established.

In the fall of 1907, one of the companies added 300 double-truck cars to its equipment, with full approval of the board. These cars had been designed and provided for prior to the passage of the 1907 ordinances. As these 300 pay-as-you-enter cars were of the latest and best type then known to the art, resulting from a most extensive study of cars in all cities in the country, they were carefully studied by the board in connection with its design of the additional passenger cars required immediately under the new franchises. The platform layout of these 300 cars designed prior to the creation of the board and the generous dimensions of door openings, aisle widths and seat spacings, all planned to promote the comfort of passengers and their rapid and easy movement, are among the features. These cars were designed for double-end operation, which is the general standard in Chicago service.

IMPORTANT DETAILS OF 1908 CARS

As a result of observations made of the time of loading passengers on the 1907 cars, it was decided that the entrance passageway on the 600 board-designed cars bought in 1908 should be made about 40 in. instead of 34½ in., as it was believed that this would permit more rapid loading of passengers and would also increase the storage capacity of the platform, which was an important gain in a prepayment type of car. The details of this design are shown in Fig. 1.

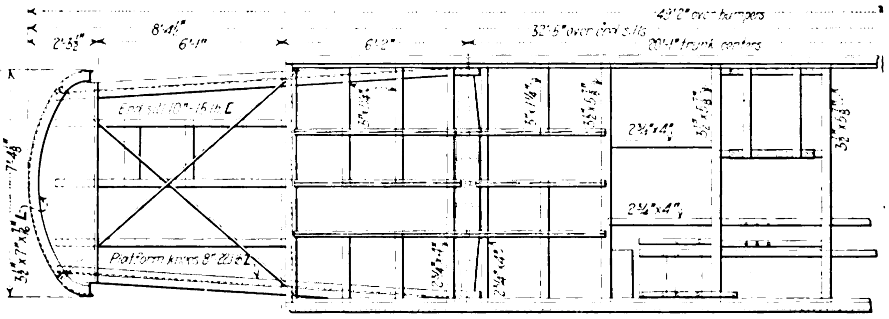

Fig. 2—Underframe construction on 1908 cars

Among other changes incorporated in the 1908 cars were the following: The cross-seats were spaced 32 in. centers instead of 33 in. This was done principally to increase the knee room between the longitudinal seats and the adjacent cross-seats. Cross-seat cushions were made 17 in. x 34 in. in order to provide a little more comfortable seat. This, together with the fact that the 1908 cars were made 8 ft. 7 in. wide over drip rails instead of 8 ft. 11 in. involved some sacrifice in the aisle width but still left it 24¾ in., sufficient to accommodate the movement of passengers and provide for standees. While the car width was reduced 3 in. the aisle width even with a longer seat cushion was reduced only 2 in. This result was made possible by the adoption of a car with raise sash instead of drop sash. It was realized that raise sash would not provide a semi-open car as is possible with the sash arrangement on the 1907 cars. Observations indicated, however, that this feature was frequently not taken advantage of so that a design would give the same practical results. The raise type of sash have other advantages, such as maximum width of aisle for a given over-all width, absence of pockets and comparative ease of operation, which caused this type of car to be selected. It may be noted that all cars since built are fitted with raise sash. Storm sash are fitted to these cars for winter service, as is also done with the 1907 cars. It has been observed that these storm sash make it possible to keep the cars at least 5 deg. warmer.

The sash frames throughout these cars were made of pressed steel treated to eliminate rust. Steel sash with narrow rails were used because it was felt the following advantages would be secured: Long life; no sticking in sash runs; increased light in the car and wider vision for passengers.

This type of sash was not successful from the standpoint of life in service, most of them lasting from twelve to fourteen years, but many considerably less. The other advantages were realized.

The floors in these cars were made of maple instead of hard pine so as to reduce the wear, especially between seats and around doorways. The maple floor has proved its merit in service and it has been standard construction since.

In designing the underframe to support a car body in which raise sash were used, it was not thought practical to utilize an overtruss because it would interfere with the placing of seats between the body side posts. This decision was also influenced by the fact that due to the great overhang of the platforms and their large carrying capacity, the stress in a truss bar of any practical section would be excessive. A plate girder design (Fig. 2) was therefore decided upon and in planning the section of this girder it was of course recognized that the most economical design would be one with the maximum possible depth. In a street railway car where wood superstructure is used, the maximum depth of girder is the distance from the bottom of the side sill to the bottom of the side window openings. In this case it was about 18 in. At the time of the design of these cars it was not thought practical to place the web of the girder so that it would form the outside wall of the car, because of direct exposure to mechanical injury and the desire to retain the concave-convex car side. The girder was therefore so placed that its web formed the inner wall of the car and the body side posts were placed outside. The body posts were covered with wooden sheathing and this sheathing protected with sheet-steel panels.

In determining the cross-section of the girder side sill a loading table was made up which showed the weight and location of all apparatus, fittings and equipment of the car and the weight and distribution of the passengers based on maximum loading. From these data and the dimensions of the car framework was calculated the bending moment at the critical section, viz.: the body bolster location, where, of course, the moment is maximum. The maximum bending moment in the platform knees was also obtained from these data. The section of the side sills of the underframe was built up to give the required section modulus which was based on a unit stress of approximately 12,000 lb. per square inch.

The platform knees are made of 8-in. Z bars of such weight and so reinforced with angles at the body end sill that they have a good margin of safety. After fourteen years service the side sills and platform knees of these cars are still in perfect alignment.

The end sills are made of 10-in. standard steel channels, and as the platform knees are of steel there is metal to metal bearing between these members. This construction was adopted to eliminate any possibility of looseness developing at the juncture of end sill and knee. The steel channel and sill is also lighter than the composite type. This was the first lot of cars in which the steel channel end sills was used and it was considered to possess such advantages as to make it standard construction on all cars since built. Experience has fully confirmed the wisdom of this choice.

The body bolsters were made in one piece of cast steel, and it is believed that this is one of the first instances in which this kind of bolster was used in street railway cars. Cast steel was chosen because it was believed weight could be saved and a stronger and more reliable construction secured. Experience has confirmed this belief, and as far as is known, out of several thousand in service, none have failed, although several have been badly bent in wrecks. In such cases they have been straightened and returned to use.

In the framing around trapdoor openings in the floor T-iron was used as in the 1907 cars. This construction has proved good in service and has been followed in all subsequent cars.

The platforms of these cars are of such length that diagonal bracing was considered necessary and it was provided with rods. This has proved effective in service. The underframe as a whole is very substantially constructed, although somewhat less in weight than that for the 1907 cars. Part of this reduction in

Data Covering Dimensioning, Construction, Equipment and Weights

Item Number	Number of Cars	Year Added to the Properties	General Type (All P. A. Y. E.) (All closed except 1907 group)	Seating Capacity			Standing Room (Sq.Ft.)	Principal Dimensions of Car					Trucks		Air Brake Equipment		Motor Equipment	
				Body	Platform	Total		Length of Body	Length of Platform	Length of Overall	Width Overall	Height of Body-Bottom of Sill Over Roof.	Type	Wheel Base	Type	Size of Compressor, Cu.Ft.	Number of Motors	Type
1	300	1907	Dble truck, dble end, semi convert	40	..	40	166	32 ft.-5 in.	7 ft.-11 in.	48 ft.-3 in.	9 ft.-0 in.	8 ft.-11¼ in.	Brill 27-FE-1	4 ft.-6 in.	National A-4	16	4	G.E.-80 straight series
2	600	1908	Dble truck, dble end	40	..	40	165	32 ft.-5 in.	8 ft.-4½ in.	49 ft.-2 in.	8 ft.-9 in.	8 ft.-10⅝ in.	Pullman 150	4 ft.-10 in.	National A-4	16	4	GE-216-A interpole
3	50	1908 09	Dble truck, dble end, all st	40	..	40	162	32 ft.-5 in.	8 ft.-4½ in.	49 ft.-2 in.	8 ft.-9 in.	8 ft.-8½ in.	Pullman 150	4 ft.-10 in.	National A-4	16	4	G.E.-216-A-interpole
4	350	1909	Dble truck, dble end	40	..	40	143	31 ft.-6 in.	7 ft.-3 in.	46 ft.-0 in.	8 ft.-6 in.	9 ft.-0 1/16 in.	Pullman 150	4 ft.-10 in.	National A-4	16	4	West. 319-B interpole
5	50	1909-10	Dble truck, dble end	40	..	40	144	32 ft.-0 in.	7 ft.-0 in.	46 ft.-0 in.	8 ft.-6 in.	8 ft.-11⅜ in.	Brill 27-FE-2	4 ft.-6 in.	Allis-Chalmers AA-6	16	4	G.E.-80 straight series
6	215	1912	Dble truck, dble end	40	..	40	136	31 ft.-2 in.	6 ft.-5 in. 6 ft.-11 in.	44 ft.-0 in. 45 ft.-0 in.	8 ft.-6 in.	8 ft.-10¼ in.	Brill 27-GE-1	4 ft.-10 in.	National A-4	16	4	G.E.-226 interpole ventilated
7	125	1912	Dble truck, sgle end, near side	53		53	124	38 ft.-1 in.	7 ft.-7 in.	45 ft.-8 in.	8 ft.-6 in.	8 ft.-10 in.	Brill 39-E	4 ft.-10 in.	G. E. C.P.-27	16	2	West. 306 interpole
8	100	1913	Dble truck, dble end	50	5	55	121	32 ft.-8 in.	7 ft.-8 in.	48 ft.-0 in.	8 ft.-6 in.	8 ft.-11⅛ in.	Brill 39-E	4 ft.-10 in.	G. E. C.P.-27	16	2	G.E.-242 interpole ventilated field control
9	200	1913 14	Dble truck, dble end	48	5	53	127	32 ft.-5 in.	8 ft.-0 in.	48 ft.-5 in.	8 ft.-6 in.	8 ft.-7⅞ in.	Brill 39-E.	4 ft.-10 in.	National A-6	16	2	West.-534 interpole ventilated field control
10	228	1914-15	Dble truck, dble end	50	5	55	127	32 ft.-8 in.	7 ft.-8 in.	48 ft.-0 in.	8 ft.-6 in.	8 ft.-8¾ in.	Brill 39-E.	4 ft.-10 in.	G. E. C.P.-27	16	2	G.E.-242 interpole ventilated field control
11	1	1921	Sgle truck, dble end, 1-man safety (Ry. design)	36	..	36	72	....	....	29 ft.-4½ in.	8 ft.-0 in.	8 ft.-5 1/16 in.	Brill 79-E	8 ft.-0 in.	C.E. C.P.-25	10	2	G.E.-264 interpole ventilated
12	10	1920	Sgle truck, dble end, 1-man safety ("standard")	32	.	32	60	....	....	28 ft.-0½ in.	7 ft.-8 in.	7 ft.-5 11/16 in.	Brill 79-E	8 ft.-0 in.	G.E. C.P.-25	10	2	G.E.-264 interpole ventilated
13	1	1921	Dble truck, dble end, 1-man safety	36	10	46	95	23 ft.-8 in.	6 ft.-9 in.	37 ft.-2 in.	8 ft.-6 in.	8 ft.-8¼ in.	Brill 77-E-1	4 ft.-10 in.	Westinghouse Bungalow	16	4	West.-508 interpole ventilated
14	101	1921	Dble truck, dble end, trler	60	2	62	117	....	....	47 ft.-6 in.	8 ft.-6 in.	8 ft.-8¼ in.	Brill 67-F	4 ft.-4 in.	....	....	..	Trailers
15	45	1922	Dble truck, dble end, 1-man safety	40	10	50	101	26 ft.-1½ in.	6 ft.-9 in.	39 ft.-7½ in.	8 ft.-6 in.	8 ft.-8¼ in.	Brill 39-E	4 ft.-10 in.	G.E. C.P.-27	16	2	G.E.-275 interpole ventilated
16	69	1922	Dble truck, dble end, 2-man	44	6	50	146	32 ft.-9 in.	8 ft.-1 in.	48 ft.-11 in.	8 ft.-6 in.	8 ft.-8¼ in.	Brill 51-E-2	4 ft.-10 in.	G.E. C.P.-127	20	4	G.E.-275 interpole ventilated*
	2,445																	

* Capable of handling trailers in all-day service. † Weight of truck without motor in per cent of maximum center plate load. e Estimated. a Approximate. x At 600 volts.

weight is due to the fact that this car is 3 in. less in width, though better design was also a factor.

ALL STEEL CARS PURCHASED IN 1908-1909

The chief engineer of the work under the 1907 ordinances felt that in view of the possibilities of all steel cars it would be wise to secure some experience with such equipment. Under his direction, plans and specifications were prepared for the construction of fifty such cars, listed in the table as the 1908-1909 group. It was expected that the following advantages would be realized with these steel cars: Long life, fireproof, and low maintenance cost. The general dimensions of these cars and the arrangement of seats and platforms is the same as for the 1908 cars just discussed.

It was the intention to eliminate wood from their construction as far as practical and the only items in which this material is used are:

Steps: The step boards or treads were made of wood principally because of ease of repair.

Floor mat strips: These were made of hard maple to provide an anti-slip surface and a readily renewable construction.

Body and platform doors: Doors were made of wood to save weight and cost.

Trolley boards: These were made of wood in order to provide a proper insulation for the trolley bases.

In other places where wood is customarily used, steel was substituted.

The framing is characterized by the use of thin pressed sections throughout, with the exception of a few connections where steel castings are used. In the underframe, the platform knees, end sills, bolsters and crossings are all pressed members. The sections of these members except the end sills are varied in depth which results in light-weight construction. The side member is of the girder type with 3/32-in. web plate extending from bottom sill to the window arm rest and reinforced at this point with a flat bar. This was the first lot of cars in which this type of frame was used. The girder is so placed that the web forms the inside wall of the car, the steel posts being riveted to the outside of the web. On the outside faces of the posts is riveted the outside steel panels, which are so placed with guard rail between top and bottom panels as to give the appearance of a concave-convex side car. This construction was possible because of the use of steel side posts which permitted a thin side wall. It was necessary however, to decrease the aisle width ¾ in.

These steel cars weigh about 500 lb. less than the 1908 composite type cars, both being built to substantially the same dimensions. They have been quite satisfactory in service, but experience has shown that the composition cement floor is not practical. It wears rapidly, is very heavy, and makes an uncomfortable floor to stand on in wet or cold weather. These floors have been replaced with wooden ones. The thin interlocking steel floor base has also proved impractical in that it rapidly rusts out, especially at points where wheel wash is thrown against it. This is also true of all thin sections of the underframe which are exposed to such action.

The expectation that it would be comparatively easy to replace bent or damaged sections has not been altogether realized, owing in many instances to the method of fastening these parts to the framing. The steel sections such as vestibule posts and body corner posts are of such shape that they are very resistant to mechanical injury and therefore they

of Chicago Street Cars Showing Trend of Development

Motot Equipment					Heaters		Lights (All 23-watt Mazdas)								Underframe					Height of Car Steps (In.)			Weight of Car Completely Equipped Less Passenger Load (Lb.)					Weight of Bare Car Body (lb.) (approximate)						
Weight (lb.) Motor Less Gearing	Weight (lb.) Per Lb. at 500 V.	Total rating motors Per car at 500 V.	H.P. per ton of Light Car	Controllers	No. Platform	No. Body	Watts per car at 550 V.	In Signs	On Platforms	Headlights	In Body	Total	Roof Construction	Side Construction	Type	Bolsters	Dia. Wheels (In.)	Height at floor (In.)	Ramp on car floor (In.)	Rail to Step	Step to Platform	Platform to Car Floor	Total Car	Per Seat	Per Foot Length	Per Sq.Ft. of Floor Area	Per Cu.Ft. of Contents	Total Body	Per Seat	Per Ft. of Length	Per Sq.Ft. of Floor Area	Per Cu.Ft. of Contents	Trucks,† Weight Factor, Per Cent	Item Number
2,420	60.5	160	5.92	K-28	2	20	12,584	2	2	2	21	27	Monitor Deck	Curved, Concave-Convex [1]	Over truss semi-steel	Steel built up bolted	34	40¾	none	17	13	10	54,040	1,351	1,120	161	20.5	20,800	520	431	62	7.90	35.5	1
2,430	60.8	160	6.04	K-35	2	20	12,584	2	2	2	21	27		[2]	Plate girder semi-steel	Cast Steel	34	40	none	17	13	10	53,060	1,325	1,078	155	20.9	20,000	500	407	58	7.90	32.3	2
2,430	60.8	160	6.09	K-35	2	20	12,584	2	2	2	21	27		[3]	Plate girder all steel	Pressed Steel	34	40	none	17	13	10	52,500	1,313	1,068	150	20.8	19,550	488	397	56	7.78	32.5	3
2,587	64.6	160	6.34	K-35	2	20	12,584	2	2	2	21	27		[2]	Over truss all steel	Cast Steel	34	40	none	15	14	11	50,500	1,263	1,098	160	21.9	17,530	438	381	55	7.62	33.6	4
2,420	60.5	160	6.03	K-28	2	20	12,584	2	2	2	21	27		[2]	Over truss all steel	Cast Steel	34	41½	none	16½	14	11	53,040	1,326	1,152	171	23.2	19,000	475	413	61	8.32	35.0	5
2,037	58.3	140	6.11	K-35	2	20	12,584	2	2	2	16	21	..	[2]	Plate girder	Built up riveted	34	40¾	none	16¼	13⅝	11	45,500	1,138	1,011	148	20.4	15,600	390	347	51	7.00	33.8	6
2,553	51.1	100	5.46	K-36	2	20	12,584	2	2	1	20	25	..	[2]	Over truss all steel	Cast Steel	34	39	1½	14	13	10½	36,600	691	802	118	15.1	15,000	283	329	48	6.25	28.0	7
2,982	54.2	110	5.10	K-51	2	22	12,584	5	4	2	18	29	..	[2]	Over truss all steel	Cast Steel	34	38½	3	13½	12	10	43,120	785	898	131	17.8	19,150	348	334	58	7.85	25.0	8
2,533	50.6	100	5.50	K-51	2	22	11,800	2	2	2	16	22	Arch Roof	Straight Steel Sides [2]	Deep Plate Girder	Cast Steel	32	37	2½	13	11½	10	35,800	676	739	104	13.8	13,720	259	283	40	5.30	26.3	9
2,982	54.2	110	5.47	K-51	2	22	12,584	5	4	2	18	29		[2]		Cast Steel	34	39	3	13½	12½	10¼	40,180	730	838	118	16.1	17,000	309	354	50	6.80	25.0	10
900	45.0	50x	...	K-63	..	12	7,200	4	4	2	8	18		[2]		......	26	27 3/16	.....	14	13 3/16	...	16,375	457	560	84	11.7	7,900	219	269	41	5.64	19.6	11
900	45.0	50	...	K-63	..	12	7,200	4	4	2	8	18		[2]		......	26	28 11/16	none	16¼	12 1/16	...	16,460	514	588	87	12.9	8,100	253	289	43	6.37	20.6	12
900	45.0	100x	5.7	K-35	4	18	10,648	3	4	2	14	23		[3]		Cast Steel	26	31	none	13	12	6	28,050	623	755	107	14.1	10,900	238	288	41	5.40	31.5	13
.....	....	......	...	.....	2	22	11,616	..		.	20	20		[2]		Cast Steel	22	31¼	5⅜	15¾	...	10¾	26,000	419	549	78	10.4	14,080	227	297	42	5.64	22.4	14
2,300	38.3	120	6.6	K-68	2	20	10,648	3	4	2	14	23	..	[2]		Cast Steel	28	33	none	4¼	12¾	6	30,300	606	765	113	15.2	11,100	222	281	42	5.56	30.0	15
2,300	38.3	240	8.7	K-35 HH	2	22	12,584	5	4	2	18	29	..	[2]	....	Cast Steel	28	37½	none	15¾	13 1/16	9 5/16	46,000	920	941	135	17.6	15,500	310	327	46	5.90	30.7	16

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[1] Bottom sash drop into pockets; top sash raise into roof. [2] Bottom sash raise. [3] Bottom sash drop into pockets.

suffer little from those blows which would do considerable damage to wooden posts. The same is more or less true of the body side panels. As far as these items are concerned the upkeep cost has been reasonable. A considerable stock of spare pressed sections were purchased with the cars and replacements have thus been available.

No additional all-steel cars have been purchased by the Chicago companies, chiefly because of the high first cost of such cars, which in this instance amounted to about 20 per cent more than the 1908 composite cars. Shop equipment is also laid out on a basis of repair for composite cars. The tendency, however, in car design is toward a greater use of steel as will be noted from the discussion on the later lots of equipment added to the Chicago properties.

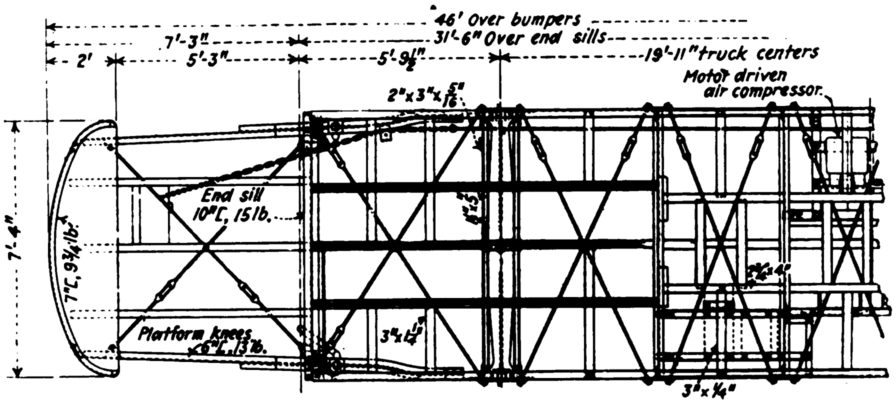

Fig. 3—Underframe construction on 1909 cars

350 SMALLER CARS PURCHASED IN 1909

The companies with the addition of the 950 large double-truck PAYE cars just described, and the remodeling of 100 such cars acquired just prior to Feb. 1, 1907, now owned 1,050 large cars capable of satisfactorily handling the heaviest service.

It was therefore felt that sufficient equipment of this class was available for some time to come and that the immediate requirements could be met with cars of somewhat smaller capacity. The next lot of equipment, 350 cars, added in 1909, were therefore built somewhat smaller.

The concave-convex car sides with top and bottom panels divided by a guard rail was followed again in these cars as in former designs because of the belief that the appearance of such design is superior to any other. The wooden panels in this case were, however, not covered with steel plates as formerly. These plates were omitted to save weight, it being estimated that this omission would result in a saving of approximately 450 lb. per car. It was recognized that there would probably be more smashed side panels than if the steel cover plates were used, but on the other hand, the steel plates gave considerable trouble due to rusting out. These steel panel plates were later removed from the 1908 cars for the reasons just stated.

SLIDING TYPE OF BULKHEAD DOORS ADOPTED

The body bulkhead doors were all made of the sliding type, instead of one sliding and one swinging door as in the 1908 cars. This change was made because of the inconvenience of the swing door, and the space taken by it in swinging into the car body. The swing door is not easy to keep in adjustment to prevent it blowing or standing open and its cost of upkeep is greater than the sliding door. A 10-in. saving in car body length was possible through this change.

By spacing the cross-seats somewhat closer, an additional saving in car body length was secured, so that in these cars, this dimension is 31 ft. 6 in. as compared to 32 ft. 5 in. in the cars preceding this equipment. The over-all width of the car is 8 ft. 6 in. instead of 8 ft. 9 in. and 8 ft. 11 in. in the earlier models. This change in over-all car width was made to provide somewhat more space between passing cars and to reduce car dimensions and therefore weights to the lowest practicable figures consistent with good design and the requirements of the service.

The monitor type of roof was used on this as on all previous cars, principally because it was then thought that sufficient ventilation was difficult to obtain in any other type of roof construction. By virtue of the thin car side walls made possible with a raise sash design, cross-seats with 17-in. x 34-in. cushions and an aisle of 24-in. width between seat end plates were secured with an overall width of 8 ft. 6 in. The underframe for these cars was designed with a view of obtaining the lightest structure possible consistent with the loads to be carried and is shown in Fig. 3. Experience with former cars having shown the desirability of lateral stiffness in the car underframe, this design was liberally provided with diagonal rod bracing which is effective and light in weight.

It was also decided to use a special type of steel body post with corrugated sides which had been successfully used in other classes of cars. The corrugated sides of this post form the sash and curtain runways. These steel posts also make possible a thin side wall because their depth can be made less for the same strength than wooden posts. These steel posts were specially treated to minimize rusting.

While these posts have given satisfactory service they have not been used in succeeding lots of equipment chiefly because of their special design, which means added cost and requires special sash fittings. The anti-rust treatment has not been altogether successful.

Steel sash were used in these as in the 650 cars immediately preceding. As in the earlier cars, these sash have suffered from corrosion due to rust and have been largely replaced with brass sash, and more recently, because of excessive cost of metals, replaced with wood sash.

TREND TOWARD REDUCED DIMENSIONS CONTINUES

The last lot of cars, fifty in number, added by one of the companies in the three-year period of immediate rehabilitation and listed in the table as the 1909-1910 group, were also of somewhat less dimensions than the first 950 large cars. These are very similar in general dimensions and equipment to the lot of 350 cars just described and listed as the 1909 group. They have proved very satisfactory in service.

This brings the discussion of Chicago's car design experience and development down through the cars purchased during the three-year rehabilitation period. The development since that time, carried up through the 1922 additions to rolling stock, will be published in next week's issue of the *Electric Railway Journal.*

Experience with Chicago Track

By CHARLES S. HOLCOMB
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The Types of Construction Used Since 1907 Have Given Very Good Results—The Few Changes in Details Found Desirable to Meet Heavy Duty Are Related—Weighted Life of Track and Special Work and Relation Between Traffic and Rail Wear Given

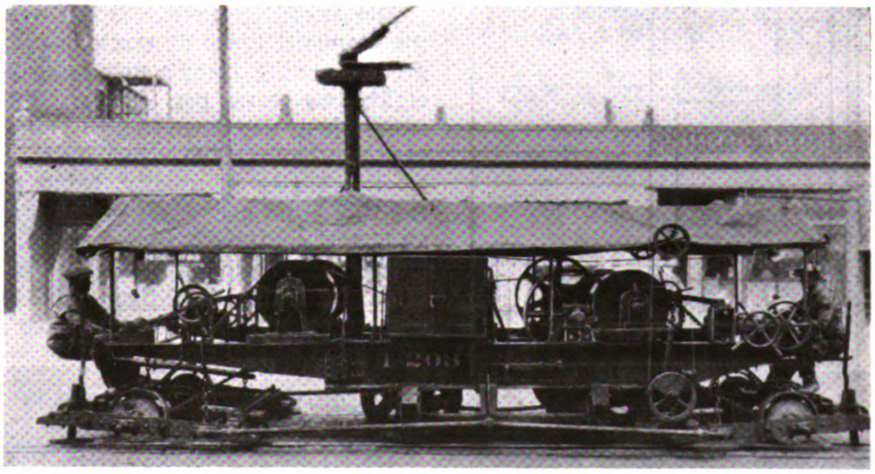
THE greater part of the street railway traffic in Chicago has been carried on four types of track used in rehabilitating the surface lines since 1907. For convenience these types will be briefly described in the following order: Type 2-A, Type 2, Type 1 and Type 3.

Type 2-A track was constructed with 9-in. 129-lb. grooved girder rail laid on 6-in. x 8-in. x 7-ft. wood ties surfaced four sides. These ties were imbedded in concrete which extended from 6 in. below to about 3 in. above the tie. The tie spacing was 3 ft. on centers and the fastenings consisted of four screw spikes per tie used in connection with 7½-in. x 9½-in. shoulder tie plates.

Type 2 track was of the same general design as type 2-A, the variations from type 2-A being due to the fact that type 2 was built almost entirely on streets where the original track had been built for cable car operation and in consequence the new track had to meet certain special conditions. This old cable track had a continuous concrete slot down the center of each track and the rails were supported on heavy iron yokes, well imbedded in concrete and spaced about 4 ft. on centers.

In most cases this old concrete was in excellent condition and could have been entirely removed only at great expense. This expense would not have been justified as the old concrete made an unusually solid sub-foundation for the new track. As a consequence where new track was laid above cable track only such portions of the old cable concrete were cut away as was necessary in order to have not less than 6 in. of new concrete below the ties and not less than 12 in. under the rails.

It was the general practice on this type of track to place the ties for the new track between the cable **yokes of the old track. Type 2 track might therefore be described as type 2-A track with the tie spacing about 4 ft. instead of 3 ft. and with pyramids of material from the old track projecting up between the ties. Nearly all of the type 2 track built was built during the years 1907 and 1908.**



Double-end grinding machine has greatly facilitated removal of corrugations and lowered the cost

Type 1 track was of the same general design as type 2 except that steel ties, attached to the rail by clips and wedges, were used instead of wood ties. Nearly all of the type 1 track was built during the year 1907.

Type 3 track was constructed with **9-in. 129-lb. grooved girder rail laid on 6-in. x 8-in. x 7-ft. wood ties surfaced four sides. These ties rested on 8 in. of crushed stone or crushed slag ballast and were covered with concrete from the bottom of the tie to about 3 in. above the tie. The tie spacing was at 2-ft. centers and the fastenings consisted of four screw spikes per tie used in connection** with 7½-in. x 9½-in. shoulder tie plates.

TABLE I—MILEAGE OF TRACK BUILT IN CHICAGO BY TYPES UP TO JAN. 31, 1922

Year	Type 1	Type 2	Type 2-A	Type 3
1907	6.884	11.352	3.484	24.723
1908	.....	57.058	10.509	28.955
1909	.....	......	86.849	31.887
1910	.....	......	37.952	21.490
1911	.....	......	64.116	38.997
1912	.....	......	30.610	8.494
1913	.....	......	42.356	19.933
1914	.....	......	31.226	20.136
1915	.....	......	37.691	3.208
1916	.....	......	34.303	2.903
1917	.....	......	17.256	1.563
1918	.....	......	3.650	3.549
1919	.....	......	1.491	0.854
1920	.....	......	0.294	0.234
1921	.....	......	....	0.341
Totals	6.884	68.410	402.547	207.266

As stated before, types 1 and 2 were used almost exclusively where new tracks were laid over old cable track construction. Both types 2-A and 3 have been laid on almost every variety of subsoil in the city and under all kinds of traffic density. In a general way, however, type 2-A track has been used where the subsoil conditions were poor and where traffic conditions were such that the track concrete could be allowed fourteen days to set before the track was opened to service, while type 3 track has been used where the subsoil conditions were good and traffic conditions were such that the track concrete could not be allowed fourte n days to set. An accompanying table shows the amount of each class of track built up to Jan. 31, 1922.

Type 1 track was discontinued after 1907 and type 2 after 1908, but this was due largely to the fact that the greater part of the old cable track had been reconstructed by the end of 1908 and that type 2-A was better suited to other conditions where a solid concrete foundation was desired. Types 1 and 2 were built chiefly on streets that contained old cable track and as these were the main lines of travel to and from the business district these two types have been under very heavy traffic ever since they were laid without giving any special trouble attributable to the type of construction. As stated before, the tie spacing on this track was governed largely by the spacing of the old cable yokes, which was about 4 ft. on centers. While no special trouble has resulted from this wide tie spacing it throws a considerable strain on the rail fastenings and ties, especially under the heavy and continuous traffic that these types have carried, and this is another reason for the change to type 2-A track where the tie spacing is at 3 ft. centers.

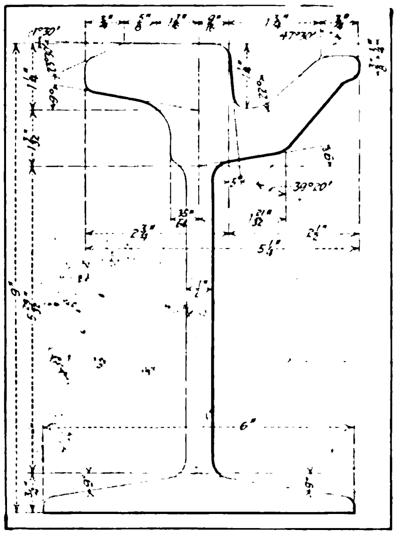


Fig. 1—Rail section used as standard in Chicago

Types 2-A and 3 have been used with equal success in most places, the type of track being governed largely by whether or not it was possible to hold traffic off the track for the two weeks required for type 2-A. In the downtown business or Loop district, where most of the streets could not be closed for two weeks, the tracks are very largely of type 3 construction, which has been satisfactory under these trying conditions.

TABLE II—AVERAGE WEIGHTED LIFE OF TYPES 1, 2, 2-A AND 3 TRACK

Type of Track	*Average Weighted Life Years	Remarks
1	14.5	
2	13.7	
2-A	9.5	
2 and 2-A	10.0	All solid concrete track having wood ties.
1, 2, and 2-A	10 1	All solid concrete track.
3	10.9	All ballasted track.
1, 2, 2-A and 3	10.4	All heavy construction track.

* The average weighted life was obtained by multiplying the number of feet of track of each kind built in each year by its age as of Jan. 31, 1922, and dividing this total by the amount of track of each type as of Jan. 31, 1922.

Considering the whole track structure as a unit, none of the four types of track under consideration can be said to have worn out or be likely to wear out for some time to come. Certain portions of the track structure have had to be replaced, but these replacements have in most cases, been due, not to the type of track but to the failure of the parts themselves. These items will be considered in detail later. The life of Chicago track on a weighted basis is given in Table II.

The variation in car traffic over the standard types of track is very great, running from a maximum of eighty-two cars per hour for a twenty-hour day down to about eight cars per hour. The vehicular traffic also varies as greatly, being all the way from practically nothing to an almost continuous line of heavily-laden trucks and wagons. This variation in traffic conditions will be taken up again in connection with a discussion of rail wear.

SUBSOIL CONDITIONS IN CHICAGO

Three general types of subsoil are encountered in Chicago—sand, clay and filled land. Along the entire lake front and for some distance back into the city the soil is almost entirely lake sand. When properly confined this gives a firm foundation and excellent drainage. In the more westerly sections back from the lake shore the soil is almost entirely clay. This clay is thoroughly rolled before placing the track and has given good satisfaction as a foundation although it has been necessary to install drain tile at some locations. Both solid concrete and ballasted types of foundation have been used with success on this subgrade, but the solid concrete type has been used to the greater extent. In the southeast portion of the city, known as South Chicago, the streets are above the level of the natural ground in many places and tracks laid on these streets have a subgrade composed of the miscellaneous material used in filling. However, the traffic in this section of the city is comparatively light, hence almost no track of the heavier type of construction has been laid on such subgrade. There are a few locations where tracks cross ridges of limestone rock but the amount of such track is so small that no change in the type of construction has been made on account of such subgrade.

As noted before, the types of foundation used are two in number, solid concrete and crushed stone, or crushed slag ballast. Both of these types of foundation have given excellent results except in a few cases. In almost all of these cases the foundation failures were due to conditions over which the street railway companies had no control. In some cases the new tracks were built over sewer ditches which had been filled for some time and were supposed to have thoroughly settled but which later settled still further, causing a settlement in the track. In other cases, especially in the Loop district, deep building foundations excavated to the curb line caused the entire street to settle, including the railway tracks. In only one instance has it been necessary to change the type of foundation on any considerable length of track because of foundation failure. This was on 1½ miles of track laid as type 3 in 1907, which settled so badly, due to poor subgrade, that it was necessary to place a 2-A foundation under it in 1914.

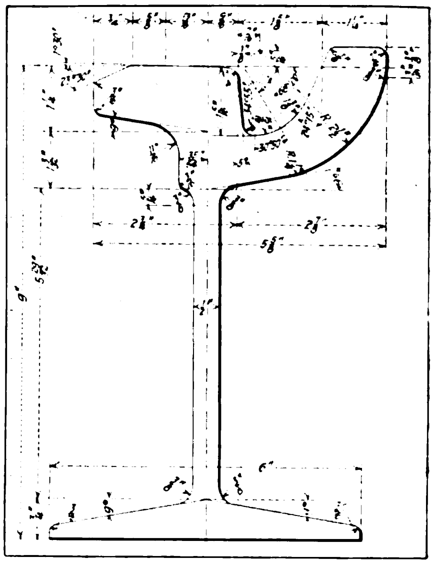


Fig. 2—Guard rail used in Chicago which fishes with standard section

Several kinds of ties have been used at various times, but by far the greater number are 90 per cent heart untreated, long leaf yellow pine, 6 in. x 8 in. x 7 ft., dressed on four sides. In the earlier years a small per cent of treated ties were used, the greater number being treated with creosote and zinc chloride. No special difficulty has been encountered with any of these ties except those treated with zinc creosote. Where such ties were laid, the rail soon showed signs of loose fastenings and upon investigation it was found that the screw spikes used were so badly eaten away that they had lost practically all of their holding power. The use of zinc chloride treated ties was therefore discontinued.

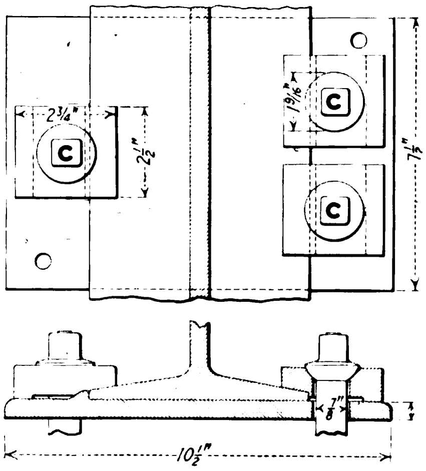
The long leaf yellow pine ties, when incased or partially incased in concrete as in the types under consideration, give a very satisfactory life. In fact, there is hardly any track of these types where there has been any appreciable tie renewal.

A large number of ties have been uncovered at the end in connection with the renewal of rail fastenings, and almost without exception they have been in such condition that new fastenings could be placed on the old ties. Most of these ties have had ten or more years in the track and in many cases appear to be in much the same condition as when placed. In most cases where holes are bored for new screw spikes in these old ties, the borings brought up are of a gray color for the first half inch or so, but for the remainder of the depth are of the same bright yellow color as those coming from a new tie. It is interesting to note that in a large number of cases these borings were damp, showing that the ends of the ties at least have absorbed some water even though completely incased in concrete. In practically no case has the tie appeared to have become loosened from the surrounding concrete.

Oak ties, both with and without tie plates, were used in some of the earlier track. These ties have proved satisfactory but appear to have given no better results than the standard yellow pine tie.

Steel ties have likewise proved to be satisfactory, but their use has been confined largely to type 1 track and to locations where the shallower tie was needed to get adequate headroom. Several stretches of track have been laid under normal conditions with steel ties, but to date this track does not seem to have given any better results than similar track laid with wood ties.

Tie plates have been used on nearly all ties laid in types 1, 2, 2-A and 3, except for a few miles of track laid on oak ties in the earlier years of rehabilitation. The tie plates used until about 1913 were shoulder tie plates 7½ in. x 9½ in. x ½ in., but after that date a new shoulder tie plate 7½ in. x 10½ in. x ½ in. was introduced in connection with a new clip fastening. The latter is now the standard plate. It is described more fully in the next paragraph. Tie plates uncovered in connection with the renewal of rail fastenings generally show wear on the upper face of the tie plate, but as a general thing the plate has not cut down into the tie. The use of tie plates on heavy traffic streets is considered necessary in Chicago and no important track is now laid without them.



Present standard Chicago rail fastening

The rail fastenings used in Chicago tracks are the only part of the track structure as originally designed in which any material change has been made or which has failed to date to have a life equal to that of the other portions of the track. The original rail fastenings consisted of the 9½-in. shoulder tie plate fastened to the tie with two lag screws, the outside of the rail base resting against the shoulder. The rail was held down by means of two screw spikes 6¼ in. long with diameter varying from ¾ in. to ½ in. and having a head about 2 1/16 in. in diameter which had a direct bearing on the rail base.

Careful tests of the holding power of these spikes were made and from all indications the fastening was of sufficient strength properly to perform its function. However, after a number of years of service in track carrying heavy cars at frequent intervals, they began to show signs of failure and a heavier fastening, shown in an accompanying drawing, was adopted in their stead. The failure of the old type fastenings to come up to expectations was not due to lack of holding power so much as to the fact that the head became bent backward, thus allowing the base of the rail a considerable amount of play, which in the course of time wore away both the screw spike and the plate.

In the case of old-style screw spikes which have been in the track for a number of years, a noticeable amount of corrosion has taken place. In some cases this has gone so far that the spike is very materially reduced in diameter and shortened in length, so that the holding power of the spike is reduced to practically nothing. It is interesting to note that the corrosion of a screw spike in an untreated tie after about ten years' service resembles very closely the corrosion that took place in two and one-half years in a similar screw spike used in a tie treated with zinc chloride.

The new fastening that has been adopted has so far overcome the defects of the old one and up to the present time has developed no failings of its own. This fastening consists of a 7½-in. x 10½-in. x ½-in. shoulder tie plate fastened to the tie with two lag screws, the outside of the rail base resting against the shoulder with the rail held down by three sets of clips and screw spikes. The screw spikes used are 7¼ in. long and vary in diameter from ⅞ in. to ⅝ in. The head of the spike is 1 9/16 in. in diameter, with a spherical surface on the underside that fits into a cup in the top of the rail clip, thus forming a ball and socket connection with the clip, and insuring a firm bearing between the spike and the clip even if the spike is not driven exactly on the perpendicular. The clip is 2½ in. x 2¾ in. and varies somewhat in thickness, the thicker or outer end resting on the plate and the other end on the base of the rail. One of these clips is placed on the outside of the plate and the other two on the inside to help counteract the tendency of the 9-in. rail to tip outward under heavy traffic. This fastening is shown herewith and is proving very satisfactory, some of them having been in place for about nine years without showing indications of weakening.

Due to the weakness that developed

with the old fastenings it has been necessary within the last two or three years to renew the fastenings on the older and heavier traffic streets. This is done by removing the paving, chipping out the concrete along the rail, removing the old fastenings and placing the new ones on the old ties, reconcreting and replacing the paving.

It has been the practice on all of the heavier types of track to weld the rail soon after it is laid, preferably before traffic is allowed on the track. When the rails were first laid they were fastened together by a pair of short two-bolt joint plates to hold them in place during construction. As soon as the concrete had properly set (seven days for all solid concrete types) the joints were electrically welded.

The welded joint used up to and including 1920 was that known as the Lorain weld which was placed with the apparatus furnished by the Lorain Steel Company. About 125,000 original joints were applied to the types under consideration up to and including the year 1920. The use of the Lorain weld was discontinued after 1920 due to the fact that practically no extensions were being built and hence the amount of work in prospect was so small that the rental of the large amount of apparatus necessary to install the Lorain joint made its continued use uneconomical. Since 1920, seam welded joints have been installed by the companies' own men with the arc welding machine supplied by the Rail Welding & Bonding Company. These joints have been installed too short a time to tell how they will work out, but so far they seem to be giving satisfactory service.

The tie rods used on all types of track are 2 in. x 5/16 in. x 5 ft. 1/8 in. They are forged or rolled from a single piece of steel or iron and have 1-in. round threaded terminals with two nuts on each end. Tie rod holes are punched at intervals of 6 ft. along the rail, except that a tie rod hole is always punched 2 ft. from the ends of each rail. The tie rods in use at the present time are practically identical with those originally used, the service rendered by these having been so satisfactory that no change has been found necessary or desirable.

The rail section used on the street railways of Chicago is a special 9-in. section known as the Chicago section. It is shown on page 446. This section is specified in the ordinance as the section of rail that the companies must use on all heavy traffic streets. It has proved to be very satisfactory and the great majority of the rail originally laid is still in place. It has only been necessary to make a complete rail renewal on one continuous stretch of double track about 1/2 mile long on Wabash Avenue, one of the heaviest traffic streets leading out of the downtown district. This rail had given about fourteen years of service when removed. In addition to this rail renewal, a number of stretches of track at heavy stopping points have been rerailed, and a considerable amount of the old rail has been cut out in short pieces in connection with the rewelding of badly broken joints.

VEHICULAR TRAFFIC IMPORTANT IN RAIL WEAR

Such investigations as have been made in Chicago on the relation of wheel passes and tonnage to rail wear seem to indicate that there is no fixed relation existing under Chicago conditions. After the new types of track had been in service for about five years an extended survey of rail wear conditions was made, and the data compiled in connection with the number of cars that had passed over the rail, the comparisons being made on the basis of the number of car passes for 1/64 in. of rail wear.

The result of this investigation showed such a wide variation in the rail wear on the streets considered that a further study was made of the local conditions, with results that seemed to show conclusively that vehicular traffic was a very important factor in rail wear. This vehicular traffic varies so greatly with the seasons, building conditions, etc., that it is very difficult to get accurate data on its kind and amount except by detailed observations over a long period of time. Owing to this difficulty the study was not carried far enough to make possible an estimate of the amount of rail wear due to each kind of traffic.

The great variation in car passages per 1/64 in. of rail wear may be seen by comparing the results found on streets "A" and "B." The track on both of these streets was of the solid concrete type laid in the same year and examined after about five years of wear. On street A the average number of car passes per hour for a twenty-hour day was eighty-two, or considerably more than one per minute during the hours of operation, while on street B the corresponding figure was ten car passes per hour or a car about every six minutes. An examination of the rail wear on these two streets showed that on street A (heavy traffic) it required 286,800 car passes to wear the rail 1/64 in., while on street B (light traffic) the corresponding figure was only 66,400 car passes per 1/64 in. of the rail wear. In this connection it should be noted that while the empty cars on the two streets did not differ greatly in weight, the average load carried on street A was undoubtedly much greater than that carried on street B.

Further examination of these streets, however, revealed the fact that on street A the headway between cars was so short that heavy vehicular traffic practically never pulled on or off the tracks, while on street B the vehicular traffic on the tracks was very heavy, due to the presence of several large freight yards in the vicinity and to the fact that the section was building up very rapidly and the paving in the tracks presented the best hauling surface of any street in the neighborhood. Almost all of this traffic was carried on steel-tired wheels and the result was that the rails were strewn with sand and stone from the material wagons, which was ground up by the following car and vehicular traffic.

These streets are extreme cases, but they bring out most forcibly the fact that car traffic and loading are by no means the only important factors in wear of rail laid in paved city streets. An examination of Fig. 3 offers further proof of the important rôle that vehicular traffic plays in street railway rail wear. The wear shown on this section is entirely due to vehicular traffic, as the rail in question was laid in a paved street as an emergency track and was used only at very infrequent intervals by an occasional car. On the other hand it did carry a large amount of heavy freight traffic moved on steel-tired wheels.

While the foregoing data are of value as giving the experience of Chicago with its track, they give little of value for figuring future rail wear because of the fact that much of the hauling over these tracks was done with steel-tired wheels, while in the future much of it will be done on rubber tires which should have a decided tendency to increase the life of rail in paved city streets.

The large number of car passes

required to produce $\frac{1}{64}$ in. of wear on street A brings up one factor that was not considered in connection with the above studies, and that is the effect that the constant cold rolling to which the head of the rail is subjected has upon the structure of the steel itself. The data from streets A and B would tend to confirm the contention that the steel in the head of a rail subjected to traffic such as that on street A becomes much harder and more durable than the steel in the head of a rail subjected to traffic like that on street B.

The way in which the greater portion of the rail in Chicago has worn is shown in Figs. 4 to 8. Fig. 4 shows what is perhaps as typical a section as any of the general conditions of Chicago rail. Examined in the street this rail appears much as when laid except that the length of the bevel at the back of the head is not quite as great. The illustration shows, however, that the gage line has been worn back to some extent, that there is a slight wear on the lip of the rail opposite the gage line due to the bearing of wheel flanges, and that the top of the lip is worn down. This latter wear is due to vehicular traffic and not to wear from cars, and is evident to some extent on almost all Chicago rail.

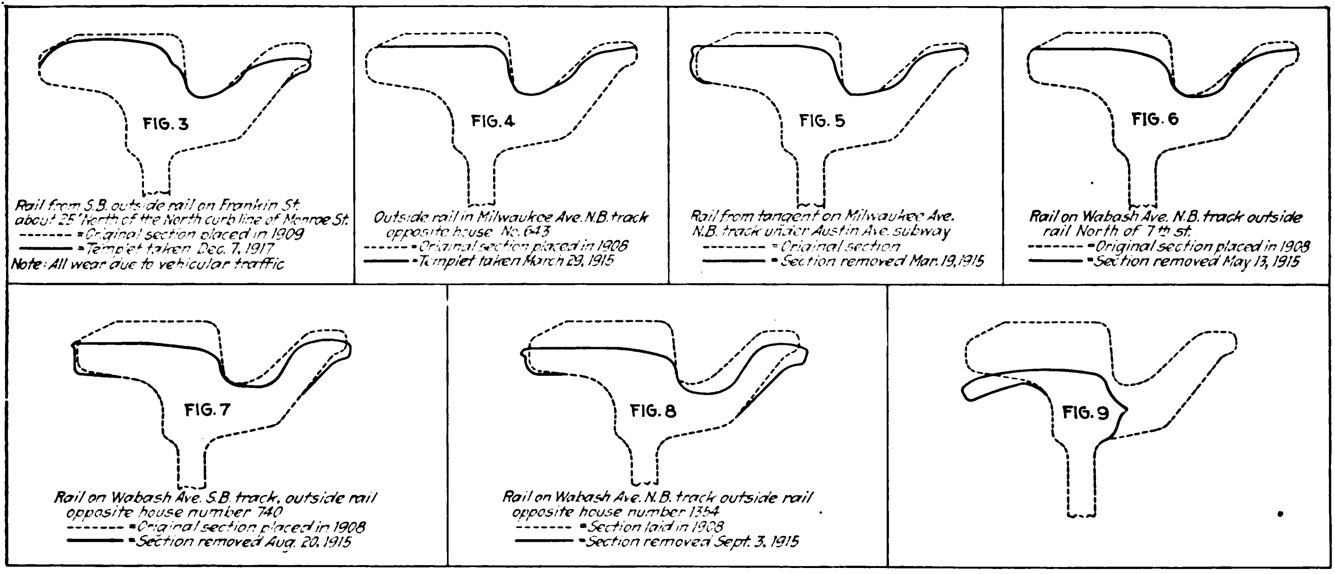


FIG. 3
Rail from S.B. outside rail on Franklin St. about 25' North of the North curb line of Monroe St.
------- = Original section placed in 1909
——— = Templet taken Dec. 7, 1917
Note: All wear due to vehicular traffic

FIG. 4
Outside rail in Milwaukee Ave. N.B. track opposite house No. 643
------ = Original section placed in 1908
——— = Templet taken March 29, 1915

FIG. 5
Rail from tangent on Milwaukee Ave. N.B. track under Austin Ave. subway
------- = Original section
——— = Section removed Mar. 19, 1915

FIG. 6
Rail on Wabash Ave. N.B. track outside rail North of 7th st.
------- = Original section placed in 1908
——— = Section removed May 13, 1915

FIG. 7
Rail on Wabash Ave. S.B. track, outside rail opposite house number 740
------- = Original section placed in 1908
——— = Section removed Aug. 20, 1915

FIG. 8
Rail on Wabash Ave. N.B. track outside rail opposite house number 1354
------- = Section laid in 1908
——— = Section removed Sept. 3, 1915

FIG. 9

Nature of rail wear as experienced in Chicago surface track

Fig. 5 shows additional wear but with the general contour much the same except for a slight flow of metal at the back, which is occasionally seen when the head is nearly worn down to the edge of the bevel.

Fig. 6 shows a more advanced state of wear. The top of the worn rail instead of being nearly parallel to its original position, as in Figs. 4 and 5, is now sloped to the gage line to a considerable extent, and there is no very decided point of division between the top of the head and the side of the throat. The wheel flange is now running on the lip of the rail to such an extent that the bottom of the groove is considerably increased in width.

Fig. 7 shows a further increase in wear. The back of the head is worn so thin that it is beginning to bend down slightly, while the flanges have cut the throat down to below its original depth, and in consequence the lip is weakened to such an extent that it shows considerable downward bend under vehicular traffic.

Fig. 8 shows the same type of wear as Fig. 7 but to a considerably increased extent. The gage line is now worn down well toward the original bottom of the throat, the back of the rail head is considerably bent down, while the lip is so weakened by flange wear as to be decidedly bent.

Fig. 9 shows the Chicago section entirely worn out. This rail was taken from a stopping point in a very heavy traffic street, and until shortly before its removal appeared about as other well worn rail when viewed from the top. Shortly before its removal a crack appeared in the bottom of the throatway between the head and the lip. The rail was removed and found to be in the condition shown here. At the time of its removal this rail was still carrying its heavy traffic in a satisfactory manner.

In connection with Fig. 9 especial attention is called to the extra metal under the back of the head on the Chicago section. This metal does not appear in most high girder rail sections, but its great value during the later life of the rail is well brought out in this case. The combination of this metal with the rest of the metal in the head gives a section quite similar to a high tie rail such as has long been used to carry heavy cars in open track. The cutting away of the lip of the rail made it of no value in paved streets, but as far as safely carrying the cars was concerned it could still fulfill its purpose. If this metal had not been under the head of the rail the head would undoubtedly have bent down much sooner and more abruptly, and this would have left so small an amount of really useful metal in the rail head that the rail would probably have become unsafe for operation and would have been removed for this cause long before it was necessary to remove it on account of the broken lip. This rail gave about ten years of service at a stopping point on one of the heaviest lines in the city.

In the year 1921 the shape of the standard Chicago section was changed slightly, the principal difference being that the head of the rail is made the arc of a circle instead of a straight line as in the old section. This has increased the weight about 1 lb. per yard. None of this rail has been in the track long enough to show how it will work out under traffic.

By far the greater part of the

track laid in Chicago since 1907 has been paved with dressed granite block. The following kinds of pavement have, however, been laid to some extent: creosote block, creosote block with a granite stretcher along the rail, and vitrified paving brick.

Whenever possible the companies pave their right-of-way with redressed granite block unless the vehicular traffic is so light that a much cheaper pavement can be used. The type of granite block used has remained unchanged from 1907 to date, but the method of laying the block has been changed from time to time. The granite blocks used are 5½ in. in depth. In the earlier years of the work these granite blocks were laid on a cushion of bank sand and sealed with a pitch filler, but this did not prove to be satisfactory as the slight motion permitted in the rail, by the loosening of the fastenings used in this early track, produced a pumping action which pumped out the sand during wet weather and allowed the stone along the rail to settle. The first step taken to overcome this difficulty was to change the bedding cushion along the rail from bank sand to dry mortar and grouting the strip along each side of each rail, paving pitch being used on the portion of the track not grouted. This practice was followed for a time, but eventually the standard method came to be the use of a dry mortar bed under all of the block and all of the block grouted. This method is still followed, but asphaltic cement sometimes used replaces the cement grout.

As the companies had an immense number of old granite blocks as salvage from their old tracks, it has always been their practice to keep a force of granite block cutters at work redressing the larger and better blocks for further service. These redressed granite blocks are used on streets having lighter vehicular traffic and they have given service equal to that of new blocks in similar locations. These blocks are laid exactly as new blocks except that because of their shorter depth the concrete under them is brought up slightly higher. About six more blocks are required per square yard with redressed block than with new block.

This granite block pavement has given excellent service in every way except for the settlement along the rail previously referred to. This one trouble has been almost entirely overcome by the use of the mortar bed and cement grout or asphaltic cement binder.

The companies lay creosote block only on streets where it is required by some special ruling, as they consider dressed granite by far the best pavement. A considerable amount of creosote block pavement has been laid, however, using a block 3¾ in. wide by 4 in. deep by from 5 in. to 10 in. long. The method of laying these blocks has been exactly along the line followed in laying dressed granite block, including most of the changes in the method.

Creosote block pavement has not proved very satisfactory in the tracks, as the blocks are not strong enough to carry the heavy loads that they have had to carry when laid next to the rail. The present practice, in nearly all cases where creosote block is required, is to lay a stretcher course of granite block along each side of each rail and pave the balance of the right-of-way with creosote block.

Brick pavement has been used very little in recent years and never anywhere except on streets in the outlying districts where the vehicular traffic is comparatively light. Practically none of this pavement was laid in connection with any of the types of track described and none of it has been subjected to very severe traffic conditions.

SURFACE AND SUBSURFACE DRAINAGE PRACTICES

Almost all of the types of track and paving considered in this article are in streets that are paved from curb to curb and properly drained into the city sewers, so that there is little trouble with the water laying on the tracks. Where the tracks are laid in streets which have not yet been permanently paved, no special arrangements are made for surface drainage except that in cleaning up the streets after construction the roadway adjoining the pavement is leveled down to or a little below the level of the track.

The track is all laid with the inside rails of double track at grade and the outside rails ¼ in. lower, the pavement being laid accordingly. The pavement between tracks is crowned slightly so that the tracks naturally drain off on each side to the adjacent pavement.

Comparatively little subsurface drainage has been intsalled in Chicago. Where the subsoil is sand it is not needed, and where the subsoil is clay it has not generally been considered necessary as most of the heavy track is laid in streets that are paved from curb to curb and consequently have good surface drainage. Nearly all street railway tracks are in streets having sewers under them and these have a tendency to lower the water level below the subgrade of the tracks.

SPECIAL TRACKWORK

As brought out in the discussion of tangent track rail, the companies are required by ordinance to use a standard rail of specified section. This rail is used on all unguarded portions of 9-in. special trackwork. A girder guard rail has been designed for use on all guarded track which follows, as nearly as possible, the section of the standard tangent track rail and fishes with it. This Chicago girder guard section weighs 145 lb. per yard and is shown in Fig. 2. All curves are double guarded when the center radius is less than 500 ft., and single guarded when the center radius is from 500 ft. to 1,250 ft.

The special trackwork used on heavy traffic streets is 9 in. in depth and of four types of construction known as types A, B, C and D. These types are described in the specifications as follows:

Type A consists of 9-in. or 7-in. steel castings, into which manganese steel plates or the equivalent are inserted at points of greatest wear. The terminals are made to fish with the abutting rails by grinding to template.

Type B consists of 9-in. or 7-in. manganese steel castings, or the equivalent. The terminals are made to fish with the abutting rails by grinding to template.

Type C consists of 9-in. or 7-in. rolled-steel rails cast steel-bound or cast iron-bound construction, into which manganese steel plates or the equivalent are inserted at points of greatest wear.

Type D consists of 9-in. or 7-in. built-up special trackwork composed of rolled-steel rail sections.

All special work considered here is composed of 9-in. switches, mates, and frogs of one of these four types, connected by one of the standard 9-in. rails, or else it consists of 9-in. curved rail only. In the following discussion and tables, where all the switches, mates and frogs are of one type, the special trackwork is referred to as A, B, C, etc. Where part of the pieces are of one type and part of another the special trackwork is referred to as B & B, B & C, etc., the letters indicating the types of the special pieces in the layouts.

Table III is based on an analysis of 443, 9-in. layouts (crossovers not included) which were placed in all parts of the city by all companies during the years 1907, 1908, 1909 and 1910. These are all of the 9-in. layouts that were installed in those years, except about twenty-five that were not included due to certain special conditions that prevented their being properly tabulated with the other layouts.

In Table III the first column shows the number of layouts of each kind as described above. The record column shows the percentage that the number of layouts of each type bears to the total laid in those years. The third column shows the total number of feet of track contained in the layouts of the different types. The fourth column shows the percentage that the feet of track in the various types bears to the total number of feet.

TABLE III—STATISTICS ON LIFE OF SPECIAL TRACKWORK

Type	Number of Layouts	Per Cent of Total	Number Feet Track	Per Cent by Feet	Average Feet per Layout	Average Life of Layouts Years	Months
A	15	3.39	1,793.9	0.94	119.6	11	5
B	140	31.60	83,188.6	43.56	594.2	9	4
C	20	4.51	3,623.0	1.90	181.1	9	8
*D	105	23.70	20,301.5	10.63	193.3	10	11
A and B	103	23.25	55,264.3	28.94	536.5	10	2
A and C	4	0.90	1,575.2	0.82	393.8	9	10
B and C	48	10.84	22,565.5	11.81	470.1	9	10
B and D	8	1.81	2,682.0	1.40	335.2	10	2
Total	443	100.00	190,994.0	100.00	431.1	10	1

* Nearly all plain curve layouts.

It should be noted that the percentages as shown in the second and fourth columns differ very materially, especially in the first half of the table. The percentage by layouts is much larger for types A, C and D than the percentage by feet while the reverse is true for type B, even though type B has the largest number of layouts of the four. This is because there are not only a larger number of type B layouts but a very large percentage of them are large layouts, many of them being in the heart of the business district.

The fifth column shows the average number of feet of track in each type of layout. It was obtained by dividing the figures in the third column by those in the first column. It should not be understood, however, that the individual layouts of each type are all of about the same size, for this is not the case. Type B, for example, contains layouts varying in length from less than 80 ft. to more than 1,800 ft.

The sixth column shows the average life of layouts for each type. This life was obtained by adding up the life of all the layouts of each type and dividing by the number of layouts. The age of each layout was taken as the time from its installation to the time when the layout was sufficiently worn so that it was necessary to replace at one time at least a standard single-track crossing or its equivalent. No account is taken of any minor replacements that may have been made before or any life remaining in the layout after the renewal of an amount equivalent to or greater than a standard single-track crossing.

Of the 443 layouts considered there are a few in which the equivalent of a single-track crossing has never been renewed at one time, although several small amounts renewed at various times might, if taken together, equal that amount. These layouts are nearly all on the list of those requiring renewal in the near future, so that for the purpose of this tabulation they were considered as having been renewed as of Jan. 31, 1922. While this assumption tends to reduce the average life shown in the last column it does so to only a limited extent and has the advantage of compensating for cases where the equivalent of a single-track crossing has been removed but in such small amounts and over such a long period that the layout appears on the record as not having been renewed.

According to the data in the last column, type A shows the longest life, and the second longest life is shown by type D special work. The life of the other types ranges from ten years and two months to nine years and four months, a variation of less than one year.

While type A shows the longest life there are certain other factors that should be considered in this connection. In the first place there are only a small number of layouts (fifteen) and it so happens that with one exception they are all plain crossings and in nearly every case are placed at locations where the traffic on at least one of the streets is quite light. For this reason the traffic over them is probably lighter on the average than is the case with type B and type C, and this probably accounts to some extent for the good showing of type A.

Type D shows the second longest life, but this type also has certain special features that should be taken into consideration. The 105 layouts shown under D are nearly all plain curve layouts and in consequence do not give any idea of what the life of bolted switches, mates and frogs would be. They are shown here to give an idea of the life of curved track with bolted joints, as such track is a part of layouts of all types. It will be noted that the life of such track is greater than the life of any construction except A. There being no special pieces in most of the D layouts listed, it is somewhat difficult to determine when the amount of wear on these layouts was equivalent to a single-track crossing on the other types of layout. No exact rule was followed as the variation in the curves was considerable, but in general curves were included in the list when all of the guard section on one rail of the curve had to be renewed.

The layouts listed as part B and part D contain built-up switches, mates and frogs. The life of these eight layouts compare favorably with the other types.

On the whole the use of type B, or solid manganese construction, was greater than that of any other type. Not only were 140 layouts constructed entirely with this type but it was used in part on 159 other layouts or in 299 of the 443 layouts considered. Eliminating the plain layouts it was used in 299 of 338 layouts.

FLANGE-BEARING SPECIAL TRACKWORK NOW STANDARD

Most of the layouts considered were not flange bearing, but flange-bearing special work was later adopted as a Chicago standard. After the change to flange-bearing special trackwork had been made, the subject of a proper slope at the ends of the throatways on solid manganese plates was taken up and given careful consideration. The result of this study was a specification that gives plates considerably larger than are used in many cities but which are considered here to be a decided improvement over the smaller plates formerly used.

The following paragraph from the specification for "Throats and Flangeways" on type C insert plates gives a good idea of the way in which the size of the plate varies to fit different conditions:

> The floor of the grooves in all 90-deg. or acute-angle frogs shall be level from the guard point to the theoretical frog point and extend beyond the theoretical frog point toward the heel. The total length of the level portion of the floor shall be twice the distance from the guard point to the theoretical frog point. The floor of the grooves in all obtuse angle frogs shall be level in front of and extending an equal distance on each side of the theoretical frog point. The total length of the level portion of the floor shall be twice the distance between the points formed by the intersecting guard and gage lines. Inclines shall begin at the ends of this level portion and slope down uniformly to a depth of 1 in. at the ends of the manganese plate, the length of slope to be not less than 6 in., the intention being that the treads of the wheels will have full bearing before leaving the manganese and before the flanges engage on entering the manganese.

MANGANESE SPECIAL TRACKWORK WELDED SUCCESSFULLY

A considerable amount of work has been done in connection with building up manganese plates by means of the arc welding process. The earlier attempts were not very successful but constant study and experiment by the engineers of the Chicago Surface Lines have brought about a decided improvement. Recent experiments with a manganese coated electrode are giving great promise, some work having stood up for a number of months under exceedingly heavy traffic without any sign of failure. It is hoped that within a short time the company will have developed a process by which it can successfully keep these manganese castings and plates in proper condition.

RAIL CORRUGATION CAUSE STILL UNKNOWN

As in the case of other large cities, corrugation of the rail has been a source of considerable trouble and expense on Chicago street railway tracks. This rail trouble seems to have developed about equally on the solid concrete and ballasted types of foundation and under a great variety of traffic conditions. The period of time in which corrugation develops has varied from a few weeks to several years, and in many cases no appreciable amount of corrugation has developed at any time.

After the corrugations have developed considerably on any stretch of track they are ground off with a grinding machine which is a modified form of the Kerwin grinder.

The standard Kerwin grinders with two grinding wheels at one end were remodeled in the companies' shop by placing two similar wheels at the other end of the machine, and using the motor which formerly operated the two wheels to operate all four. The size of the driving belts was also increased and the shape of the belt pulleys changed, so that all grinding wheels now operate more uniformly and with less belt slipping than formerly. In remodeling the machines the control levers were placed on the inside of the wheels and a seat built at the end of the machine so that one man on this seat could readily operate both grinding wheels on his end of the machine. The position not only enabled the operator to handle two wheels instead of one, but placed him in such relation to the rail that he could watch his work much better than when walking alongside the machine as formerly.

The result of these changes has been that the same electrical and truck equipment now handles four grind-wheels instead of two; that the grinders are more reliable than formerly, due to the change in the belt drive; and that one man now operates two grinding wheels instead of one, and in a more efficient manner, since he is so placed that he can see his work better and is relieved of the physical strain of constantly walking at the exceedingly slow and tiresome rate at which the machine moves.

Handling the Records of 11,000 Trainmen on Chicago Surface Lines

ONE MIGHT suppose that the system for handling the records for as many trainmen as are employed by the Chicago Surface Lines would be complicated and the records themselves voluminous. The records do bulk large, of course, when all material information about each man must be kept and permanently preserved for a total of nearly 11,000 trainmen. However, the system for handling and filing these records makes them immediately accessible.

The records are divided into three groups, namely, men who are in active service, former employees, and those applying for employment. All the information pertaining to one man is placed in a jacket, alphabetically filed. Such data include the application blank, his contract with the company, his yearly record sheets, his accident record, the work sheet during his instruction period, any correspondence pertaining to him, and all necessary record papers. During a man's period of employment his name is entered on one page of a loose-leaf record book according to the division to which he is assigned.

This book is in the hands of the division superintendent and in it is entered anything arising in connection with his service as a trainman. For instance, if a complaint is received at the main office about a conductor, the letter is forwarded to the superintendent of the division in which the conductor works. The division superintendent makes a disposition of the case, a record of which is entered on his books and the correspondence is returned to the general office, where it is filed in the jacket of the employee. The division records are returned and filed yearly in each man's jacket. Thus the complete record of any trainman is available instantly at the office of the superintendent of transportation.

A similar file is kept in the employment office for all applicants. In this case the principal record is the application blank and the references from former employers. Last year 4,808 were allowed to file such applications.

RECORDS OF FORMER EMPLOYEES KEPT IN FILES

The record of a trainman who has left the service is removed from the active files and after all papers in regard to terminating his connection with the company are included, the complete jacket is placed in the inactive files in the office vault. Records of former employees are held in the main office as long as the space permits and then the older ones are removed from the files for permanent storage.

It is often necessary to know quickly whether a man is in the company's employ, or has filed an application, or has terminated his connection. For this purpose a card index is kept for ready reference.

"Educating the Public" in Chicago

Large Newspaper Display and Expert Copy Found to Be Inefficient and Ineffective — Reaching the Car Riders Direct with Brief Messages Has Proved to Be More Valuable Publicity, but the Trainmen Offer the Best Entree to Public Good Will

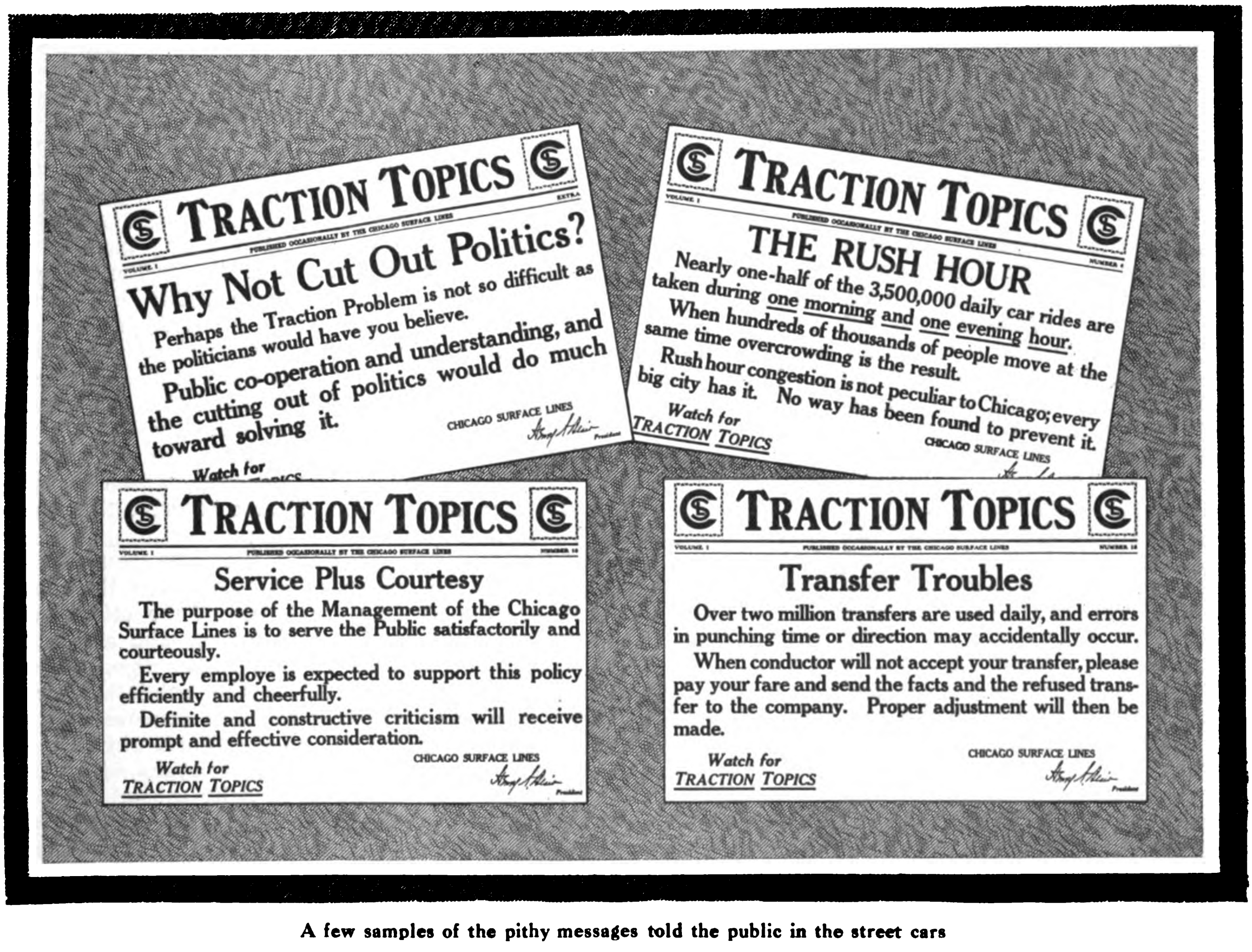
By JOHN E. WILKIE
Vice-President Chicago Railways Company

THE Chicago Surface Lines has had a very interesting, and more or less illuminating, experience with "educational publicity." Its experiments in this field have been conducted with the able assistance of "crowd psychologists," "advertising engineers," publicity experts and common, or garden variety, honest-to-goodness advertising men.

It has experimented with pages and half pages of the "knock-their-eyes-out" variety; quarter pages three times a week; eighty lines, three columns wide, every day; straight reading matter, with and without individual fancy and plain borders, and everything in the way of topographical ingenuity that might be suggested by the skilled, confident and enthusiastic gentlemen who at the moment might be in charge of the mechanical details.

The writer, as a former newspaper man, though not identified with the advertising department, was favorably inclined to this character of publicity as the best method of "educating the public" and creating and crystallizing a friendly public sentiment, but he confesses, with some reluctance, that after several years activity in this particular direction the results have fallen far short of the rosy predictions and confident assertions of the experts. And he has reached the somewhat disappointing conclusion that a sympathetic public sentiment cannot be manufactured by any of the foregoing methods. At least not in Chicago.

It is quite conceivable that in a wide territory embracing small towns and large agricultural areas, where the county seat newspaper is carefully read from the first column on the first page to the last column of the last page, and thoroughly digested, there is a field which may be



TRACTION TOPICS
VOLUME 1 PUBLISHED OCCASIONALLY BY THE CHICAGO SURFACE LINES EXTRA

Why Not Cut Out Politics?

Perhaps the Traction Problem is not so difficult as the politicians would have you believe.

Public co-operation and understanding, and the cutting out of politics would do much toward solving it.

Watch for

CHICAGO SURFACE LINES
President

TRACTION TOPICS
VOLUME 1 PUBLISHED OCCASIONALLY BY THE CHICAGO SURFACE LINES

THE RUSH HOUR

Nearly one-half of the 3,500,000 daily car rides are taken during one morning and one evening hour.

When hundreds of thousands of people move at the same time overcrowding is the result.

Rush hour congestion is not peculiar to Chicago; every big city has it. No way has been found to prevent it.

Watch for TRACTION TOPICS

CHICAGO SURFACE LINES

TRACTION TOPICS
VOLUME 1 PUBLISHED OCCASIONALLY BY THE CHICAGO SURFACE LINES

Service Plus Courtesy

The purpose of the Management of the Chicago Surface Lines is to serve the Public satisfactorily and courteously.

Every employe is expected to support this policy efficiently and cheerfully.

Definite and constructive criticism will receive prompt and effective consideration.

Watch for TRACTION TOPICS

CHICAGO SURFACE LINES
President

TRACTION TOPICS
VOLUME 1 PUBLISHED OCCASIONALLY BY THE CHICAGO SURFACE LINES

Transfer Troubles

Over two million transfers are used daily, and errors in punching time or direction may accidentally occur.

When conductor will not accept your transfer, please pay your fare and send the facts and the refused transfer to the company. Proper adjustment will then be made.

Watch for TRACTION TOPICS

CHICAGO SURFACE LINES
President

A few samples of the pithy messages told the public in the street cars intensively cultivated by a railroad or other utility and satisfactory results achieved. A campaign of this character, which has been a scintillating success, I believe, is the one which President Charles Markham of the Illinois Central Railroad has conducted throughout the territory served by his lines.

But our experience, if it means anything, means that the Chicago public, or a very considerable part of it at least, is "hard boiled," cynical and suspicious. This section of the community seemingly accepts with enthusiasm and gives credence to any and every charge against a utility that may be voiced by a self-seeking politician and refuses to take any interest in or be convinced by evidence submitted in courts of record or before commissions, even though that evidence demonstrates the falsity of the wild assertions of the demagogues.

There is another element to be taken into consideration in Chicago. It is a high-pressure community and the readers of newspapers seem to have time only for a glance at their morning and evening daily. Many of them are devotees of particular sections of the paper. They read all of the news in the department in which they are especially interested and give to the remainder of the paper only a hurried and casual once over.

DEFINITE CHECK ON HOW MANY READ RAILWAY AD

A complete confirmation of this fact was obtained by a little research work a few years ago, following the publication in all of the morning and afternoon papers of a page display relating to a phase of the transportation situation which was rather acute at the time. Our representatives called at every room in three of the largest downtown office buildings and asked two questions: "Did you read the Surface Lines' ad printed in yesterday's afternoon and today's morning papers?" and "How did it impress you?" Out of more than 3,000 individuals who were called upon only about 300 admitted having seen the advertisement, and of those 300 less than 100 had read it. Of those who had read it the majority reached the conclusion that its publication was merely an attempt on the part of the utility to secure the support of the newspaper by buying a large amount of space.

It was these experiments that led to a different, very much less expensive and what has proved thus far to be a much more satisfactory publicity policy. We concluded that the public in which the companies were most interested was the army of car riders. Something more than 1,000,000 people ride twice daily on our lines. Counting each fare-paying passenger and each transfer passenger as a car rider, we had a total of 3,500,000 riders daily. Using the phraseology of the advertising men, here was a "circulation" of 3,500,000 to whom a direct appeal might be made within our own vehicles.

We, therefore, began the publication and display, in 20½x13½-in. poster form, of *Traction Topics*, two copies of which were attached to the windows in opposite corners of the car during the cool weather, and with the approach of summer the form was changed to a card printed on both sides, suspended from the roof over the center aisle. The text was restricted to forty or fifty words.

INFORMATION RATHER THAN PROPAGANDA

We abandoned any attempt to "manufacture public sentiment" and devoted ourselves to creating an interest in the property by featuring facts which might appeal to the imagination of the reader or give him something to quote in the way of easily remembered and striking statistics. Most of these related to such simple matters as the number of employees, cars and their cost, magnitude of the transfer business, distribution of riders during the rush and non-rush hours, cost of lighting and heating the system, track mileage, and so on. Interspersed with information of this character were brief statements relating to the uses of transfers, what to do when conductors questioned the validity of transfer slips, how to avoid controversy of one sort and another and similar matters disclosed through the correspondence in files of the complaint department. Several of the posters are reproduced herewith to give an idea of the matters touched upon in *Traction Topics*.

We have daily evidences that *Traction Topics* is widely read, and among other things emphasized by the correspondence from our readers is that the complaint department of our organization is the real barometer of public sentiment. Your treasurer can tell you your exact financial status; your auditor can give you tabulated information about your revenue passengers, car-miles, car-hours, maintenance costs, and so on. But when you want to know how you stand with the public, consult your complaint department.

Nobody knows better than the public utility official that relations with the public are not established by the amiable resolutions or intentions of the management. The real factor in the development of a friendly public spirit is the platform man. Upon his treatment of his passengers, upon his smile or frown, upon his courtesy or incivility, depends the real sentiment of the car-riding public. And this being admitted, it at once becomes evident that in establishing satisfactory relations with the public, nothing is more important than a complete understanding and co-ordination between the complaint and the transportation departments of a great system. One conductor with a grouch can do more to destroy friendly inclination on the part of the company's patrons than the management can do to build up such inclination by a long period of sincere effort and service.

PUBLIC RELATIONS A MATTER OF EMPLOYEE RELATIONS

In these days, where liberty is taken with even national laws, and there is a spirit of resentment toward restraint of any character, one recognizes that the problem of dealing effectively with offending employees is becoming increasingly difficult. But the writer believes that no public utility can secure either public sympathy or support through any form of publicity unless and until it has educated its trainmen to understand that the reputation of the company is in their hands, and that the disciplinary policy of the organization is sufficiently effective to drive this truth home.

It would therefore seem to be wiser, perhaps, to devote the educational activities of the utility companies to the men who are under their control, rather than attempt to "educate the public." For a properly educated employee can do more in an educational way with the patrons of the company with whom he comes in daily contact than the companies can accomplish with acres of newspaper space, gallons of printer's ink and the expenditure of thousands of dollars in advertising appropriations.

Considerations which have established a power supply unique for degree of reliability and low cost are related. Features of power contract and the engineering determinations embodied in the a.c. and d.c. systems are given in connection with the

Development of Unified Power Supply and Distribution Systems in Chicago

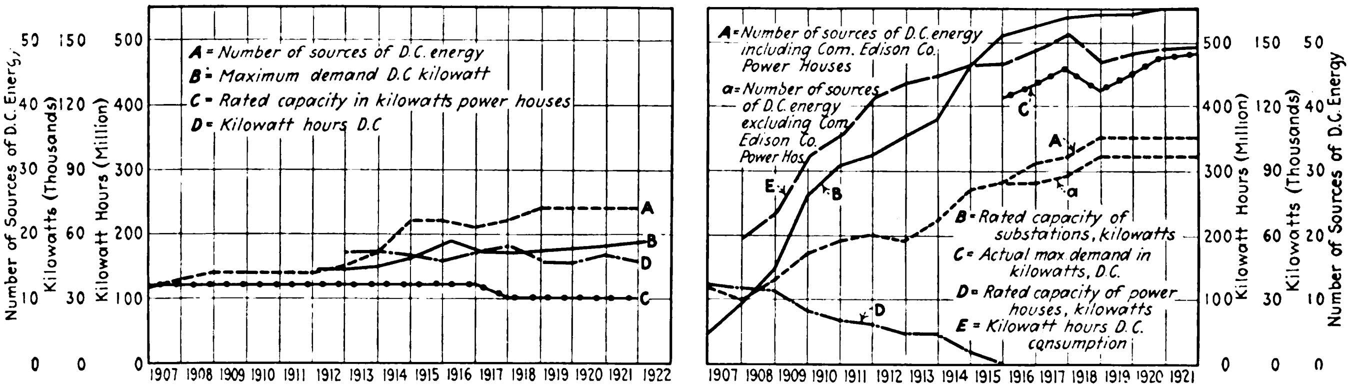
By RALPH H. RICE
Principal Assistant
Board of Supervising Engineers, Chicago Traction

IN THE EARLY DAYS of street railway history in Chicago, all the functions of a power system were performed by horses. The cable system was then introduced and brought its own power problems and troubles, which, like the horse car, are now only memories. Steam power was used on some of the elevated lines, but like the surface lines this has given way entirely to electricity. In a later period all of the elevated lines and most of the surface lines were electrified and operated from steam generating stations providing current at trolley voltage. At that time there were a number of independent companies operating in different parts of the city and having overlapping territories to some extent. Each power system was separate from all others, and there was the usual inefficiency of small plants and duplication and overlapping of distribution lines.

The first great step in advance was in 1907, when most of the independent surface lines were consolidated into two large systems and each of these companies entered into partnership with the city of Chicago. These consolidations were authorized by contract ordinances made between the companies and the city, and provided for a complete rehabilitation of all the properties. This afforded an excellent opportunity, and in fact the necessity, for considering the whole power situation. These ordinances created the Board of Supervising Engineers, whose duty it was to interpret the ordinances, establish standards of construction, prepare plans and specifications and supervise construction and expenditures.

One of the earliest problems confronting the board was to make a decision between purchasing energy from a central station company or producing it in the railway companies' own plants. At that time a number of street railway steam plants were in operation, and the question involved an extension or ultimate scrapping of such steam plants. This question was quite thoroughly studied and a decision was finally made to purchase from the central station company under contracts covering a period of years, and to abandon the steam stations at the earliest practicable date.

At that time the Commonwealth Edison Company was well established in the central station field and was seeking a more diversified load. It was furnishing some energy to the separate railway companies, but the acceptance of the ordinances by the surface line companies necessitated very extensive and rapid increase in the mileage and equipment of their lines, with a consequent demand for additional power equipment. By the purchase of energy the railway companies would be relieved of the necessity of constructing and operating new generating plants to extend or supersede those in use, and this was an item of considerable importance when the railway companies were burdened with such an enormous rehabilitation program. If the central station company could make attractive rates there seemed to be an advantage on both sides. As a result of the study made along this line the decision was finally made to purchase all energy and ultimately to abandon the railway's steam station.



Elevated Railroads

Surface Lines

Fig. 1—Growth of power producing equipment and demand of Chicago local railways

The purchase of power from the Commonwealth Edison Company is based upon contracts made between the Chicago Railways Company and the power company and between the Chicago City Railway Company and the power company. Similar contracts are in effect between the elevated railway companies and the C. E. Co. In the early years of the rehabilitation work such contracts were entered into and purchase of power was made under them until 1912 and 1919, when new contracts were made. In both cases, these were made retroactive to Aug. 1, 1909. They involved several features not in the original contracts, such as a sliding primary and secondary scale, provision for change in rate with change in price of coal, provision for limitation of maximum demand in very cold weather, and changes in location of measuring the energy furnished. Subsequently additional contracts were made between the C. E. Co. and each railway company in which they mutually agreed to convert energy for the use of the other. These latter contracts involved only conversion and not the purchase and sale of energy.

In 1913 the Commonwealth Edison Company took over the generation of energy and operation of all substations of the elevated lines, these lines having been joined into one operating organization in 1911. By this arrangement it became necessary for the Edison Company to furnish direct current to the elevated railways. It was also evident that economies would be effected if energy for the elevated roads could be secured from some surface railway substations, and some energy for surface railways from elevated railway stations. As a result of such an arrangement a very satisfactory power supply system has been developed. Its chief operating merits are its reliability and the elimination of overlapping territories in which several independent systems of power supply are situated.

The power contracts and the conversion agreements result in several operating conditions which are interesting. These may be enumerated as follows:

1. Railway company buys a.c. energy.
2. Railway company buys d.c. energy.
3. Railway company converts a.c. to d.c. for Commonwealth Edison Company.
4. Railway company operates joint substations with the Commonwealth Edison Company.

In the first case the railway company owns and operates its own substations and purchases a.c. power at the substation, under the terms of the contract.

In the second case the railway company purchases d.c. power from the Edison Company at stations owned and operated by the latter. In this case the railway company buys the a.c. power under the terms of the contract, and in addition pays for the conversion to d.c. in accordance with the conversion agreement. The companies divide the operating expenses of the substation in proportion to the output used by each.

In the third case the railway company furnished direct current to the Edison Company from stations owned and operated by the railway company. The railway company receives from the power company only a conversion charge, as the a.c. energy furnished to the substation for the Edison Company is not included in the bill to the railway company. As in the second case, the operating expenses of the substation are divided in proportion to. the output to each company.

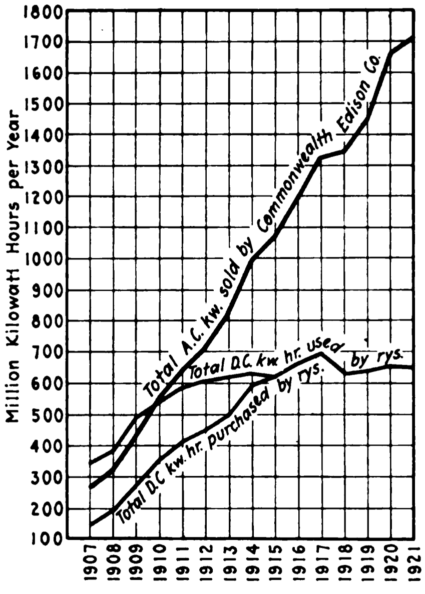


Fig. 2—Energy supplied to railways and total load of Commonwealth Edison Co.

In the case of joint substations now in operation the Commonwealth Edison Company owns the land and building and the machinery for its own output. The railway company owns the equipment for its own output and buys a.c. energy from the Edison Company. The operating expenses are also divided in proportion to the output of the two companies.

These contracts extend to the date of expiration of the railway company franchises, Jan. 31, 1927. The rates are composite, having a primary charge covering fixed charges on investment, taxes, insurance and depreciation based upon the maximum demand for energy, and a secondary charge proportional to the actual cost of production comprising fuel, labor and supplies and based upon the energy actually used. Both of these charges have a sliding scale; that for the primary charge is as shown in table above.

	Per Kw.
Up to and including 30,000 kw. maximum demand	$1.25
Over 30,000 and including 60,000 kw	1.00
Over 60,000 and including 90,000 kw	0.91⅔
Over 90,000 and including 120,000 kw	0.87½
Over 120,000 kw	0.83⅓

The secondary charge is, monthly, up to and including 5,000,000 kw.-hr., at the rate of 0.4 cent per kw.-hr.; over 5,000,000 and up to and including 10,000,000 kw.-hr., 0.395 cent per kw.-hr.; and then reducing by 0.005 cent per kw.-hr., for each additional block of 5,000,000 kw.-hr. or fraction thereof, to a minimum of 0.36 cent per kw.-hr. for all energy above 40,000,000 kw.-hr. per month.

To ascertain the monthly maximum demand, the Commonwealth Edison Company selects any three consecutive days and takes the maximum hourly demand during the morning and evening peaks for these three days. The average of these six peaks is taken as the maximum demand. Of course the Edison Company selects the three days which produce the highest maximum. The maximum demand as thus determined becomes permanent until exceeded by a larger one. A new maximum established in the winter months holds over the succeeding summer period when the actual demand is much less.

The computation of the maximum demand is somewhat involved as it is evident there may be several maxima. These are:

A—The main a.c. maximum at railway company stations or joint substations, due to purchase of a.c. power.

B—The a.c. maximum due to the direct current purchased by the railway company at Commonwealth Edison Company stations.

C—The a.c. maximum, due to energy converted for the Commonwealth Edison Company at railway substations.

The maximum demand upon which the primary charge is paid, or the "billing maximum," is the total resulting from adding A and B above and deducting C. This result is the total demand by the railway company for energy used by it. In determining this the three successive days which produce the greatest resultant total are selected, and of course the values of A, B and C are simultaneous maxima. But the cost of conversion to be paid by the railway and the Edison Company is based upon the actual maxima required for conversion, and these may not be the same in amount or coincident in time with the values used in determining the billing maximum for alternating-current energy as previously explained.

There is one condition which may affect the primary rate and one the secondary rate. When the temperature falls to 15 deg. F., or lower, the excess over the previously established maximum is not to establish a new maximum to be paid for at the above primary rates, but the excess is to be paid for at the rate of 25 cents per kw. per day.

The secondary cost is dependent upon the cost of coal and this is recognized by a provision in the contract, that when the price of coal exceeds $1.90 per ton delivered, there shall be an increase in the secondary charge; and if the price falls below $1.40 per ton there shall be a decrease in the secondary charge. This adjustment may be made every two years. The amount of adjustment in dollars is obtained by dividing by 1,000 the number of kilowatt-hours used during the two-year period, and multiplying the quotient by the difference between the average coal price and $1.90, if an increase, and $1.40, if a decrease.

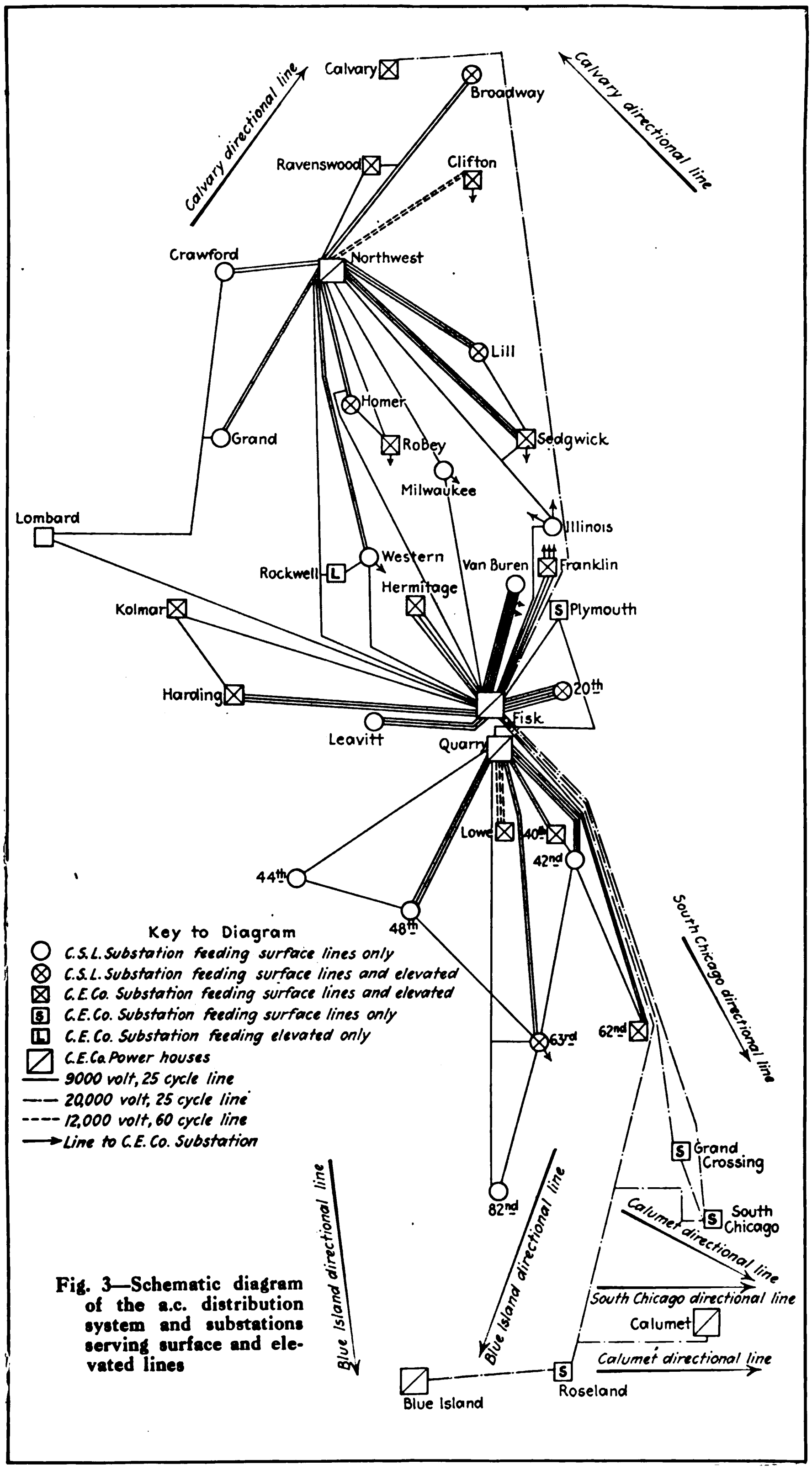

Calvary directional line
Calvary
Broadway
Calvary directional line
Ravenswood
Clifton
Crawford
Northwest
Lill
Homer
Grand
Robey
Sedgwick
Milwaukee
Lombard
Illinois
Rockwell
Western
Van Buren
Franklin
Hermitage
Kolmar
Plymouth
20th
Harding
Fisk
Leavitt
Quarry
Lowe
40th
42nd
44th
48th
South Chicago directional line
Key to Diagram
○ C.S.L. Substation feeding surface lines only
⊗ C.S.L. Substation feeding surface lines and elevated
☒ C.E.Co. Substation feeding surface lines and elevated
S C.E.Co. Substation feeding surface lines only
L C.E.Co. Substation feeding elevated only
⧄ C.E.Co. Power houses
—— 9000 volt, 25 cycle line
—— 20,000 volt, 25 cycle line
---- 12,000 volt, 60 cycle line
——► Line to C.E.Co. Substation
63rd
62nd
Grand Crossing
82nd
South Chicago
Calumet directional line
Blue Island directional line
Blue Island directional line
South Chicago directional line
Calumet
Calumet directional line
Blue Island
Roseland

Fig. 3—Schematic diagram of the a.c. distribution system and substations serving surface and elevated lines

The conversion agreement stipulates that both the railway company and the Edison Company shall pay for conversion from a.c. to d.c. on the basis of 23 cents per kw. up to and including 10,000 kw. and 18 cents per kw. for all in excess of 10,000 kw. This is a conversion charge only and does not involve the initial cost of the energy. The Edison Company owns and operates all high-tension lines between power houses and substations. Meters are placed at each substation on the incoming high-tension lines for measuring the maximum demand and consumption, and all a.c. energy is purchased by the railway company upon the basis of readings of these meters.

In stations furnishing energy to both the railway company and the Edison Company the operating expenses each month are borne jointly by the two companies, the division being determined by the energy received by each. If the output of the station is all d.c. divided between surface lines and Edison Company for elevated railway use, then the division of expense is made simply on the basis of kilowatt-hours delivered to each. However, if the output is direct current to the surface lines and alternating current of a higher voltage to the Edison Company for general power purposes, then the division must be made on the basis of equivalent alternating-current energy. The railway output in d.c. kilowatt-hours is divided by the efficiency of conversion to get the equivalent a.c. kilowatt-hours. The actual efficiency of conversion for each station is used, which averages 93 per cent. The output to the Edison Company is likewise divided by a conversion factor to reduce it to an equivalent alternating-current value. From some stations energy is furnished to the surface lines, to the Edison Company for elevated railway use, and to

TABLE I—SUMMARY OF RATED CAPACITY OF GENERATING STATIONS

In Service December 31, 1921

No. of Station	Date Erected	600 Volt D.C. No. of Units	600 Volt D.C. Kilowatts	9,000 Volt-25 Cycle No. of Units	9,000 Volt-25 Cycle Kilowatts	12,000 Volt-60 Cycle No. of Units	12,000 Volt-60 Cycle Kilowatts	Total No. of Units	Total Kilowatts
Fisk Street	[illegible]	..	....	12	180,000	2	50,000	14	230,000
Quarry Street	November, 1908	..	....	4	56,000	2	28,000	6	84,000
Northwest[1]	July 1912	..	....	3	85,000	3	80,000	6	165,000
Calumet	December, 1921	..	....	..	....	1	30,000	1	30,000
Grove Street	October, 1913	..	....	..	....	4	14,000	4	14,000
Blue Island	August, 1917	..	....	..	....	2	*15,000	2	15,000
Fortieth and State Streets	October, 1913	9	15,000	..	....	..	....	9	15,000
Fullerton Avenue	October, 1913	7	5,000	..	....	..	....	7	5,000
Loomis Street	October, 1913	5	8,000	..	....	..	....	5	8,000
Total Generating Capacity		21	28,000	19	321,000	14	217,000	54	566,000
Edison substation batteries, kilowatt capacity at one-hour rate									23,650
Elevated railway batteries kilowatt capacity at one-hour rate									6,800
Purchased energy under contract from Public Service Company									5,200
Actual generating capacity in service Dec. 31, 1921									601,650
Additional capacity added to Calumet station in 1922									30,000
Total									631,650

* The total capacity of units 6 and 7 at Blue Island is 25,000 kw. but 10,000 kw. has been leased to the Public Service Company.

[1] No. 1 at Northwest Station has two armatures and may be used either as a 25- or 60-cycle machine. At present it is operating as a 60-cycle unit.

the Edison Company for general power purposes. In such cases the railway company pays its share of the operating expense resulting from the division as outlined.

To provide for the demands for power the Commonwealth Edison Company has constructed very large steam generating stations, and each station when constructed was of the most advanced type. Fisk Street station opened in 1903, Quarry street in 1908, Northwest in 1912 and Calumet in December, 1921.

In addition to these plants the company also operates several smaller steam stations and has also some direct-current stations, for elevated railway use principally, and some storage-battery capacity. Table I shows the total generating capacity of the system. It will be noted that both 25 and 60-cycle current are produced.

The four main stations represent an investment of approximately $44,000,000. In addition to this there is about $16,000,000 invested in substations and about $40,000,000 in transmission and distribution lines and cables. Additional investment in other items add several more millions, so that approximately $118,000,000 has been invested in the physical plant to provide electric power and light service in Chicago.

The growth of business of the Commonwealth Edison Company has been rapid and regular, as shown in Fig. 2. The alternating-current kilowatt-hours sold have reached the enormous total of 1,700,000,000 per annum, and of this amount 770,000,000, or 45 per cent, are for railway use. In 1907, both the railway and total loads were much less, and the railway load was then 55 per cent of the total. The decrease in per cent has been due to the steady growth in the retail and wholesale light and power loads, which in recent years have exceeded the railway growth. However, the railway load for surface and elevated lines is the largest carried by any one central station system in the world.

The portion of the total load used by the railways, converted to direct-current kilowatt-hours, is also shown in Fig. 2. It will be noticed that the railway load in 1907 exceeded the total of the Commonwealth Edison Company. At this time and up to 1915 the railway companies generated a portion of their own energy. The lower curve shows the kilowatt-hours purchased from the Commonwealth Edison Company from 1907 to date. The difference between the curves represents the energy produced by the railway companies in their own stations. In 1915 the last railway generating station was shut down and from that date on the two curves coincide.

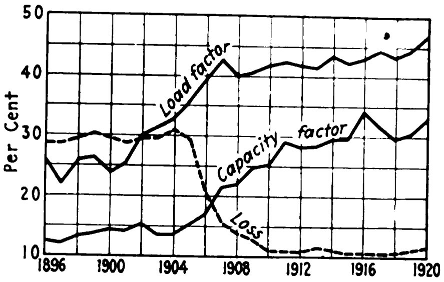


Fig. 4—Load factor and capacity factor of Commonwealth Edison Company

Fig. 1 shows the growth of power-producing equipment and demand for both the surface and elevated lines. The curves show the increase in number of stations, their rated capacity, the maximum demand and the kilowatt-hours produced. The lower curve reducing in value to zero in 1915 shows the decrease in the rated capacity of the railway steam stations. Totals from Fig. 1 have already been shown in Fig. 2.

One of the chief aids in developing energy cheaply is to increase the load factor by building up a load in the off-peak periods of the day and year. The diversified use of electrical energy has been so carefully developed by the Commonwealth Edison Company that they have increased their load factor as shown by the curve in Fig. 4.

In an address by Samuel Insull, delivered at Princeton University in December, 1921, he showed the economic advantage of interconnected systems and diversified load. For comparative purposes the maximum winter day load of the Commonwealth Edison Company in 1902 was prorated on the basis of the maximum winter day load in 1920, and the result showed an increase in the daily load factor from 42.4 per cent to 56.5 per cent. The "capacity factor" of the power system, that is, the ratio of the average kilowatts sold for the year to the capacity has been improved from about 12.5 per cent in 1896 to 33 per cent in 1920. From an economic standpoint, the capacity factor is a better basis for comparison than the load factor, because the fixed charges are based upon the investment in capacity and not upon the power demand of the customer. The improvement in capacity factor is largely the result of adding railway and industrial load, which has increased the load factor and reduced the losses.

HIGH-TENSION DISTRIBUTION BY POWER COMPANY

The Commonwealth Edison Company owns and operates the high-tension lines from the generating stations to the substations. Fig. 3 is a sketch showing the high-tension distributing system from the generating stations furnishing energy to the railway companies, the Calumet station not yet supplying any railway load. There is shown the ownership of the substations and the number of lines supplying each station. All railway supply was formerly at 25 cycles, but the 60-cycle supply is being developed and some of the railway load is very satisfactorily carried on these 60-cycle lines. The earlier transmission voltage was 9,000, but the longer lines were subsequently operated at 20,000. The existing 60-cycle railway transmission is at 12,000 volts but a transmission voltage of 33,000 is in use from the new Calumet station. All transmission is by three-phase underground cables. Fig. 4 also shows the ownership of the substations and the disposition of the energy furnished from each.

One of the most important features about this high-tension transmission system is the provision made for the continuity of supply. It will be noticed from Fig. 3 that every substation has at least two lines supplying it, and most of them have several more. In addition to direct lines from the generating stations, the various substations are tied together by lines which may furnish an energy supply regularly or only under emergency conditions. There are also provided ties from these railway stations into other Commonwealth Edison Company substations used for general service other than railway. As a result of this thorough interconnection and the reliability of the generating plants a general interruption to service is absolutely unknown and local interruptions are rare.

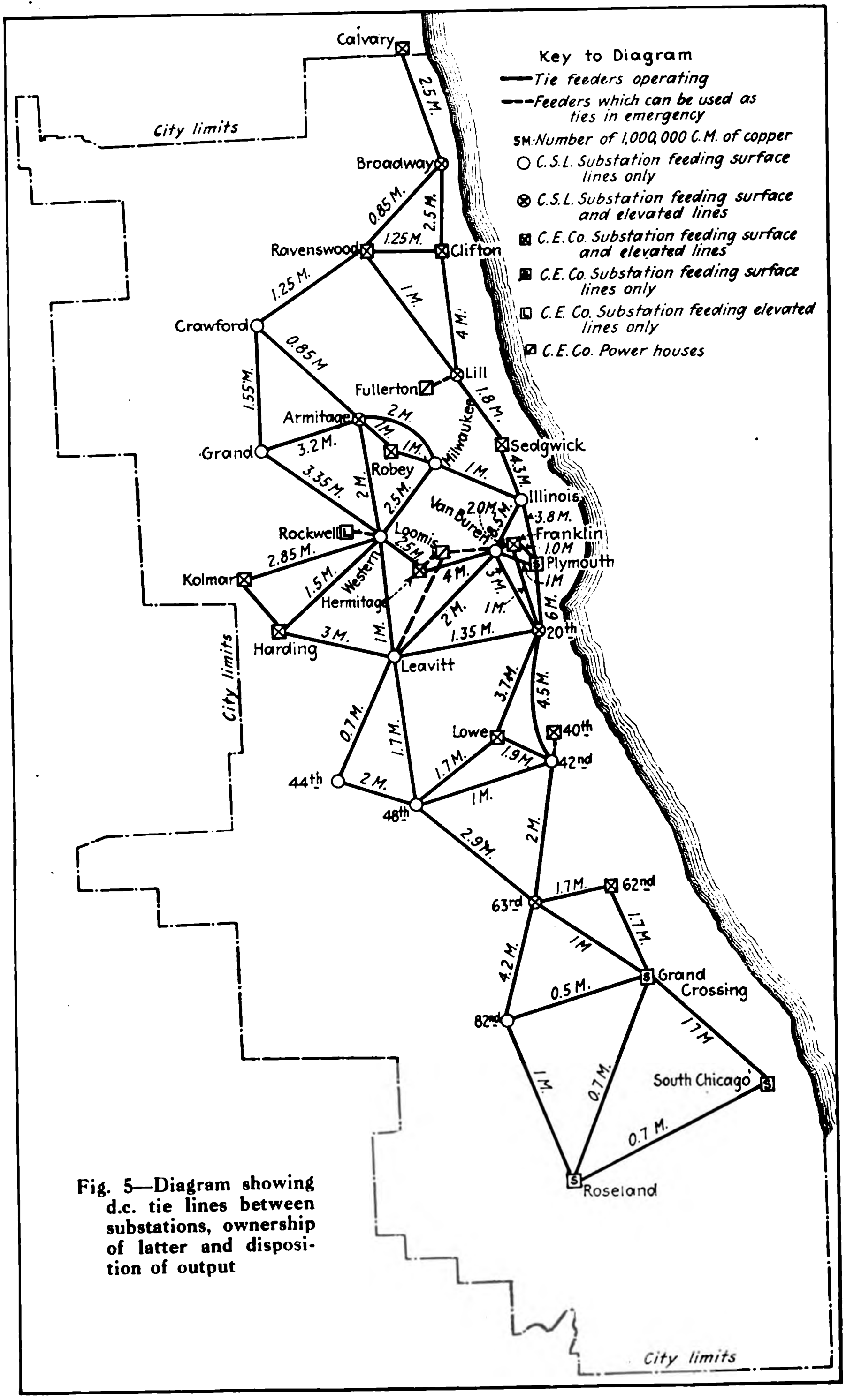

Key to Diagram
Tie feeders operating
Feeders which can be used as ties in emergency
5M·Number of 1,000,000 C.M. of copper
○ C.S.L. Substation feeding surface lines only
⊗ C.S.L. Substation feeding surface and elevated lines
⊠ C.E.Co. Substation feeding surface and elevated lines
C.E.Co. Substation feeding surface lines only
C.E.Co. Substation feeding elevated lines only
C.E.Co. Power houses
City limits
Calvary
2.5 M.
Broadway
0.85 M.
2.5 M.
1.25 M.
Ravenswood
Clifton
1.25 M.
1 M.
4 M.
Crawford
0.85 M
Lill
Fullerton
1.55 M.
Armitage
2 M.
1.8 M.
1 M.
1 M.
Milwaukee
Sedgwick
Grand
3.2 M.
Robey
1 M.
3.35 M.
2 M.
2.5 M.
4.3 M.
Illinois
Van Buren
2.0 M.
3.5 M.
3.8 M.
Rockwell
Loomis
Franklin
2.5 M.
1.0 M
2.85 M.
Plymouth
Kolmar
1.5 M.
Western
4 M.
3 M.
1 M
Hermitage
2 M.
1 M.
6 M.
Harding
3 M.
1 M.
1.35 M.
20th
Leavitt
City limits
3.7 M.
4.5 M.
0.7 M.
1.7 M.
Lowe
40th
1.7 M.
1.9 M.
42nd
44th
2 M.
1 M.
48th
2.9 M.
2 M.
1.7 M.
62nd
63rd
1.7 M.
1 M
4.2 M.
Grand Crossing
0.5 M.
1.7 M
82nd
1 M.
0.7 M.
South Chicago
0.7 M.
Roseland
City limits

Fig. 5—Diagram showing d.c. tie lines between substations, ownership of latter and disposition of output

The practice in Chicago has been to consider the location of substations first from a general knowledge of where they are most needed on the system. The trolley sections to be put on the new station are then chosen and a graphical calculation of the load center is made by finding the combined "center of gravity" of these loads. If the station location is not the most economical for distribution of copper, studies are made of comparative costs for other locations where company property is available or where real estate may be obtained to advantage. It is found practically that new stations are rarely located where theoretical requirements would indicate.

Chicago substation equipment has become quite standardized and various installations differ chiefly in arrangement of minor details. In the earlier installations traveling cranes and heating equipment were provided. The crane has been omitted in the later stations, as the standard modern machinery is so reliable that it is rarely necessary to make replacements of parts requiring the use of a crane. In fact, the Chicago companies were among the first to omit the crane. Not only does this avoid the investment in a crane, but the building may be made lower and the side walls somewhat lighter, thus making an additional saving. Frequently no heating plant is installed as the waste heat energy from the machines is sufficient to give a comfortable working temperature. The rotary converters used in the early substations were of 1,000-kw. capacity, but the 2,000-kw. unit soon became standard, and was in turn superseded by the 3,000 and later by the 4,000-kw. size. Sixty-seven rotary converters are now in use, divided as follows:

Twelve 1.000-kw. units
Two 1,200-kw. units
Forty-one 2,000-kw. units
Two 3,000-kw. units
Ten 4,000-kw. units

All of the latest stations have

4,000-kw. units. The cost of these large machines is less per kilowatt and they occupy but little more space in the substation, making the square foot area per kilowatt much less than formerly. It is possible to place a 4,000-kw. unit on the same foundation as occupied by a 2,000-kw. unit. Care in design has made this improvement possible, and the later machines contain numerous refinements in design, which in the aggregate improve this class of machine very materially. Standardization of sizes has also permitted the use of standard switchboards, transformers and other auxiliary equipment, and a reduction in spare parts required.

Fig. 5 shows the thirty-four substations furnishing energy to the local lines. In addition to these there is one storage battery station; and also at Plymouth Court substation a battery is in service with rotary equipment. The elevated railway system receives its energy from some of these stations and has in addition two battery stations available for special demands. The ownership of each station and the disposition of its energy output is indicated in Fig. 5. Only the Edison Company stations which furnish energy to the railway systems are shown. Table II gives this information in a more convenient form.

TABLE II—OWNERSHIP AND USE OF SUBSTATIONS

Ownership	Number of C. E. Co.	Stations Used by C. S. L.	Elevated
Commonwealth Edison Company Stations			
1. General, light and power only	41	..	..
2. Elevated only	2	..	2
3. Chicago tunnel	4	..	..
4. Surface and elevated	11	11	11
5. Joint stations, with surface equipment	4	4	..
Surface Lines Stations			
6. Surface only	..	11	..
7. Surface and elevated	..	5	5
8. Battery station	..	1	..
Elevated Lines Stations			
9. Battery stations	..	..	2
10. Elevated and C., N. S. & M. Ry.	..	..	1
Total substations	62	32	21
Steam stations operated by Commonwealth Edison Company	3	3	3
Total stations	65	35	24

The surface line railways have an investment in substation property now in service of about $4,750,000, of which $3,500,000 is in station equipment and the remainder in buildings and real estate.

In Chicago the trolley line is sectionalized by section insulators and each section is fed from a separate feeder panel in the substation. This feeder is often composed of several cables running by different routes and tapping in at different points to a distribution cable on the street, from which feed taps are made to the trolley wire. This "radial" system of distribution is not so economical of copper as a "network" system, in which all the trolley wires form a continuous network and the feeders furnish energy to selected points of the network. But it is difficult to locate trouble in an extensive network of this kind and also difficult to isolate the portion in which the trouble occurs. Some effort has been made in Chicago to utilize the advantages of a network with the radial system by joining adjacent trolley sections through fuses or circuit breakers. Such a method has not been found satisfactory, because it was impossible to adjust the connection so that it would distinguish between a heavy transfer of current from one section to another due to a shift of load (which it should allow) and a heavy flow of current into a section due to short circuit (which it was not intended to permit). The practice at present, therefore, is to provide knife switches, mounted in a pole box, which are normally open, but which may be closed on each end of a section if for any reason the feeders to this section become disabled. Such a plan provides a quickly operative and convenient device for insuring continuity of service, as it is quite unlikely that both the sections adjacent to a disabled section would also be out of service.

In the central portion of the city all feeders are in ducts underground, with laterals up poles for feed taps to the trolley. In the outer portions of the city all distribution is by overhead lines, with a jumper connection to the feed span. All cables are rubber insulated. The clamps holding the weatherproof riser to the pole have an insulating band between them and the pole, and the cable is held in the clamp by a split insulator. This gives three insulations between the conductor and the pole and practically prevents "hot poles."

The basis upon which the positive and negative feeder systems were to be computed was established by the Board of Supervising Engineers. That for the positive system is as follows:

1. The d.c. bus at substations will be operated at approximately 600 volts.
2. An allowance of 40 kw. in substation capacity will be provided for each standard double truck car or its equivalent operated. (The standard car then weighed approximately 26 tons light.)
3. In calculating copper for current-carrying capacity an allowance of 75 amp. per standard car shall be allowed.
4. An average drop of 50 volts will be allowed between the d.c. busbars and the center of load of each trolley section, due provision being made for the lines to take care of emergency cases.
5. The carrying capacity of insulated cables shall be calculated upon the following basis:

In arriving at the basis for kilowatt and ampere requirements extensive tests were made on individual cars in actual operation in different kinds of service. Tests were also made upon groups of from eighteen to seventy-six cars operating on isolated trolley sections of a mile or more in length, by stationing observers to note the cars entering and leaving the section and to take current and voltage readings on the section feeders. The values finally decided upon included requirements for heat and light and operation under winter conditions. The methods of test and computation are fully described in the second annual report of the Board of Supervising Engineers (1908), and in a paper by the writer on "Low Tension Feeder Systems for Street Railways" (Jour. West. Soc. Eng., June, 1910).

A question of considerable importance is the interconnections of stations so that the temporary shutdown of one will not throw out of service all the sections fed from that station. One method of accomplishing this would be to install in every station sufficient copper leading from the adjacent stations to enable the full current capacity of the disabled station to be fed into it from the others. The presence of such trunk tie lines would be highly desirable during an emergency, but would be of no service at other times, except as equalizers between the stations. The investment for such ties would be quite large. Essentially the same results have been secured in Chicago by selecting a number of the more important trolley sections and feeding them from two stations.

The entire trolley network is sectionalized with insulators between the sections. All of the trolley sections on the more important traffic lines are fed from two or more substations. These "tie lines" are so proportioned that on the whole system, in case of a shutdown of some of the stations, those remaining in service could carry the load through the tie lines. In all cases these tie lines are uniform size cables running through from one station to another, with the load for the trolley section tapped off somewhere between. The amount of emergency current drawn over the tie lines is regulated by the resistance of the cables and by voltage control at the stations—a lowering of voltage at a station throwing more load on adjacent stations. This tie-line feeder system represents in a measure a factor of safety necessary for successful operation. The number of tie lines varies with the importance of the stations and the density of traffic on the individual section fed from them.

Fig. 5 shows the direct-current tie lines between stations furnishing energy to the surface railways in Chicago. Similar ties exist on the elevated system between their stations. The diagram indicates the various classes of substations, as to ownership, and distribution of current to surface and elevated lines. It will be noted that some ties exist between steam stations and railway substations. These ties are not normally in service but are available for use when it is necessary to run the steam stations, as in severe winter peaks. Then the tied-in substation may be relieved of this portion of its load, which will be available for other sections. This plan of providing a flexible and partially duplicate system of feeders has worked well in practice. The feeder system has been so reliable that service interruptions due to lack of power are virtually unknown. This system of the feeders forms the complement of the alternating-current tie lines already discussed.

It is too often the case among electric railways that the return circuit, except possibly for rail bonding, is neglected, while the positive system is carefully planned and constructed. A poorly built negative system does not jeopardize life or cause delays to the same extent as similar neglect in the positive system, but elements of danger and loss are present which are of great importance. With these thoughts in mind the Board of Supervising Engineers determined to make the return circuit of the best type possible, by the following means:

1. Utilizing the full conductivity of the rails, and making the rail joints equivalent in conductivity to that of the rail.
2. Providing for full conductivity through the special trackwork.
3. Providing additional return conductivity so as to keep the potential gradient on the track to a fair value, and the maximum drop within the limit set by ordinance. (This also limited the current density in the return circuit.)

The first was accomplished by electrically welding the rail joints, which produced a conductivity through the joints somewhat in excess of an unjointed length of track. Cross-bonds were provided every 330 ft. between all four rails, so that a break in a rail did not materially affect the total conductivity. Each rail of 129 lb. had a conductivity equivalent to 1,500,000 circ.mil of copper. Full conductivity through the special trackwork was secured by installing long bonding cables completely around the special work, with the ends of these cables electrically welded to the straight track on each side of the special work. Each internal joint was bonded with No. 00 pin terminal bonds, and the conductivity of heavy twelve-bolt joint plates was also utilized. An entire piece of track special work may be removed without materially reducing track conductivity.

In addition to the four electrically welded rails, auxiliary copper cables are used on every street. In the majority of streets one 1,000,000-circ.-mil cable is buried between the tracks, and each cross-bond is connected to this cable. This auxiliary cable continues through the track special work and is tied solidly to the special bonding cables referred to above. On some of the less important streets a 500,000-circ.mil cable only is used. Near substations the amount of copper is increased, so as to keep the current density in the return circuit within a maximum value allowed. This has the effect of limiting the potential gradient in the return circuit and so reducing the tendency to produce stray currents. The amount of copper thus used in the return circuit is equivalent to approximately 875,000 circ.mil for each double track.

TABLE III—INVESTMENT IN POWER PROPERTIES FOR RAILWAY USE

	Generating	Substations	Distribution	Total
Commonwealth Edison Company	$19,800,000	1,125,000	18,000,000	38,925,000
Chicago Surface Lines	....	4,750,000	13,500,000	18,250,000
Elevated Lines	4,500,000	425,000	3,625,000	8,550,000
	$24,300,000	6,300,000	35,125,000	65,725,000

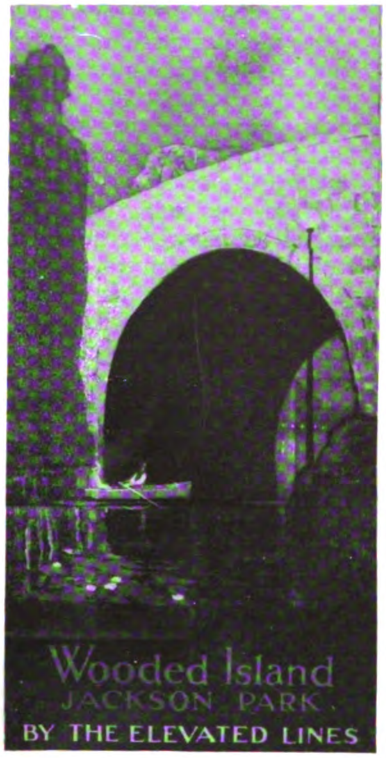
Before deciding on the types of return circuit construction many tests were made covering various phases of the circuit, such as types of bonds, rail joints and cable terminals. In computing the requirements of the return circuit a map was prepared showing the network of tracks and the distribution of cars. From this a diagram was prepared showing the load in amperes for each side of any mesh in the network. The current must of course return to the station from which the corresponding positive feeders are run. A preliminary estimate was made of the probable amount of copper required on each street in addition to the rails, the resistance of each mesh of the network was determined, and the distribution of the current returning to each station was calculated by the laws of divided circuits. The drop in each section was computed and the resultant drop around each mesh was determined. Between two corners of a mesh the drop must be the same by all paths, and if this was not found to be so the current was redistributed. This process indicated in many locations that the current was not properly distributed. At these localities a recalculation was necessary. In this way the copper distribution for the entire return system was calculated. In these calculations average conditions with respect to the return of current to the negative buses at maximum load were approximated as nearly as possible. But on account of changes in distribution with each extensive rerouting or change in stations, it has been necessary to make studies of various localities from time to time.

The investment of the surface lines in the positive and negative feeder system is about $13,500,000, including duct and pole lines, all cable and trolley wires and all equipment necessary, outside of the substations.

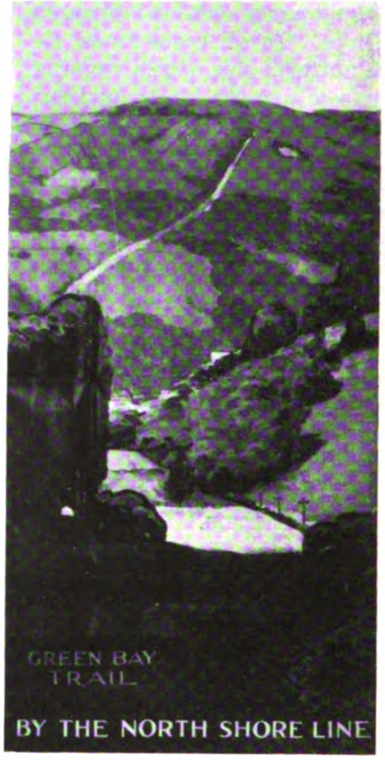
The investment in railway power properties now in service may be summarized in table III.

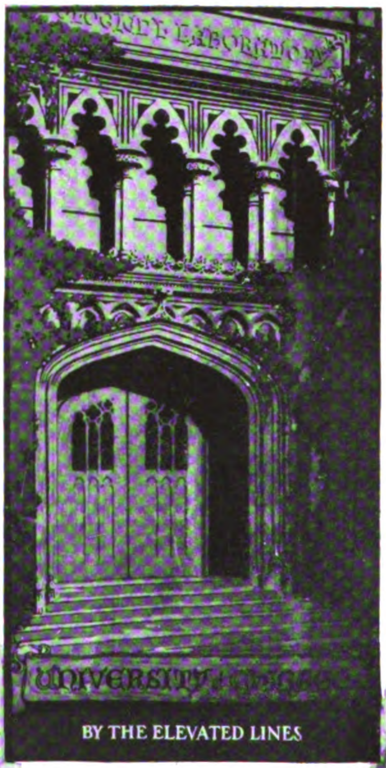
The allocation of the Commonwealth Edison Company investment in property for railway use was made upon the basis of the energy furnished as compared to the total, and upon the equipment required. While it is an estimated portion of the total it probably represents a fair value of investment involved for railway use. The investment values given are for equipment now in service.

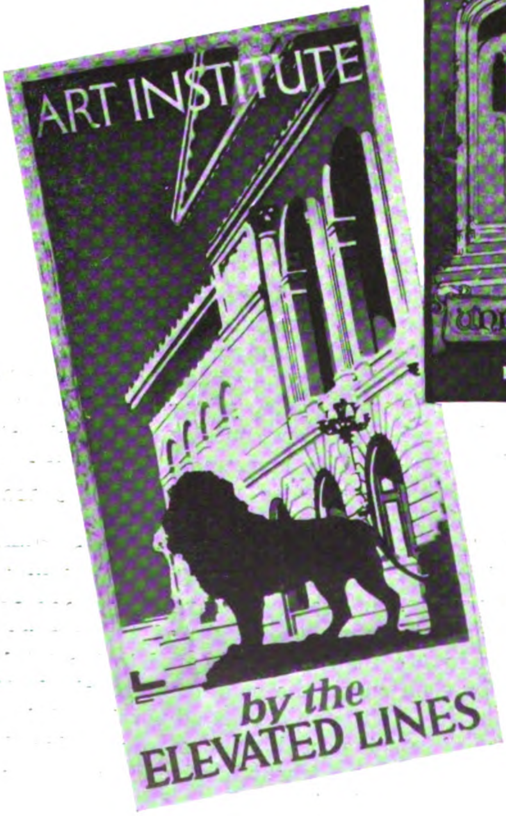
Chicago Elevated Vies with London Underground in Beauty of Traction Posters

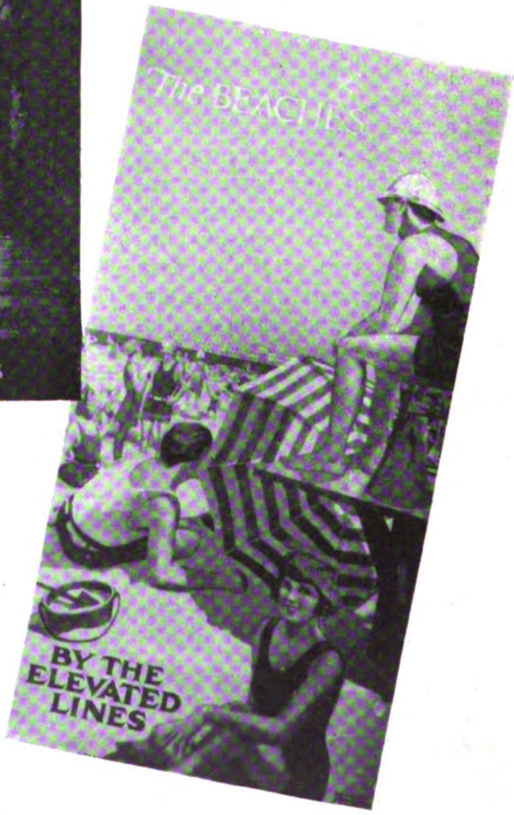

Wooded Island
JACKSON PARK
BY THE ELEVATED LINES

MUCH favorable comment has been evoked by the artistic posters now appearing on the stations of the Chicago elevated roads. A well organized campaign has been laid out so that the copy of the posters is varied according to the seasonal activities of the people. The reproductions here are typical of the subject matter utilized. The fact that these posters stand out so markedly from the usual type of advertising which appears on the stations has been an important factor in the attention attracted. They are printed in three colors and measure 39 in. x 77 in.


GREEN BAY
TRAIL
BY THE NORTH SHORE LINE


UNIVERSITY
BY THE ELEVATED LINES


ART INSTITUTE
by the
ELEVATED LINES


The BEACHES
BY THE
ELEVATED
LINES

Typical North Shore Limited train photographed while traveling 65 m.p.h. over rock-ballasted trackway

$1.00 Revenue for $1.47 Investment

By C. E. THOMPSON
Assistant to the President
Chicago, North Shore & Milwaukee Railroad

How the Chicago, North Shore & Milwaukee Railroad Has Been Built Up—Gross Revenue Has Been Increased 350 per Cent in Six Years by a Splendid Improvement of the Physical Property and an Intense Application of Selling—Total Investment Has Been Decreased from $11.80 to $3.76 per Dollar of Annual Gross Revenue

THE Chicago, North Shore & Milwaukee Railroad, now commonly called the "North Shore Line" or the "Road of Service," was organized six years ago (1916) to take over the properties of the Chicago & Milwaukee Electric Railroad Company of Illinois and the Chicago & Milwaukee Electric Railroad Company of Wisconsin. The properties had been operated by federal receivers for eight and one-half years or since January, 1908.

An appraisal of the property at the date of reorganization showed an investment of $12,252,000. The property needed many improvements; improvements in roadbed and track, overhead and transmission lines, rolling stock and power equipment, and improvements in shops and terminals. Most of all it needed improvement in traffic and revenue which would make possible the financing of the improvements in physical property which were necessary to the improvement of the service.

The reorganization plan provided for practically no working capital; business generally was staggering from the early effects of the World War, and the condition of the electric railway industry of the country was such that to obtain new money from the sale of electric railway securities presented a problem of serious undertaking.

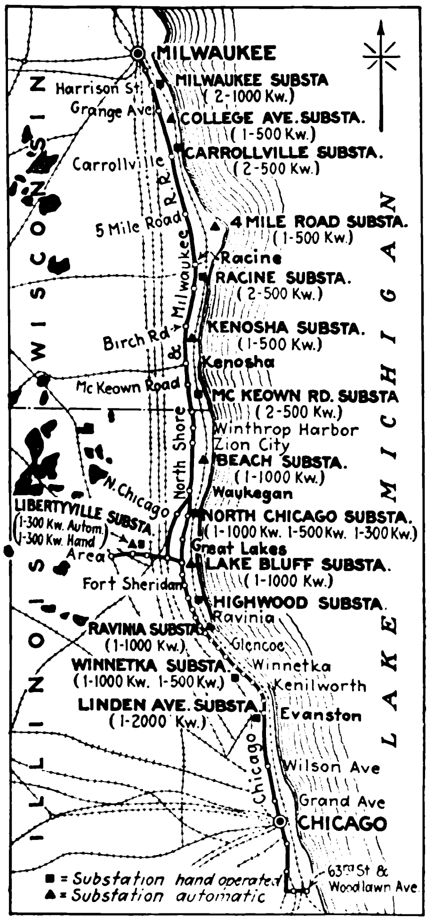
The situation was one that called for an executive with unusual vision and courage and the organizing ability which gets things done. President Britton I. Budd saw at once that with terminals in Chicago and Milwaukee, having a combined population of 3,000,000, the rapidly growing North Shore suburban district between Evanston and Lake Forest, and the growing manufacturing cities of Waukegan, Kenosha and Racine, having a combined population of 200,000, the development of a high-class, high-speed electric railway service would create traffic and justify the necessary investment. While the problem is still in the process of solving, the result at the end of six years is *one dollar per annum increase in gross revenue for each dollar and forty-seven cents increase of investment.* At the date of reorganization the investment for each dollar of annual gross revenue was $11.80. The investment is now $3.76 for each dollar of annual gross revenue. The total investment is now $17,616,000. The gross operating revenue for the year ended June 30, 1916, was $1,038,183; for the year ended June 30, 1922, $4,674,171, an increase of 350 per cent in six years.

Many forecasts were made by financial, engineering and operating experts as to the probable results which could be obtained in the way of increased revenue and traffic, but the actual results have far exceeded what was once considered the wildest flight of engineering imagination. The methods used in building up this property will be treated under two broad headings: First, giving service; and second, selling service.

GIVING SERVICE

As previously stated, many improvements to the physical property were necessary before the character of the service and the reliability of the service could be placed on a real service basis. The additions to the rolling stock and the improved shop practices; the additions to and changes in maintenance standards of the roadway, tracks and buildings; and the additional power and transmission equipment and methods employed in maintaining the overhead trolley system are each treated in other articles in this issue of *Electric Railway Journal*, and will be referred to in this article only to show their effect upon the giving and the selling of service.

The financing of improvements to the amount of five and a half million dollars during this period was no small task in itself. The demand for money to finance the manufacturing and other industries directly engaged in producing equipment and munitions for the prosecution of the World War, the rapidly advancing cost of rendering service, the slow and dilatory action of governmental authorities in granting increases in rates of fare, forced many electric railways into bankruptcy and ruined the credit of the industry. And the rates, when money was obtainable, were so high as to be almost prohibitive. For these reasons the money obtained for improvements during this period was from the sale of equipment certificates, from short-term notes secured by first mortgage bonds and from operating revenue. Of the total new investment made, less than 50 per cent is now represented by outstanding securities.


MILWAUKEE
MILWAUKEE SUBSTA (2-1000 Kw.)
Harrison St.
Grange Ave.
COLLEGE AVE. SUBSTA. (1-500 Kw.)
CARROLLVILLE SUBSTA. (2-500 Kw.)
Carrollville
5 Mile Road
4 MILE ROAD SUBSTA. (1-500 Kw.)
Racine
RACINE SUBSTA. (2-500 Kw.)
Chicago, North Shore & Milwaukee R.R.
Birch Rd.
KENOSHA SUBSTA. (1-500 Kw.)
Kenosha
Mc Keown Road
MC KEOWN RD. SUBSTA (2-500 Kw.)
Winthrop Harbor
Zion City
BEACH SUBSTA. (1-1000 Kw.)
Waukegan
N. Chicago
NORTH CHICAGO SUBSTA. (1-1000 Kw. 1-500 Kw. 1-300 Kw.)
LIBERTYVILLE SUBSTA. (1-300 Kw. Autom. 1-300 Kw. Hand)
Area
Great Lakes
LAKE BLUFF SUBSTA. (1-1000 Kw.)
Fort Sheridan
HIGHWOOD SUBSTA.
Ravinia
RAVINIA SUBSTA. (1-1000 Kw.)
Glencoe
WINNETKA SUBSTA. (1-1000 Kw. 1-500 Kw.)
Winnetka
Kenilworth
LINDEN AVE. SUBSTA. (1-2000 Kw.)
Evanston
Wilson Ave
Grand Ave
CHICAGO
63rd St & Woodlawn Ave
WISCONSIN
ILLINOIS
LAKE MICHIGAN
■ = Substation hand operated
▲ = Substation automatic

The North Shore Line

The most important part of a railroad is its terminals. When the North Shore line took over the properties, the southerly terminal was at Evanston, where passengers were transferred to the Chicago Elevated Railroads. The Milwaukee terminal was in Second Street, a busy business thoroughfare, with a waiting room in a dilapidated store building. One of the first steps of the new management was to acquire property a block long and half a block wide for a terminal site. A beautiful modern station building was constructed with train sheds and tracks for convenient and efficient handling of the traffic. This station was opened to the public with appropriate ceremonies on Sept. 14, 1920. At the time, the site selected was thought by many to be too far from the business center of Milwaukee. The growth to the west has been so rapid that our terminal is now very near the business center of the city. We have recently acquired practically all of the east half of the block bounded by Sycamore, Clybourn, Fifth and Sixth Streets to provide for future developments of our passenger and merchandise dispatch business.

The Chicago terminal presented an entirely different problem. The purchase of a terminal was entirely out of the question. Negotiations by the receiver for the lease of terminal facilities had been pending for some time, but the obstacles seemed to be insurmountable. The matter was again taken up promptly after the reorganization, and finally resulted in the leasing of all the property of the Chicago, Milwaukee and St. Paul Railway lying between Wilmette and Montrose Boulevard, Chicago. Coincident therewith an operating agreement was made with the Chicago Elevated Railroads for the joint use of the St. Paul property and for North Shore trackage rights over the elevated lines to and around the Union Loop and as far south as Twelfth Street on the south side. Operation under this agreement was

CHICAGO NORTH SHORE & MILWAUKEE RAILROAD
212

Multiple-unit equipped cars used in merchandise dispatch service

Artistic new station recently opened in Kenosha, Wis.

The Chicago, North Shore & Milwaukee R.R., in keeping with its policy of improving all facilities for the convenience of passengers, on Aug. 12 opened to the public a new station in Kenosha, Wis. With the exception of the Milwaukee terminal, the new Kenosha station is the most imposing on the road and in fact is claimed to be one of the show places of that city. Special attention was devoted in designing it both to obtain maximum utility for railroad purposes and produce a building that would harmonize with the site. The main building is 131 ft. long and 34 ft. wide. Across the tracks on the west side of the line is a platform and a waiting room 48 ft. x 18 ft. The platform will accommodate a five-car train. The building cost was $75,000.

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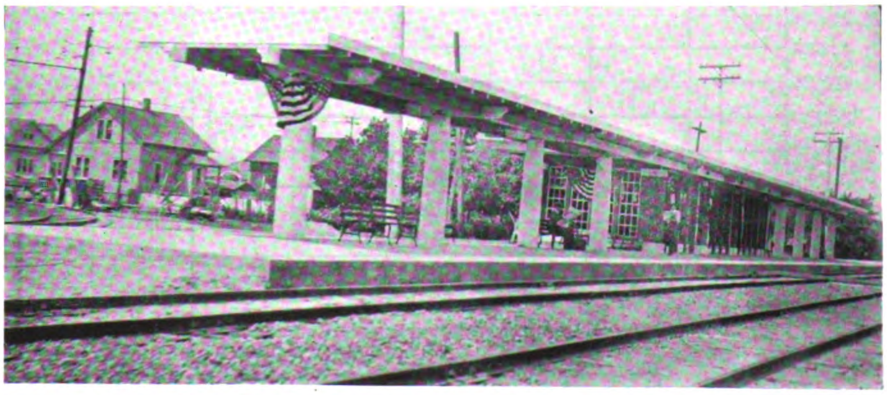
begun on Aug. 1, 1919; and the rights were subsequently enlarged to provide for North Shore operation to Sixty-third and Dorchester Avenue in the Woodlawn district of Chicago. This terminal enables us to deliver passengers, at their pleasure, directly to the Loop, the business heart of this great city, or to the uptown business center at Wilson Avenue, or to the largest south side business center at Woodlawn.

The passenger service, from which 86 per cent of the revenue is derived, has been gradually improved and rearranged to meet the needs of our patrons until there are now five distinct classes of passenger service—city street car service which is operated in Waukegan, Ill., and Milwaukee, Wis.; local interurban service between Evanston and Waukegan at half-hourly intervals, between North Chicago and Milwaukee at two-hourly intervals and between Lake Bluff and Area at half-hourly intervals; express interurban service between Chicago (Loop) and Waukegan at half-hourly intervals; limited interurban service between Chicago (south side) and Milwaukee at hourly intervals daily and half-hourly intervals on Saturdays, Sundays and holidays; De Luxe trains (of which there are six daily) between Chicago and Milwaukee, making stops only at Evanston, Kenosha and Racine. These trains, called the "Badger," "Interstate" and "Eastern," which were recently added to the schedules, make the 86.5 miles in two hours and ten minutes and have proved very popular. They carry dining cars or parlor-buffet cars, are usually three to five car trains, and at least once each week the "Badger" is run in two sections of four cars each. We have found that high speed and reliable service with few stops are appreciated by our patrons.

DINING CAR SERVICE IS VERY POPULAR

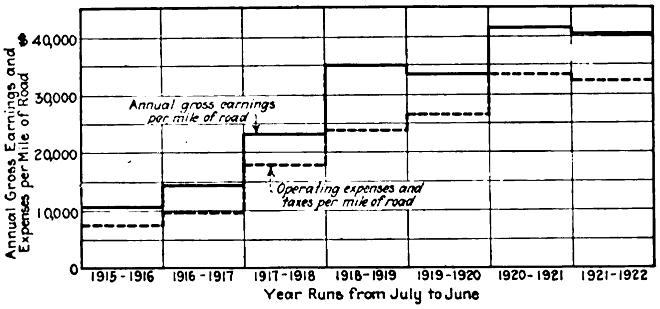
One of our most popular features is the dining car service. Special table d'hôte and à la carte service is now provided on seven trains daily. Everything served on these dining cars from the soup, via the North Shore special steak, to the toothpicks and after dinner mints is the best that money can buy and it is prepared by experienced chefs who know how. Reasonable prices add to the enjoyment of the meals. The most recent addition to the service is the "Eastern Limited," which makes connection in Chicago with the "Broadway Limited" and the "Twentieth Century" for New York and other Eastern points. These trains have parlor cars as well as coaches, and parlor-observation cars will soon add attraction to these already popular trains.

Another feature which is operated for the convenience of our patrons are the concessions and restaurants in our stations. Realizing that the traveling public usually avoids railroad concessions and restaurants for fear of inferior goods and exorbitant prices, and knowing from experience the difficulty of controlling the prices and service when the concessions are operated by outside parties, we have undertaken to operate these as part of North Shore service. A high standard of quality and service is maintained. Where practical, local and nationally advertised brands are



Better view of waiting shelter opposite main station, Kenosha

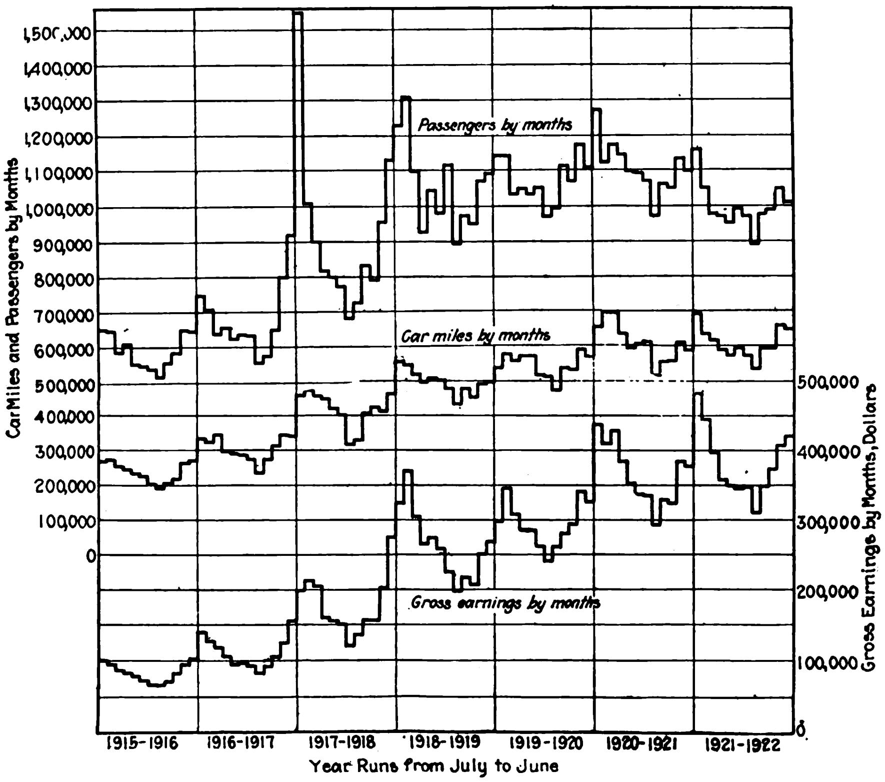
sold at the prevailing local prices. In our Milwaukee terminal station the restaurant is of the most modern design, fully equipped for both table and lunch counter service. A plate lunch is served at 35 cents and a full course dinner at 50 cents. This service attracts not only those traveling via our road, but also draws largely from Milwaukeeans. These concessions now operated in seventeen of our stations produce gross revenue in excess of $300,000 per annum and in addition to the convenience to our patrons, they add a neat sum to our net revenue.



Trend of revenue resulting from improvements and salesmanship

Our city street car service in Waukegan and Milwaukee was as unprofitable as most lines of like character. In 1919 one-man safety cars were purchased for the Waukegan city line and placed in operation early in 1920. Before the cars were placed in service, the idea was sold to the city officials, to the public and to the men who were to operate the cars. Street car fares were being increased wherever possible in an attempt to cover the rapidly increasing cost of operation. We explained our situation frankly and expressed the hope that the one-man safety cars would enable us to give better service and at the same time keep the fare down to a reasonable basis. The trainmen were thoroughly instructed in the handling of this type of car. By the use of these cars the service was increased 90 per cent, the fare was kept down to 6 cents, the traffic was increased substantially and the financial improvement has been quite gratifying. The Wisconsin Railroad Commission has approved of similar operation on our city line in Milwaukee. The cars are being built and will soon be in service.

The passenger service on our branch line between Lake Bluff and Area has never been profitable. We are now having built for use on this line some light-weight interurban cars, designed for operation by either one or two men. The reduction in operating expenses which will become possible by the use of this car will, we believe, make this branch at least self-supporting.



Seasonal variation of traffic, service and earnings, North Shore Line

In 1916 the Adams Express Company was operating on our line and we also did a small amount of carload freight business. The express contract was unprofitable, and the possibilities of carload freight were limited to a small part of the line and consisted largely of sand, gravel and crushed stone, which moved only during the summer months when road building and other construction work was being done. The express company discontinued its service in 1917 and we inaugurated a merchandise dispatch service. This business is handled in express cars constructed for the purpose and the service corresponds with express service without the pick-up and delivery features, although the rates are on a par with the steam road freight rates and the steamboat rates. From a very small beginning this department has developed rapidly until the revenue from this source is more than half a million dollars per annum.

FACILITIES PROVIDED FOR MERCHANDISE DISPATCH SERVICE

Twenty cars are used exclusively in this service and fifteen additional cars are now being built. Four receiving and delivering stations are provided in Chicago at convenient points. The principal station is at Franklin and Austin Streets near the Loop. On the south side is one on Sixty-third Street near Calumet and one at Forty-first and Union in the Stock Yards district. The north side station is on Montrose Boulevard near Broadway. Cars are operated to the Montrose station and to the Sixty-third Street station. Between Montrose and Franklin stations and between Sixty-third Street and Union Avenue station transfer is made by motor trucks. The North Shore Line owns and operates six 5-ton tractors and fifteen 10-ton trailers for use in making this transfer. Two stations are operated in Milwaukee, the principal one, which is 400 ft. long with track capacity of ten cars, is located on our main terminal property at Sixth and Clybourn Streets. The other is at Harrison Street near the south city limits. Ample station facilities are also provided at Racine, Kenosha, Waukegan, North Chicago and other points. In addition to local shipments on our line, business is interchanged with other rail carriers and with boat lines in both Chicago and Milwaukee.

Lying west of the North Shore Line in northern Illinois and southern Wisconsin, there is a chain of very beautiful lakes. This territory provides vacation and recreation places for many thousands of Chicago and Milwaukee families. Many have their summer homes on these lakes and many tourists are attracted by the fine fishing in spring and summer and the hunting in fall and winter. The North Shore Line plans to make this beautiful playground much more accessible and bring it much nearer to the cities by extending its service into this region. A start was made this season by providing motor bus service between Kenosha and Lake Geneva, Wis. This service was popular from the start, and before another summer we will establish other lines until the entire territory is adequately served.

SELLING SERVICE

Does the live merchant, having selected a good location, installed modern equipment and tastily arranged his high-class merchandise, sit down with folded hands and wait for customers to come to him? Or does the successful manufacturer fill his warehouses with his product and then wait for customers to come to him? No! These men advertise. They send out their salesmen and their sales engineers, who give reasons why they should receive patronage; who explain the superior value of their product or merchandise, their process of manufacture, the responsibility of the men behind their business, their ability to make prompt deliveries; they get in personal contact with their customers and create friendships; they use modern selling methods.

Modern selling methods are as necessary in the transportation business as in the sale of haberdashery, boots and shoes, or farm implements. To build a railroad, equip it with fine cars, provide stations and good service and then sit down and wait for customers will naturally get the same results as the retail merchant or manufacturer gets who uses this same out-of-date method—a bare existence or mediocre living.

Our selling methods will be treated under three divisions, i.e., advertising, sales force and public relations.

We have used various forms of advertising. The most effective medium is by word of mouth from patrons who have been pleased by the service. You know it means something, when traveling men are sitting around the hotel lobby, to have Bill say to John, "Have you used the North Shore Line? That's the best service I know of"—and go into details to support his statement. Our patrons are our best advertising medium. And then we use the newspapers, not only the large dailies in Chicago and Milwaukee, but also the dailies and the weeklies in the smaller cities and towns through which we operate. We use the large outdoor advertising boards in carefully selected locations, most of which are illuminated, and also posters at our own stations and on the Chicago Elevated platforms. We use the street car and elevated car cards and many thousands of folders and time cards annually. We have used stereopticon slides in the motion picture theaters with good results and we have two excellent motion picture films which we use in the theaters and at public gatherings of every kind. These are called the "Green Bay Trail" and the "Pace of Progress," each in its interesting way showing the development of transportation from the Pioneers and the Indians to the highly developed electrically operated service of the North Shore Line. These films will be exhibited at the convention at the North Shore exhibit space.

We also have the "North Shore Bulletin," which is issued monthly and distributed to a large mailing list and also direct to our patrons on the cars. This unique "house organ" is stamped by the individuality of its Scotch editor, and while it bristles dry humor, it also carries a message each month with his philosophy and about some improvement or new service which the road is providing.

Another form of advertising which we have used freely is *paint*. No, I don't mean the paint used on the billboards and posters. I mean the paint used on the cars and the stations, and on the signs and signals along the right-of-way. No money is spent in the maintenance of a railroad to better advantage than that spent for paint. You not only preserve the steel and the wood which is covered, but you show the public that you are up and doing. In addition to the paint we have used shrubs and flowers and grass, and the lawnmower, to improve the appearance of our station grounds.

Main waiting room in new Kenosha station

As I have said before, the most effective advertising medium is by word of mouth. While we have been improving the roadway, adding new equipment, building new stations and improving the service, yes, and raising the rates, we have told our patrons our plans and called their attention to the improvements and explained the reasons for increasing the rates; all the time giving them something to think about and to talk about and letting them know we have transportation for sale.

We believe that advertising pays. And while it is very difficult to measure results directly, we think all the forms of advertising used have produced. But we haven't depended entirely on paint and printers' ink. We have our salesmen on the road calling upon our trade. Our traffic men find shippers who don't know about our merchandise dispatch service. They find booking agents who didn't know the North Shore could handle the properties of a troupe having an elephant and several ponies. They call at stage entrances on actresses who didn't know they could, by using the North Shore service to Chicago, leave Milwaukee after their evening performance and be in St. Louis for rehearsal the following morning. They find many lodges which are pleased to learn that the North Shore has all ready for their use their illuminated emblem to be placed on the front end of their special train. Our traffic men not only find new customers but they keep in touch, both by personal calls and by mail, with those who already know of and are using our service.

Our sales force is not confined to our traffic department, however. All of our employees are salesmen, and especially those who come directly in contact with our patrons, such as our station agents and our conductors. By intelligent selection, careful instruction and close supervision we now have courteous, obliging, well-informed "business-getters" on our trains and in our stations. Supplementing the usual rule books, bulletins and other written instructions, we have frequent meetings with our agents and also with our trainmen at which our plans for new lines of service are discussed, questions are asked and answered and the part our agents and trainmen have in developing and keeping business is emphasized. Our patrons are impressed with the uniform courtesy of our employees, and both the employees and the management are proud of our reputation in this respect.

PUBLIC RELATIONS AND EMPLOYEE RELATIONS

The progress which has been made in the development of this property can be attributed in large measure to a very definite policy of fair and liberal treatment of our employees and the public. The road has paid the highest wages conditions would warrant and provided the best working conditions. At the Highwood headquarters a restaurant is provided which serves wholesome, well-cooked food at cost, and a liberal discount is allowed employees at all restaurants and concessions operated by the company. Recreation rooms are provided at Highwood and at the Milwaukee Terminal. A visiting nurse is provided by the company to assist any who are sick or have sickness in their family. A mutual benefit association, to which all employees are eligible to membership, is supported on the basis of the company paying into the fund 50 per cent of the amount contributed by the members. This association pays both sick and death benefits and has proved very helpful. Americanization work among our foreign speaking employees is directed by an expert in this line, assisted by volunteer services from our supervisory force. This work includes teaching of English, instruction in American ideals and standards, sanitation and recreation; our objective being the naturalization of these men until our employees are 100 per cent American citizens.

Organized safety work under the direction of the bureau of safety has had a prominent part in the improvement of the service. This work is so organized that the interest of every employee is enlisted, every suggested improvement in operating practice and in the physical conditions are carefully considered and promptly acted upon. Our standard is service with safety. In addition to its work among our employees, this organization has preached the gospel of safety to all school children and to many clubs and societies in our territory.

All legitimate claims, whether for personal injury, loss or damage, overcharge, or for ticket refunds, are settled promptly and whenever possible on the day received.

During the six years we have obtained new franchises in Waukegan, Lake Forest and Highland Park. Each case involved the acquisition from the city of all or parts of the public streets, for private right-of-way and for extensive improvements in the way of track extensions and the relocation of highways. Negotiations were on a business basis, the public was fully informed as to what the railroad was to get and what it was to give the city in addition to the better service which the improvements would make possible. In two of these cities having commission form of government, the franchises were approved by popular vote.

The passenger fares six years ago were very low, the average being less than 1¼ cents per mile. Rapidly rising costs due to the World War made increases imperative. This involved not only increasing the mileage rates but also the setting aside of commutation rates provided by municipal franchises. Our first step was to increase the rates to 2 cents per mile and eliminate the low commutation fares. Through extended hearings before the state commissions our cards were all on the table face up, the public was fully advised as to both the legal and economic phases of the situation, and the first bridge was crossed in 1917 with little, if any, ill-feeling. Later in 1918 our interstate and Wisconsin intrastate rate was increased to 2½ cents per mile; in September, 1920, to 2.7 cents per mile, and finally in November, 1920, to 3 cents per mile, the rate for Illinois intrastate traffic remaining at 2 cents per mile on account of statutory limitations until July, 1921, when these rates were raised by order of the Interstate Commerce Commission to the same basis as the interstate rates to remove the discrimination against interstate traffic. When our service was extended into Chicago, commutation rates were voluntarily established between Chicago and the Illinois suburban towns on the basis of 1.6 cents per mile for the twenty-five ride ticket and 1 84 cents for the ten-ride ticket. These rates, which are still in effect, average 28 per cent higher than corresponding rates on the steam road between the same stations. All other passenger rates are uniform for the entire line and are now:

Interurban:	
Cash fare	3.3 cents per mile
Ticket fare	3.0 cents per mile
25-ride ticket	2.5 cents per mile
1,000-mile book	2.5 cents per mile
60-ride monthly	1.5 cents per mile
50-ride child's	1.0 cent per mile
City Lines:	
Waukegan	6 cents
Milwaukee	6 cents

Modern business success is accomplished through organization. In addition to the many other problems involved in the rapid development of this property, there was the problem of developing an organization. This was largely accomplished by selecting men from the ranks and training them for superintendencies and other supervisory positions. Through frequent meetings of the executives and supervisory force, the president outlines the policies to be followed. Programs are laid out, all criticisms and suggestions are considered and each department kept closely in touch with all contemplated changes in service and plans for development of the property. All matters of importance are referred to a special committee or to one of the standing committees for careful consideration and for their recommendation. The more important of the standing committees are the rate committee, which considers all contemplated changes in passenger, merchandise dispatch and freight rates; the authority for expenditures committee, which passes upon all expenditures for additions and betterments to the property, and the budget committee. The work of the A.F.E. committee (as the second is called) has been especially important owing to the fact that the small amount of money available each year had to be expended for those improvements which would be the best from the revenue producing standpoint. When money for improvements depends upon each dollar expended producing 70 cents additional revenue annually, great care must be used in deciding which of the many "necessary" improvements to defer.

The work of the budget committee has also been very important. We are using the budget system for the sixth year for both operating and capital expenditures. Prior to the beginning of the year, each department submits in detail and by Interstate Commerce Commission classification of accounts the amount required each month of the ensuing year to operate that department. These estimates are predicated upon an assumed operating schedule prepared by the transportation department and passed upon by the budget committee. Based upon the same estimated car-miles for each class of service, the committee carefully estimates the operating revenue, and a budget of operating revenue and operating expenses is thus prepared. After carefully considering the estimates of capital expenditures required, the committee determines the maximum total amount that can be financed, based upon the budget of operating revenue and expenses. This committee then eliminates those items of capital expenditures which can best be deferred. After determining in what months the new capital will be expended, the interest and other fixed charges are determined and the income budget is completed. The budget of capital expenditures and operating income are then submitted to the president and board of directors for approval. The actual results are then compared with these budgets monthly, and any over-expenditures promptly brought to the attention of the department responsible. The work of this committee is so carefully done that the actual results for the year are frequently within 1 per cent of the budget estimates.

Our auditing department has worked out a very complete cost accounting system under which the revenues and expenses of various classes of the service are segregated and reports rendered monthly so that each department knows what kind of a financial showing is being made. For example, a report is made monthly covering the operation of the merchandise dispatch service, another for carload freight, one for each of the city lines, one for the motor truck service, one for the motor bus service, etc. Monthly meetings are then held which are attended by the superintendents and the accounting officers at which the results are analyzed, attention is called to any unusual charges, and by the use of charts the general trend of each department is illustrated. This cost system has been very helpful to the management in determining what classes of service are most profitable and along what lines it is best to make developments. It has also had an important part in the education and development of superintendents and others who have been promoted to supervisory positions. To obtain real efficiency those directly in charge must know the cost of rendering service and must also realize that the service must always be just in advance of the requirements in order to create traffic.

In addition to developing our own organization, we have used to advantage various experts who render special service in systematizing the work of our own departments. Among these are the Bureau of Railway Time Service, Western Weighing and Inspection Bureau, Western Demurrage Association, Bureau of Commercial Economics and the Bureau of Safety; also experts in filing, forms and correspondence, in valuation work and in accounting.

Special attention has been given to the elimination of claims. When claims do arise they are disposed of promptly, but it is much better business to prevent them. In addition to the direct effect upon traffic, accident prevention work has a direct bearing upon the efficiency of the organization. Safety and efficiency go hand in hand. We have invested approximately $100,000 in crossing gates and automatic signals to protect the general public, besides the many improvements for the protection of our employees and our patrons. We are spending $150,000 per annum in the maintenance and operation of safety devices. Practically all the work of our merchandise claim department is in the elimination of loss and damage claims. Actual payments in settlement of such claims now amount to less than 1 per cent of the gross.

The North Shore management has the same threefold obligation that every public utility has. The first, the obligation to serve the public, we believe we have met by giving this territory a very high grade, high speed, electrically operated railroad service. The second, the obligation to the employees, has also been met by providing good working conditions and by paying the highest wages which can be justified by the general economic conditions and the earning power of the property. The third, the obligation to pay a fair return to those who have invested their money in the property, has not yet been fulfilled. The investor's position, however, has greatly improved since the reorganization, and the indications are that a fair return may soon be earned, not only on the new capital invested, but also upon the fair value of the property.

NUMBER OF TRAINS OPERATED ON CHICAGO, NORTH SHORE AND MILWAUKEE RAILROAD

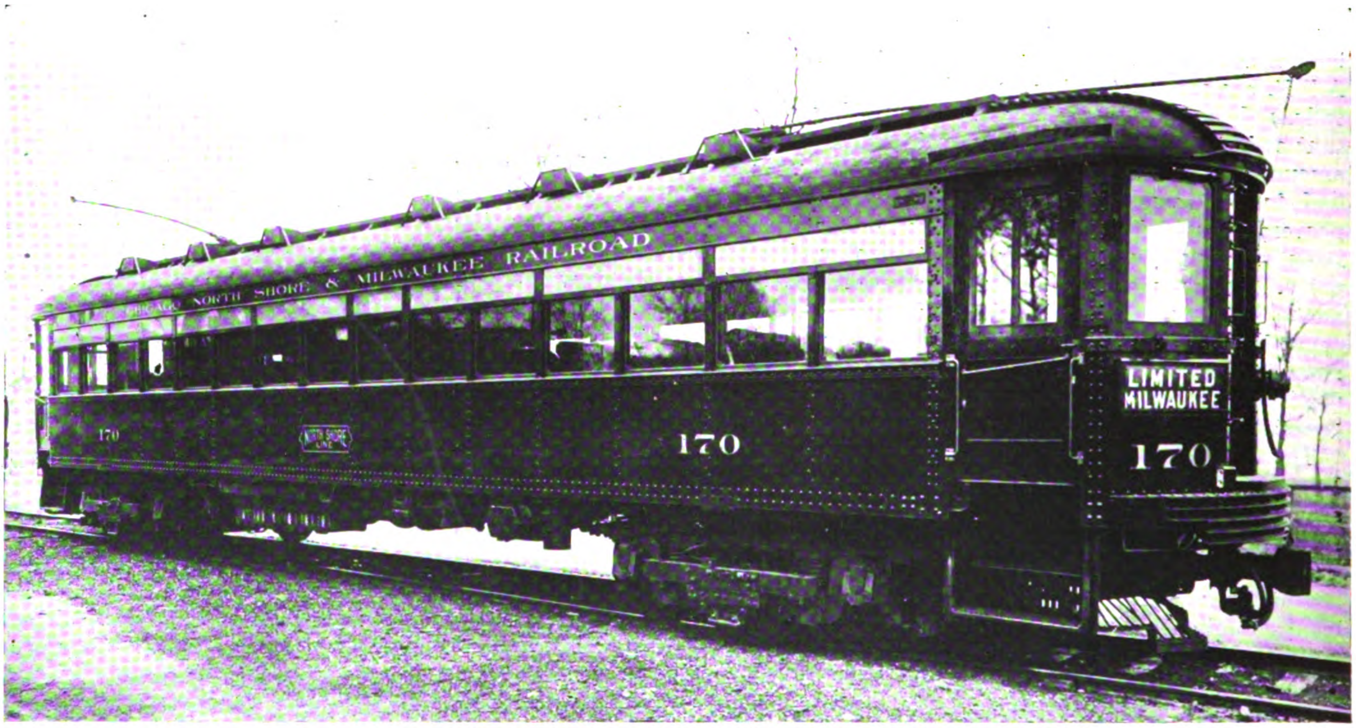
	July, 1916		July, 1922	
Local Trains	Daily	Sundays Holidays	Daily	Sundays Holidays
Evanston-Waukegan	103	116	71	64
North Chicago-Milwaukee	23	21	36	27
Lake Bluff-Area.........	36	40	68	68
Express Trains				
Chicago-Waukegan	..	..	59	69
Evanston-Waukegan	..	..	15	4
Limited Trains				
Chicago-Milwaukee	..	..	46	59
Evanston-Milwaukee	30	33	..	..
	192	210	295	291

Much has been accomplished, but those responsible for the success of the road feel that only the foundation has been laid; that upon that foundation may be built a transportation service meeting every need of the communities served, furnishing employment to many people at fair wages under favorable conditions, and earning a fair return for all those who may become financially interested in the Road of Service.

Comfort, speed, quick acceleration, operation in trains and on elevated structures, through slow suburban territory and fast open country are among the

Requirements Imposed in Designing North Shore Passenger Cars

By H. A. OTIS
Engineer of Equipment
Chicago, North Shore & Milwaukee Railroad



Type of steel passenger car which has proved very successful on North Shore Line

MANY limitations and special requirements were imposed upon the engineers in developing the design of passenger equipment for use on the Chicago, North Shore & Milwaukee Railroad. Part of these restrictions and requirements are readily seen from a brief characterization of the route over which the trains operate. Trains start in the Woodlawn section on the south side of Chicago, travel over the elevated railroads through the Loop district, the Wilson Avenue district and the north side of the city, and then through the fine residential suburbs along the North Shore. Operation is entirely over the elevated structures and tracks leased from the Chicago, Milwaukee & St. Paul Railroad to a point approximately 16 miles north of the downtown Loop district, or to the southern edge of the village of Wilmette, where the North Shore tracks begin. From Wilmette to North Chicago Junction there are numerous suburban towns which result in the necessity for a suburban service along this part of the line. From North Chicago to Milwaukee the route passes through open country and strikes the prosperous manufacturing centers of Waukegan, Kenosha and Racine, covering a distance of approximately 50 miles to Milwaukee, the northern terminal. For many miles the North Shore line parallels the tracks of the Wisconsin division of the Chicago & Northwestern Railroad, which operates frequent, fast, first-class trains between Chicago and Milwaukee.

With the conditions of this route in mind, it will be seen that the North Shore cars must meet the limitations in length, width and height imposed by the clearances of station platforms and curves on the elevated structure, which was built many years ago without thought of serving other than local service. For this reason the North Shore cars are narrower and shorter than they otherwise would have been built. The vestibule posts have also had to be set in, in order to assist in gaining the greatest length while still meeting the elevated clearances. It is also necessary that the North Shore cars be limited to a certain weight per axle, and certain spacing of the axles to prevent overloading of the elevated structures. On account of the suburban operation at the south end of the system numerous stops must be made, and this necessitates that the cars be equipped with sufficient motor capacity to permit of rapid acceleration, in order to keep up a high average schedule speed. This matter of high schedule speed for the entire run also necessitates that sufficient motor capacity be provided to operate at fairly high maximum speed through the open stretches of track at the north end of the system.

As the North Shore Line is in direct competition with the very excellent service of the Chicago & Northwestern Railway, the running time on the North Shore must compare favorably with that of the steam railroad time in spite of the suburban service limitations at the south end, in order to obtain its proportion of the business. This means that the cars must attain a speed of 65 m.p.h. Besides speed, the North Shore must compete with the steam railroad in the matter of comfort and convenience to passengers and in safety of operation.

The amount of traffic and the frequency of trains was also another matter which had to be considered in the design of this equipment. At first a considerable number of one-car trains were operated and this make-up was maintained by shortening the time between trains until the point was reached where there were limited trains leaving Chicago and Milwaukee every hour. As the traffic further increased more cars were added to the trains until now there are practically no single-car trains, and many of them run with four and five cars. Operating four and five-car trains at a speed as high as 65 m.p.h. obviously introduces many problems to be taken care of in the way of buffing stresses, and stresses that would develop in the event of collision or derailment, which are not so important in single car operation.

HEAVY STEEL FRAMING PRODUCES SAFE AND QUIET CARS

A great deal of study has been devoted to the development of a proper design of the steel framing on the North Shore cars to prevent telescoping in case of collision and to make these cars as safe as possible in every way for the passengers riding in them. The sub-frame has been developed along the general lines which have proved satisfactory in heavy steam railroad service, having continuous center sills form end to end of the car, which are heavily reinforced at the ends. The vestibule framing has also been very carefully worked out to give as much strength as possible to the vestibules to prevent crushing in. The vestibule corner posts, body corner posts, train door posts and bulkhead arch posts are all tied together at the top by means of steel members and a heavy steel cover plate. The steel cover plate also forms the vestibule ceiling. This steel frame construction has proved very satisfactory, and it is believed that it meets the conditions for which it was designed.

LIMITED
MILWAUKEE
170
170

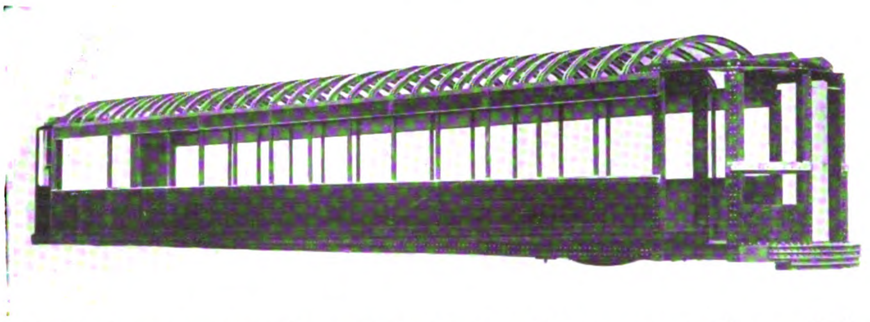
Train door, heavy end construction and equipment

In the selection of air brake and electrical equipment and in the building of the trucks no expense has been spared to obtain the safest and most reliable equipment known to the art. Another important matter on which a great deal of time was spent was the matter of riding qualities. It has often been said that the average interurban railroad cars do not ride as easily as the cars on the steam railroads, and various causes have been assigned for this. The management of the North Shore Line has insisted upon obtaining trucks which would ride as easily as steam railroad equipment. This has been accomplished by paying particular attention to the design of the trucks and springs.

There is a tendency among many spring and truck manufacturers to provide springs which are somewhat too stiff. This is the result of insistence that the spring shall stand up without sagging for a long period of time, and also because there is a tendency for cars to weigh more than is estimated before construction, which causes manufacturers to make rather generous allowance in dimensioning the springs in order to be on the safe side. Also, the live load variation on electric cars is so large in proportion to the weight of the cars light that it is rather difficult to design springs which will provide easy riding when the car is light and still have sufficient capacity for a heavy passenger load.

In order to accomplish the desired end as to riding qualities, the closest co-operation must exist between the railroad company and the spring manufacturer, and both sides must

Interior appearance is pleasing and the ride is quiet and comfortable

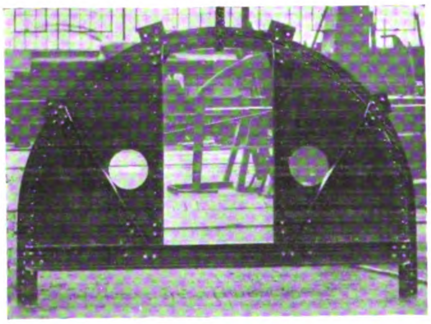


Steel body construction with special steel framing, giving great strength to vestibules

be willing to make concessions and to provide proper data and exact conditions under which the springs will be expected to operate. To provide easy riding they must be flexible. But many equipment men maintain that flexible springs will take a permanent set and will not last as long as stiffer springs. The management of the North Shore, however, has insisted that springs must be provided which will produce a comfortable riding car under all conditions of passenger load. If, in meeting these conditions, it becomes necessary to replace the springs more frequently than has been customary, that is considered merely as one of the expenses incident to the kind of service which is being rendered the public, just the same as any other operating expense.

As a matter of further convenience to the traveling public, the North Shore Line is now operating five dining cars between Chicago and Milwaukee. In addition, among the new cars which are now under construction there are one dining car and two parlor observation cars.

The five dining cars which are at present in service are arranged so that they can be converted into parlor cars by the removal of the tables, which are than stored in a locker provided for that purpose. They are operated as dining cars part of the time and as parlor cars on other trips. The new dining car which is being constructed will be used only as a dining car, so that its equipment will be adapted for dining car purposes only. Similarly the two new observation parlor cars will be designed for use as parlor cars only and no facilities will be provided for the serving of meals or luncheons.



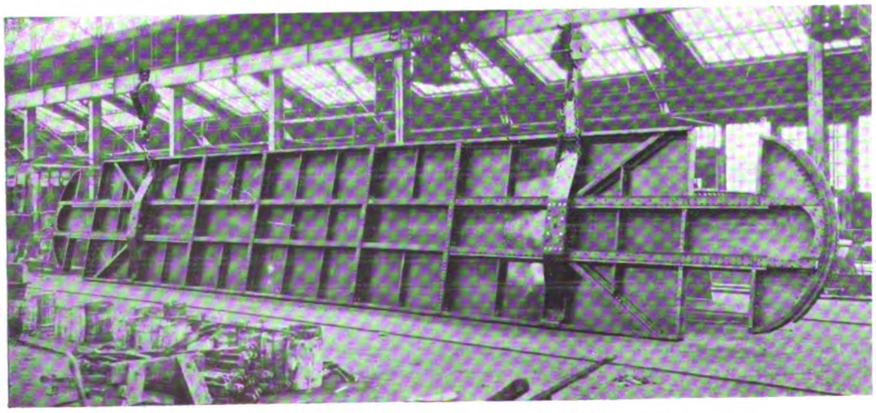
Top plate number of vestibule framing

The interior finish of all the North Shore passenger cars is a plain, simple design, but it is pleasing and the decorating is in good taste. Plush seats of steam railroad design are installed in the main passenger compartment and spaced far enough apart so that passengers are not uncomfortably crowded. The seats in the smoking compartment are upholstered in imitation leather.

The cars are well heated and ventilated and the lighting system provides generous illumination. The cars which are at present in service are equipped with large hot water heaters. While this form of heat is good in cold weather, there are times of mild weather in spring and fall when the cars are overheated, causing some discomfort to passengers. This is due to the fact that trainmen are unable to control the heaters properly. It is expected that this condition will be obviated in the new cars now under construction by the installation of an auxiliary system of electric heaters. The electric heat can be used in mild weather in spring and fall and can be easily controlled to meet the wishes of the passengers. In extremely cold weather the electric heaters can be used to supplement the hot water heaters. This scheme will give a considerable variation in the amount of heat available, and should enable trainmen to maintain a satisfactory temperature.

A feature of the new North Shore coaches will be their equipment with electric fans in addition to a first-class ventilating system.

That the policy of the management to provide fast, safe, reliable and comfortable service has been carried out in the design and construction of these cars is perhaps indicated by the growth of the passenger business handled and by the numerous letters received from patrons commenting upon the comfort of the cars and pleasure of the ride.



Steel underframe of North Shore passenger cars

Supervisory Control on the North Shore Automatic Substations

A SYSTEM of supervisory control is now being installed in two automatic substations of the Chicago, North Shore & Milwaukee Railroad. By this system the load dispatcher in North Chicago can take either or both of these stations off the line or put them back so that they will operate in the normal automatic way. The control, which uses standard equipment, is an adaptation of the Western Electric Company's train-dispatching system. No additional circuits to the substations were strung, but the control is operated through the existing single pair of telephone wires.

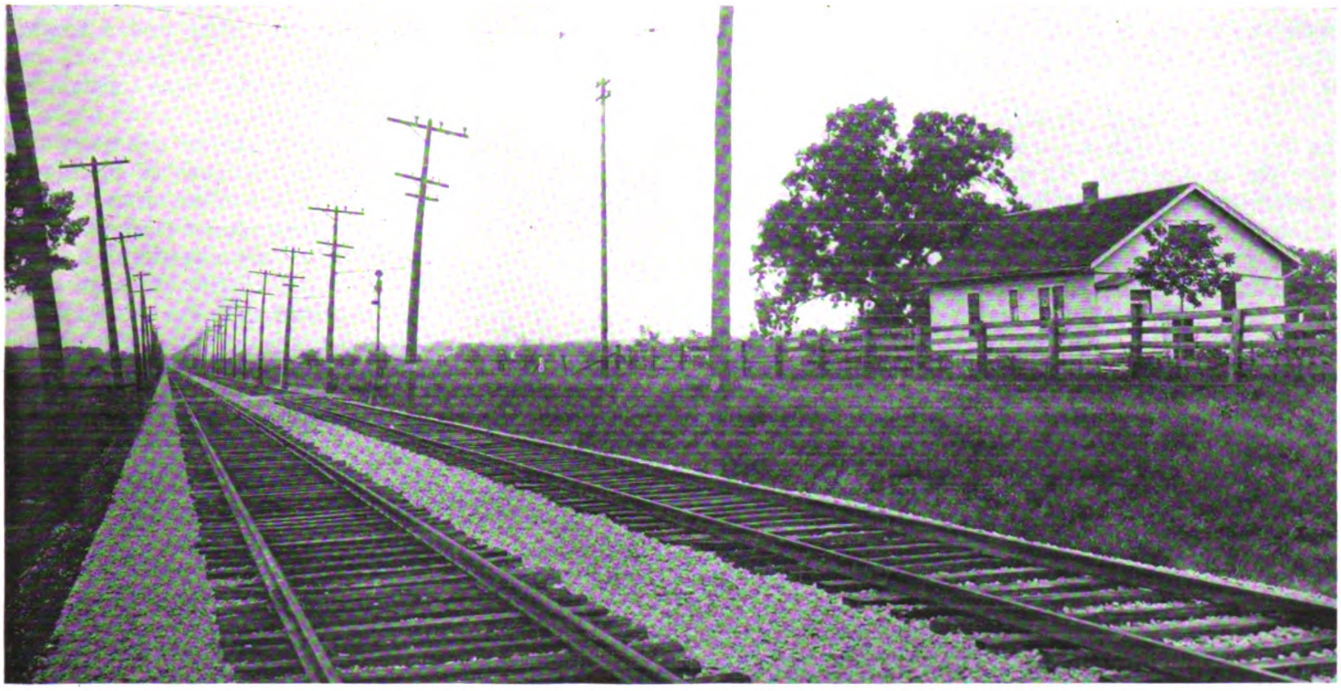
It is expected that the supervisory control of these two stations will be installed and in operating condition by the time of the American Electric Railway Association convention. The installation is being made by the General Electric Company, which supplied all the automatic equipment on the North Shore line.

How the Difficulties of

Using Direct Suspension Trolley in High-Speed Train Service

Have Been Worked Out on the Chicago-Milwaukee Railroad—The Bonding Experience and Manner in Which the Power Supply Is Being Improved Are Also Treated

By CLIFFORD HUTTLESTON
Electrical Engineer
Chicago, North Shore & Milwaukee Railroad

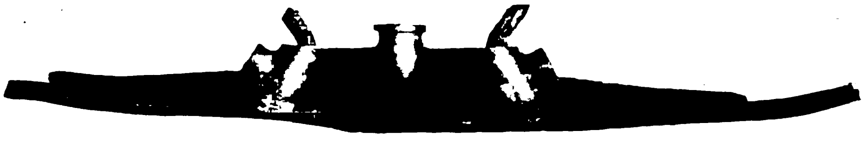


Plain span overhead on North Shore Line and, incidentally, a good view of a well-trimmed roadbed

CHANGING from a rather infrequent service employing single 30-ton wooden cars operating at a schedule speed of 15 m.p.h. to a frequent service using from one to six steel 50-ton cars per train operated at an average schedule speed of 47 m.p.h. and a maximum of 70 m.p.h., without any material changes in the overhead construction, is what has actually taken place on the property known as the Chicago, North Shore & Milwaukee Railroad. The overhead construction is what is known as "direct suspension," familiar to all, with double pole line and ⅜-in. messenger cross-spans. And today with the increase in weight of cars, more frequent service and longer trains, there are fewer delays, fewer accidents, fewer dewirements and fewer wire breaks than at any time for years past. The reason for this is due primarily to the excellent co-operation existing between the electrical, mechanical and maintenance of way departments, as laxity on the part of any one of these would contribute to poor operation. We are constantly endeavoring to live up to our slogan, "The Road of Service."

The line force of the North Shore Line consists of a foreman, ten linemen and three helpers. The equipment at the disposal of these men consists of two line cars used the year around, and an additional car used several months during the summer or heaviest traffic season. The territory covered by these men extends from Evanston, Ill., to Milwaukee, comprising 70.53 miles of double track, a branch line from Lake Bluff to Area, which has 8.6 miles of single track, and several miles of city trackage in Waukegan and Milwaukee, or a total of about 180 miles of single No. 000 grooved trolley wire, not counting sidings and crossovers. A three-phase transmission line, the d.c. feeders and two telephone lines covering the entire distance and a third telephone line 12 miles in length are also maintained by this line force. In addition to the maintenance of the overhead lines these men do all of the reconstruction and such new construction as is required on a healthy property for the improvement of service and the proper handling of new business.

Because of the difficulty of locating an overhead frog or switch so that several different types of equip-



How splice ears wear away at the ends forming shoulder and causing dewirement

ment will ride through it, and also in order to provide a smoother wire, frogs or switches are not used on the main line at crossovers or sidings. A crossover wire is provided at each track crossover, but the wires that lead to the sidings are extended, paralleling the main line to a point 300 ft. beyond the switch point to give time to change all current collectors on a train from the main-line wire to the crossover or siding wire or vice versa.

In the latter part of 1915, when the first fifteen high-speed steel cars were put into service, we undertook to operate them with trolley wheels, as the sliding contactor or shoe was to our mind then an untried piece of apparatus. In fact, it came out at about this time. Wheel operation was not at all satisfactory. It was expected that the substantial construction, pleasing appearance and comfortable riding qualities of the new cars, as well as the faster service, would please our old patrons and make new friends. Instead there were numerous dewirements and the cars were filled with a loud rumbling noise, spoiling what would otherwise be an enjoyable ride and creating anything but a favorable impression of the "improved service." It was a serious matter requiring serious consideration, and we could not afford to pass up any suggestion offered for overcoming the difficulty. Much time was spent and study made in a short period of ways and means of eliminating the noise. The retriever question was a live one. Retrieving, however, was not the cure. The sliding contactor or shoe was considered and tried and in a short time all of these cars in limited service were equipped with the Miller shoe.

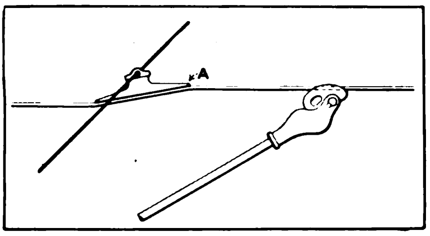


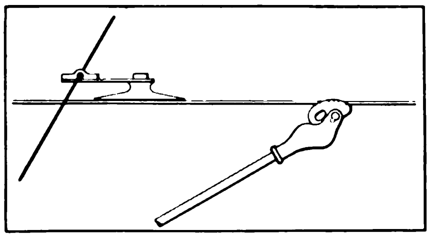
Illustration of why splice ears wear irregularly and cause dewirements

We believe these sliding contact shoes have been very much improved since that time. No actual measurements of wire are taken, but the condition found on inspection shows conclusively that there is less wear on the trolley wire due to the use of sliding contacts than there is due to wheels.

The sliding contactors put a high gloss or polish on the wire very similar to the polish on a good commutator. No lubrication is used. With the pole in the operating position, 35 lb. was found to be the best trolley pole tension. In fact, to vary much from this invites trouble and causes dewirements. Consequently, the trolley base tension is set and frequently checked with a scale or weight to keep it at this amount.

We found that six conditions, singly or in combinations of two or more, would give trouble (cause dewirements and wire breaks) with high-speed operation on direct suspension, namely:

Poor alignment. This is sometimes caused with certain soil conditions by the temporary removal of the back guys for ditching or other improvements. Alignment is easily maintained but requires watching.



One scheme tried of supporting splice ears

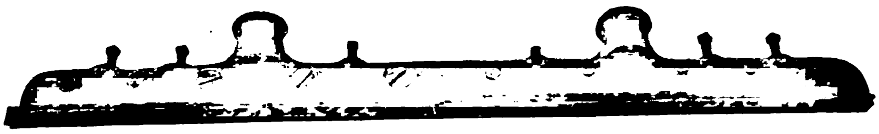
Slack wire. This depends much upon the temperature, but it nevertheless must not be allowed to become bad as with a high wind it causes dewirements, the rear trolley pole of a train being by far the greatest offender due to the side swing of the wire and the influence of the preceding trolleys on it. And without a high wind, the resulting rapid change in level or height of the shoe above the rail will frequently cause dewirements, or cause the operation of a sensitive retriever. For successful operation slack wire must be cut out, and when cold weather sets in some slack must be put back or breaks under tension will result.

Improper trolley base tension, referred to above.

Stiff trolley base or one not working smoothly because of pitting in raceway or for other reasons. In one instance when we were unable to account for an epidemic of dewirements, a list of the offending cars was obtained and the trouble was detected and cured by replacing the inferior bases.

Rough track. This causes rocking or side sway of the car and it may cause dewirement if there is slack wire or a stiff trolley base. We are rather proud of our present roadbed and track, and extensive improvements are constantly being made which are mitigating this source of trolley trouble.

Wire splices. We are not satisfied with the present-day practice of splicing trolley wires. We have tried different types of splicing ears with their "smooth underrun" but to date have not found one that gives us entirely satisfactory service under high-speed operation with a sliding current collector. We have very few wire breaks, but most of those we do have are caused by the unsatisfactory splices. As the sliding current collector approaches a splice, particularly when located at the span wire, the near end of the splice tends to rise as shown exaggerated in an accompanying sketch. The slider tends to dig in to the splice at point *A* and bounds away, making contact again after passing the splice. In time, a shoulder is formed on the underside and if let go this will cause a dewirement, or the continual pounding will cause the wire to become crystallized and it then eventually



Special Drew ear designed to overcome rapid wear of ordinary splice ear breaks just inside the splice, it being impossible to detect crystallization on inspection. We are trying one or two splices installed as shown in another sketch reproduced herewith. We find these give longer service but they are not the solution of the problem. At our request a special splice was designed by the Drew Electric & Manufacturing Company which appears as shown in an accompanying picture. This is a long sherardized malleable casting in which the two ends of the trolley are brought together without bending. While it has given reasonably good service we are not entirely satisfied. We hope, however, that this splice can be improved upon as it provides an absolutely smooth underrun and has none of the objections belonging to the common splicer. We have given it about one year's trial and believe that it is going to enable us to cut down materially on the maintenance of splices. Until it is improved so we can install it generally, we shall have to continue to true up frequently the ordinary splices and renew them before they become bad.

ROAD
SSING
RAILROAD
DANGER
CROSSING

Crossing signs and center wig-wag installation

Most of our splices are installed with boss at the cross span. Splices without boss installed away from the cross-span give much smoother operation and longer life if they do not become tipped to one side. If slightly tipped, or if a shoe becomes deeply grooved, as happened occasionally during the earlier days of shoe operation, we again have trouble. Over the entire system we have been averaging about eight years wearing life on the trolley wire and about eighteen months on the splices. This life should be considered in conjunction with the annual car mileage on the system presented in the article by Mr. Thompson, elsewhere in this issue.

For some years on wire renewals we have been recovering 60 per cent of the original weight as scrap, 40 per cent being the usual wear. Considering the scrap value of the trolley wire and the comparatively low labor cost on a renewal job, we favor renewing before 40 per cent weight has been used in wear. Probably from 30 per cent to 35 per cent wear will be found about right in our case, to insure a good factor of safety against breaks.

SOME BONDING EXPERIENCE

The concealed 10-in. No. 0000 compressed terminal rail bond was our standard for some years. Six or eight men installed thirty or thirty-five bonds per day on pick-up work where renewals ran about 6 per cent. The American Steel & Wire Company bond tester was used in locating bad joints. When the resistance of a joint was found to equal that of 6 ft. or more of rail, the joint was marked by the testers as being bad.

As the service increased the question of opening joints under service conditions and the slowing down and stopping of trains became a more and more serious objection. In 1919, during January, No. 0000 L.U. bonds applied with the Rail Welding & Bonding Company machine were adopted as standard. A foreman and three men install from sixty to eighty of these bonds per day on pick-up work. L.U. bonds of 300,000 circ.mil capacity were installed during 1920. But during 1921, when rail renewals were made with 100-lb. steel, it was decided to increase the capacity of bonds to 400,000 circ.mil.

The laying of 100-lb. steel using heavy joint plates necessitated the development of a Webber type bond of 400,000-circ-mil capacity which could be applied with the bonding machine. For the purpose of comparing results, 38-in., 400,000-circ.-mil cable bonds are also being installed. These are passed through the space between the plate and the web of the rail and the terminals welded to the head of the rail. For the same reason a few 400,000-circ.-mil steel terminal Webber type bonds are to be installed, using a metal electrode in welding.

The four rails are cross-bonded every 500 ft., the cross-bonds being stapled to the ties and covered up in order to discourage theft. About 40,000 bonds have been applied during the past three years.

DANGER
RR
DANGER
RAIL ROAD
CROSSING

Another type of auto-flag warning more generally used on this line

Typical automatic substation on North Shore Line

We have forty-eight highway crossings protected by gates, thirty-five by auto-flag or wigwag signals and twelve by bell signals. The signals are operated on 600-volt current, using rail contactors for control. The total maintenance cost on the auto-flags and bells is approximately $10,000 per year.

POWER IMPROVEMENTS OF GREAT IMPORTANCE

When the reorganization of the company took place in 1916, a careful study was made of the power conditions on the property, having in mind needed improvements and a construction program to take care of future demands. At this time seven manually operated substations were in operation on the main line, spaced approximately 13 miles apart, and one at Libertyville on the Libertyville Branch.

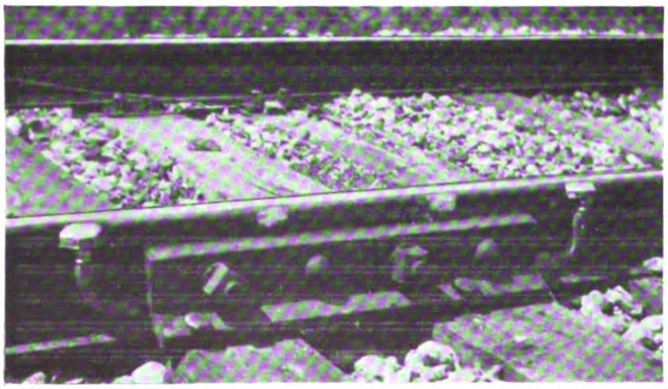
It was estimated that if sufficient copper was to be added to give satisfactory voltage conditions, it would be necessary to install approximately 177 miles of 500,000-circ.mil cable at an approximate cost of $650,000. Changing the trolley voltage would necessitate the scrapping of many old type, 600-volt motors which were in use, and it was thought inadvisable to carry 1,200 volts on the trolley going through the numerous towns.

After having considered the problem from its various angles, it was decided that automatic substations should be placed midway between the manually operated stations. Designs and plans were adopted only after a study had been made of the automatically operated stations in use on other properties.

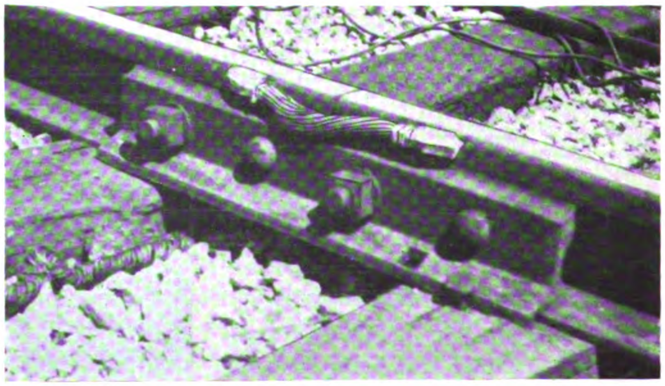
Two 500-kw. stations were put in service during 1917, one during 1918 and one during 1921. One of the two 300-kw. machines at Libertyville was equipped for automatic operation during 1920 and the first 500-kw. installation was changed this year to a 1,000-kw. station. Today we have one 300-kw., three 500-kw. and three 1,000-kw. stations automatically operated. Two (1,000 kw. each) are 60 cycle and the others 25. Six are of the inclosed type and one semi-inclosed.

The buildings are of fireproof construction, roomy enough to permit of the installation of machines of greater capacity and, in general, the arrangement is such that extension can be made and additional or duplicate equipment installed to harmonize with the arrangement of the present equipment.

These seven stations, spread over a territory covering 60.5 miles as seen on the map in a previous general article on the North Shore Line, are inspected daily and given general care by a force consisting of three men as compared to the twenty-one operators required for the seven manually operated stations. The operation is checked by means of recording charts and mechanical counters installed on different parts of the equipment. While we look for improvements, the present automatic equipments have our unqualified indorsement, for aside from the savings accomplished in labor, distribution losses, copper and idle running time, the machines are not subjected to the abuses which sometimes obtain in manually operated stations. It is estimated that the efficiency of distribution has been increased from 20 to 25 per cent. On account of the rapidly changing service conditions it is difficult to make accurate comparisons, but a self-evident fact is that without these additions to converter capacity we could not operate our present service.



38-in. welded cable bonds on 100-lb. rail



Webber type bond developed for welding on 100-lb. rail

Building Track and Right-of-Way to Create Traffic

By J. S. HYATT
Engineer Maintenance of Way
Chicago, North Shore & Milwaukee Railroad

How the Chicago, North Shore & Milwaukee Railroad Has Within a Short Time Reconstructed the Track to Make a High-Grade, Smooth-Riding Roadbed — The Elements of Contented Track Employees, Clean and Safe Right-of-Way and Attractive Station Facilities as Important Traffic Producers Are Treated—A Practical Article for Way Engineers

* * *

Standard unit type framed road crossing as built on North Shore Line

ROAD MEN are not generally looked upon as aids to the traffic department or as advertising agents, but we believe a very important and valuable element of their worth is lost when this viewpoint is overlooked.

A safe, easy-riding and good appearing track is fundamental in obtaining and retaining traffic. The most effective selling organization that can be produced in a railroad will be ineffective, if the track and its maintenance are not what they should be. The road men are therefore a most important factor in producing traffic. With the ever-present pressure for economy it is vital that the small groups of workers who are handicapped by the scattered locations of their work and the interruptions of weather be efficiently organized and supervised, if the best results are to be obtained. When the necessity for reducing operating expenses comes on a railroad the first place in which it seems easiest to reduce expenses is the road work. This means the neglect of the very foundation upon which rest all the efforts of the railroad to carry on its business.

We believe the history of the North Shore Line very forcibly illustrates this fact. Built (in its main essentials) as a first-class interurban railroad capable of carrying high-speed service, under the policies of the eight or nine years of the receivership the advertising features of smooth roadbed, clean, well-kept right-of-way, clean and convenient station facilities and satisfied and enthusiastic employees were so overlooked that the traveling public was beginning to fear the neglect of the essential maintenance duties which insure safety.

The improvements on the North Shore Line that have so aided in the increase of its revenues commenced with the elimination of all wooden trestles and temporary bridges and the purchase of steel rolling stock. Coincident with the elimination of these bridges, and in fact as a part of this improvement, the narrow stretches of roadbed on high fills approaching these bridges were widened. The first steps taken in improving the drainage conditions were in the deep and long cuts, done by widening these cuts and by digging deep and ample ditches with an "American" ditcher. We also proceeded at once upon a plan of producing a safe, smooth-riding track that would carry the high-speed steel cars of the North Shore Line without fatigue or anxiety to patrons. The essential elements of such a structure are known to all. Our plan was simply one that would be used by any intelligent engineer.

The ties were immediately brought to a high state of maintenance by a liberal policy of renewal and, thanks to the faith and foresight of the management, we were able to requisition and obtain ties of the best type and durability, ties of no lower grade than a No. 3 white oak being used, and many of our ties were red oak, creosote-treated, until the conditions of war times made it impracticable for us to get good creosote oil for treatment.

Much of the rail was of very light weight and badly worn through long use under light maintenance, and a plan was immediately put in effect of renewing all of this light rail with 80-lb. and 100-lb. rail. Such of the old rail that was heavy enough and in suitable condition for rehabilitation was supplied with new angle bars, rebolted, properly spaced and anchored.

Following immediately upon these preliminaries, an extensive plan of reballasting was inaugurated. The road was originally ballasted with 24 in. of gravel ballast but this ballast, a large part of which was of the cementing type, had been allowed to become so fouled with weeds that its drainage qualities were greatly impaired, and so it was immediately recognized that it would be necessary to lift the track out of this ballast and overlay it with a more substantial and porous type of ballast. Due to the immediate necessity to get the road in good riding condition and because of the high cost of the better types of ballast such as slag and stone and the difficulites of obtaining them, and also with the idea in mind of using a method that would more effectively kill the weeds and leave the sub-ballast in a contour that would improve drainage, the easily obtained cinder output of a steel mill on our line was contracted for. The old ballast was first put under the ties and the track resurfaced on cinders, widening out the ballast bed with these cinders to form a liberal shoulder to receive the later application of stone or slag ballast. We have found this method admirably adapted to the treatment of cementing gravel and very economical in the amount of stone later required. We found that the clay in the cementing gravel would work up through a very thick layer of stone ballast. But where the track was treated with the light cinder lift, the drainage and the supporting character of the sub-ballast were so improved that a lighter layer of stone ballast was quite as effective. This plan also enabled us to get over a great many more miles of track immediately and put it in good riding condition, though of course the final expense will be somewhat greater than the direct application of stone ballast.

In all of our track design, drainage has had to receive first consideration, as the soil throughout the whole line is one that is quite impervious to water, and in some sections is of such a character as to give us a great deal of trouble when not properly drained, particularly at the north end of the line where a great many of the cuts are very deep and long. These vary in length from ½ to 1½ miles, and in depth from 20 to 30 ft. Even the wide and deep ditches constructed with our American ditcher did not seem to meet the situation here, and all of these cuts have been subdrained by a double row of tile laid in a trench 3 to 4 ft. deep and backfilled with cinders.

MAKING THINGS ATTRACTIVE FOR TRACKMEN

Our full program of improvement was begun just about the time that the world war was commanding the majority of our labor and when it was most difficult to obtain adequate help. We were forced rather by necessity than by choice to establish an entirely new system of caring for our men, but the results have proved so advantageous that it is certain we will never go back to the old-time methods.

In place of the box car with its contract commissary and all the privations, inconveniences and irritations attendant upon it for the men, we established at convenient locations permanent camps where our men could be adequately housed with ample space per man, protected by proper means from flies and vermin, furnished with clean bedding and bath. We established our own commissary, fed the men ourselves, not for profit but for satisfaction, and devised a method of furnishing a hot lunch on the job at noonday, thus eliminating the one drawback of the permanent camp. The installation of such a camp seemed at first an extravagance; and we doubt, if it had not been for the necessities of the times, whether we would have had the courage to go ahead as we did, but the returns that we have received in lower turnover, better class of employees, and more work out of satisfied employees, has proved the wisdom of the expenditure.

As a natural sequence of this experience and as a result of some of the lessons taught by the war and a desire to develop foremen from our force, to replenish the decreasing number of trackmen available for these positions, we employed a Y. M. C. A. man and established an Americanization and Foremen's School among our trackmen. While these schools were primarily designed to perfect safety by teaching the English language and to train men for foremen's positions by showing them the right way to do work and the reason for it, they have had a very great value in getting the men and the supervisory force together, in changing the ideals of the foreign element in our track gangs and increasing the general interest in the work among all the track employees.

These schools were started at convenient locations along the right-of-way, taking up first Roberts' Lessons in English at an evening session held for each class twice a week. These lessons were supplemented with a study of the Constitution of the United States and the fundamentals of our government, so that any of our men were able, as soon as they wished, to take out their citizenship papers. They were then further extended into simple instruction in grammar and arithmetic and matter having particular reference to the daily work.

The foremen's school was an outgrowth of the Americanization school for the benefit of the more intelligent men and the foremen, at which they took up the various problems connected with the maintenance of way, such as drainage, installation of ties, care of right-of-way, keeping of records and reports, duties of foremen to their men, and kindred subjects regarding which the foremen should be well informed. These classes have been supplemented with music and songs and motion pictures to give them life and interest. Educational films of the universities were very largely drawn upon, instructing the men in safety work, sanitation and prevention of disease. The foremen's classes were largely illustrated by lantern slides of actual examples of good and bad work on their own and adjacent sections of the North Shore Line.

Both in these foremen's classes and in the execution of our daily work, we have tried to emphasize two features of the maintenance of way work, namely, systematic work programs and systematic clean-ups.

KEEPING THE RIGHT-OF-WAY DRESSED UP

Killing weeds and keeping the right-of-way in neat condition is a matter that gives all a great deal of concern, some not so much as it should, for there is nothing that will impress the traveling public more favorably than a clean right-of-way. A weedy one always leads one to feel that the property is poorly maintained. This work involves a very large expenditure, and if it is done by the usual hoe and shovel method it takes the labor from the track maintenance at the time when it is most needed. We have obviated this drain very largely by the use of chemical weed killer. After going through the usual experimental stage, we have come to the conclusion that the proper method of treating is to have our own treatment cars and our own storage tanks, thus enabling us to make more frequent applications and make them at the proper time. A caustic arsenic solution is used. The cost per mile of weeding by this method has been reduced to approximately 25 per cent of the hand method. This is partly accounted for by the policy followed of frequent light treatments rather than fewer heavy applications.

STATION FACILITIES MADE PLEASING

In considering the advertising features of the maintenance of way, the question of station facilities, crossing protection, or the construction of highway crossings have not been overlooked, as at these points the railroad makes its first impression on the public. During the last few years the North Shore Line has greatly improved its station facilities. Terminal stations have been built both in Chicago and Milwaukee that have enabled the road to give much improved service to its through patrons. But its improvements have not been limited to these expensive terminal facilities, as many minor improvements have been made to all stations along the line.

Cleanliness has been greatly stressed, and although a station has but little traffic and is very small, the utmost has been done to keep it in a clean and satisfactory condition for our patrons. To this end has been inaugurated a thorough system of janitor service under ample supervision. Stoves have been installed even in the way stations where no agents are in attendance and a liberal application of paint has kept the appearance of the stations in a cheerful and well-maintained condition.

The safety of the patrons has been constantly thought of in planning and improving these stations. This frequently has involved the moving of stations from one side of the road to the other, or of moving them back from the tracks. Stations sufficiently important to justify an agent have been largely rebuilt, providing ample office room, proper toilet facilities and in many cases the installation of concessions operated by the railroad company. Regular sanitary inspection has tended to keep all employees responsible for the maintenance of these stations on the job, thus insuring station facilities that the patrons are pleased to use.

With the inauguration of the merchandise dispatch service, many additional facilities were required, and these stations, team tracks and teamways have all been constructed, not with the idea of building them as cheaply as possible, but with the idea of building a structure that will serve and attract the shippers.

In improving our highway crossings, considerable thought is given to the amount of highway traffic that they will have to carry. It is our policy to make these crossings a little wider than the adjacent highway is likely to be. In order to get the maximum life from these crossings, we have adopted the standard policy of not having any joints in the crossing, and when a new crossing is placed, all ties under it are renewed. We construct these crossings of 4 ft. x 6 in. treated maple heart plank, frame them and cover the wearing surface with a coat of tarvia and sand. We find that the riding qualities and length of life are greatly improved by this treatment. For less traveled crossings we find that the Headley crossing makes a very good substitute for the plank, and is much less costly. This crossing is made of crushed stone treated in a concrete mixer with Headley's "Good Road Oil." This is a patented asphalt emulsion which solidifies upon drying out, thus rendering the whole mass a monolith in a few days.

SAFETY AT GRADE CROSSINGS

The safety of the employees and the public has not been overlooked by the maintenance of way department. Fully 75 per cent of our crossings have been protected in the last four years. This means every crossing between Evanston and Waukegan, and all of the more important ones in the more sparsely settled district between Waukegan and Milwaukee. Practically all of these gates are of the wire-pull type, designed by our own engineers and built from our own patterns in nearby foundries and assembled in our own shops. In a few instances where gates could be controlled by interlocking towermen without additional expense, the electric gate has been installed on account of the ease of its control from a distant point.

The right-of-way has been thoroughly marked by crossing signs and station boards and by permanent slow-speed boards at all points where the physical condition constantly requires reduced speed. These boards are placed at the motorman's right, usually 1,000 ft. back from the point of reduced speed, and the maximum speed allowed is noted so that even a motorman not familiar with the road will have little difficulty in properly taking a train over the North Shore Line.

Each section gang is provided with slow boards and slow lights and all other signals, and by frequent drills and safety meetings these men are kept familiar with the proper methods of protecting themselves while at work and of advising train crews of sections that need caution in traversing. A systematic patrol is kept over the whole road so that any defect in track structure is detected early.

Since the reorganization of the company, the expired franchises in Waukegan, Lake Forest and Highland Park have all been renewed. In the first city, all the track in city pavement has been reconstructed, our franchise requiring brick pavement. Our standard type of construction has been 91-lb. rail on International or Dayton ties, with thermit rail joints laid on 6 in. of concrete foundation. We have felt it advisable to subdrain all this track structure, and this has been done by a longitudinal line of pipe which in double track is supplemented with branch lines in herringbone formation. By this method we have very successfully prevented track that has previously given us much trouble from settling out of surface.

In Lake Forest and Highland Park, where the right-of-way was almost entirely on the street previous to the granting of the new franchise, under the terms of these franchises the right-of-way has been obtained and the streets moved so as to give the railroad a private right-of-way 80 to 100 ft. in width, and the city a street with unobstructed pavement.

These improvements have all materially aided the elimination of slow speed points and largely made possible the inauguration of the two hour and ten minute service between Chicago and Milwaukee by the Interstate, Badger and Eastern Limiteds, and have done much to justify the slogan, "The Road of Service."

Moving Cars by Telephone

Practically All Operating Matters as Well as Other Business Clears Through a Central Switchboard in Main Office of Chicago Surface Lines -- Operators Act as Division Superintendent in Emergency

THE Chicago Surface Lines has a very thorough and practical system for dispatching aid or instructions to any location where a blockade or breakdown has occurred, or for doing the proper thing immediately in any emergency. The focus of this system is a telephone switchboard located in the office of the superintendent of transportation in the Borland Building, where the downtown main offices of the railway are located. Each operator is more than a person who merely connects one circuit with another. Each one has a clear mental picture of the whole railway system and knows immediately the nearest wreck wagon to any trouble or delay that arises. In case of traffic tie-up, the operator temporarily exercises the judgment of a division superintendent by advising how to get around the trouble. In the case of more serious trouble or accident, the situation is turned over to the general superintendent.

The switchboard consists of two positions, and from 8 a.m. to 5:30 p.m. two operators are normally on duty. Into this board come the circuits from the twelve division headquarters, in each of which is located a small private branch exchange board that connects with the box telephones located all over the system. The board is also provided with eleven incoming and seven outgoing trunks to the city telephone system. Lines are also provided to other parts of the system such as the west and south side shops, the engineering office on the north side, the claim and legal department on the west side, the various operating officials and executives of the road in the Borland Building, and the three headquarters of the line repair trucks, and to numerous other points of activity on the system. All the substation telephones on the city system must be reached through trunks to the city exchanges.

In any trouble or emergency the procedure is for the conductor to go to the nearest telephone in a store and call Randolph 0581. The operator immediately calls the nearest trouble wagon, which proceeds to the scene of the delay and in the meantime the nearest car station is called to send a supervisor or inspector. If the wrecking crew finds that the trouble is too serious for it to handle in short order, a call is put in immediately for help. The operator then dispatches the proper piece of equipment to the location.

As soon as the cause of any trouble or delay has been removed, the wrecking crew calls the switchboard, giving the time that the track was cleared and the number of the car or cars that were delayed. The operator keeps a record of all delays, which shows the location, time, nature and time consumed by the depot from which the wreck wagon was sent. On this same form are also recorded the facts about any other dispatching that is done, such as the line repair wagon or the ambulance in case of an accident.

In the switchboard room is a fire alarm ticker which gives notice of all alarms that are turned in. After the operator has read the number on the tape, he calls the depot in whose territory the fire is, and a supervisor is immediately sent out. If the supervisor finds that hose bridges are necessary to keep the cars running, he immediately calls back and the operator dispatches the necessary equipment.

The operator, besides having a clear mental picture of the system, is also familiar with the police precinct districts, the location of hospitals, etc. In the case of accident, it is the operator at the central switchboard who gets the claim department on the job, and if necessary sends an ambulance from the nearest police station. When a heavy rainstorm floods the subways under the railroad viaducts, it is the operator who notifies the track department. It would be almost impossible to list or classify the multitude of emergencies, both large and small, that are handled through this central switchboard. The operators have an intimate "speaking" acquaintance with all the personnel of the system and always know where any man can be found. Besides taking care of the work in connection with keeping the system operating, they also answer many calls from people who wish to know where to apply for lost articles, from those who want to know how to get from one place to another on the surface lines and from others asking for miscellaneous information or who have business with any company official. This one switchboard is the central clearing house for nearly all matters of or pertaining to company affairs.

Chicago Tunnel Handles Excavated Material

THE Chicago Tunnel Company, which owns and operates 62 miles of underground tunnel lying under the central portion of Chicago, has been removing a great deal of excavated material from building sites with its tunnel trains during the last few years. This unusual method has relieved the streets of much truck haulage and furnished a cheap and handy way for disposal of the excavated material.

In deep foundation work and in excavations for basements and subbasements of large buildings, it is a common practice to sink an inclined shaft or chute to the tunnel under the site, the tunnel being enlarged or having a spur for a siding to enable a car to be set under the chute.

The tunnel system is an electrically operated freight railway of 2-ft. gage. The tunnel is of oval section about 7½ ft. high and 6 ft. wide with the rail level approximately 45 ft. below the surface. It was built particularly for freight-handling service and connects numerous freight railway stations with commercial houses, department stores, warehouses and office buildings.

The tunnel traffic averages about 10,000 cu.yd. of excavated material monthly, 7,500 cu.yd. of ashes from buildings and power plants, 4,000 cu.yd. of coal to these plants, and 45,000 tons of merchandise handled to and from railway freight houses. The coal business was formerly much larger, but of late the larger coal companies have maintained fleets of motor trucks for the delivery of their own coal. The tunnel cars are of 3½ cu.yd. capacity and are used for hauling the excavated material, refuse and ashes. Trains of from six to eight cars of such material and twelve to fifteen cars of freight are handled at an average speed of 8 m.p.h. by electric locomotives, of which 110 are now in daily service. The average haul to the disposal station is 2½ miles.

The Severity of Chicago's Traffic Problem

and Observations on Measures of Relief in Use or Applicable Generally in Large Cities

By R. F. KELKER, JR.
Supervisor of Transportation, City of Chicago
Kelker, De Leuw & Company, Consulting Engineers, Chicago

State and Madison Streets, Chicago, between 12 and 1 p.m.

OF THE MANY perplexing problems which add to the difficulties confronting operating officials of street railways in our large cities, the regulation of vehicular and pedestrian traffic is of growing importance. Business districts are daily congested, the movement of cars is impeded and operating costs rise while service declines as the speed of cars is diminished.

The street widths, which were satisfactory in earlier years, are no longer adequate for the ever-growing volume of traffic. Henry Ford a short time ago made a statement that should demand a more thorough study of our traffic problems. He estimated the automobile saturation point for the United States at 30,000,000 motor cars—nearly three times the number of cars now in use. If traffic conditions render the operation of street cars difficult today what can be expected when Mr. Ford's saturation point is reached?

In large cities the cost of delay in handling traffic is an enormous charge against all kinds of business, and in Chicago this loss probably runs over $25,000,000 per year. The present space between curbs has been reduced one-third or one-half of its useful width, by devoting valuable street space to parking.

The first step to minimize obstruction due to unlimited parking has usually been to permit parking for one hour, and the second step has usually been to reduce the time period to thirty minutes or to fifteen minutes. While these changes and regulations are intended to facilitate traffic movement, it appears that the contrary result has been achieved. In order to conform with time limits drivers either move a short distance or jockey for place at the curb and consequently burden the streets with useless mileage and also obstruct the movement of through traffic.

In large cities the parking space is usually occupied almost completely.

Limited Period Parking Tends to Increase Congestion—Complete Prohibition Has Drawbacks, But Is the Best System—Pedestrian Movements Are Better Uncontrolled

* * *

The delays and obstructions to traffic which arise from the pulling in and out of parking spaces are considerable, and these are rarely given adequate consideration in determining the authorized period for parking. The importance of this factor is shown if we consider, comparatively, parking periods of various lengths on a twelve-hour basis. A period of one hour permits twelve changes; of thirty minutes, twenty-four changes; fifteen minutes, forty-eight changes for each vehicle. And it must be remembered that in each change there are two moves—out and in.

The complete prohibition of parking during the rush hours, while necessary and desirable, causes a considerable amount of "cruising" on the part of private cars, which adds to the congestion and at the same time increases the number of right and left-hand turns. However, this restriction should be enforced as its benefits are far greater than the objectionable cruising.

The complete all day prohibition of parking in the central business district in any city, while ideal from a traffic point of view, works a hardship on certain classes of business and inconvenience to motorists unless adequate and convenient parking spaces are provided.

The prohibition of parking on some of the streets in the business district is criticised as it results in discrimination as between merchants located on non-parking streets and others located in the same general area where parking is permitted.

Parking for an unlimited time results in the exclusion of all persons desiring to do business who arrive after the parking spaces are filled.

The south end of Dearborn Street Bridge, Chicago, looks like this at 9 a.m.

In Chicago the available parking space at the curb in the Loop district will provide for the standing of 3,700 cars. As there are nearly 250,000 cars in the Chicago territory, the validity of this criticism is at once apparent.

Traffic regulations have grown rapidly and their present forms are many and varied—frequently mystifying to drivers—and their complexity often adds to rather than reduces confusion. Multiplicity of ordinances does not add to the effectiveness of regulation, but rather emphasizes the lack of proper education of drivers.

Because of such abundance of rules, the courts become clogged and general disregard for traffic rules increases. Consequently we must do more in the way of educating the public to observe at all times the ordinary rules of the road and to develop a natural road courtesy which will bring about improvement in traffic movement and increase the comfort and safety of all. Many out of hand suggestions are made to improve conditions at a bad point which usually result in producing new points of congestion, for reasons shown in tables that follow, giving the variation in traffic density at different locations on the same street.

Few people have any idea of the volume of traffic in our dense centers of activity. Here in Chicago there are points where on normal days 2,000 vehicles pass through a street intersection in an hour, and in the same period at the same place 26,000 to 30,000 pedestrians cross the intersecting streets from curb to curb—more than eight persons per second.

On Washington and Clark Streets, Chicago, between 5 and 6 p.m.

VARIATION OF VEHICULAR TRAFFIC ON A NORMAL WEEK-DAY AT DIFFERENT INTERSECTIONS OF THE SAME THOROUGHFARE

On State Street 4 p.m. to 5 p.m.	North and South	East and West	Tota
At Lake	670	615	1,285
At Randolph	839	858	1,697
At Washington*	880	1,084	1,964
At Madison†	979	682	1,661
At Monroe	909	800	1,709
At Adams	993	405	1,398
At Jackson	994	1,005	1,949
At Van Buren	930	506	1,436
At Harrison	813	507	1,320

* 26,000 pedestrians in same hour.
† 30,000 pedestrians in same hour.

Note:—At Washington Street the east and west traffic is 55 per cent of the total, while at Adams Street it is only 29 per cent.

On Jackson Boulevard 5 p.m. to 6 p.m.	North and South	East and West	Total
At Wabash	957	890	1,947
At State	775	839	1,614
At Dearborn	460	904	1,364
At Clark	620	1,242	1,862
At Wells	650	1,167	1,817
At Franklin	502	1,499	2,001

Note:—At Franklin Street the east and west traffic is 75 per cent, while at Wabash Avenue it is 46 per cent.

On Washington Street 4 p.m. to 5 p.m.	North and South	East and West	Total
At Wabash	906	1,090	1,996
At State	880	1,084	1,964
At Dearborn	531	874	1,405
At Clark	709	967	1,676
At La Salle	740	1,074	1,814
At Wells	587	1,075	1,662
At Franklin	693	940	1,633

Accompanying graphs show respectively the hourly volume of passenger and commercial vehicle traffic flowing outbound from the Loop district, an area of about 0.49 square mile. The volume of all traffic and the passenger carrying value of the different vehicles are estimated as follows:

	Number	Passengers
Horse-drawn vehicles	14,500	14,500
Motor-driven vehicles	17,180	17,200
Total commercial vehicles	31,680	31,700
Passenger autos	42,130	84,300
	73,810	116,000
Street cars	8,360	330,000
	82,170	446,000
	Number	Passengers
Vehicles, per cent	90	26
Street cars, per cent	10	74
	100	100

The above percentages show conclusively that, where such conditions exist, the traction officials and the patrons of their service have an unquestionable right and interest in the traffic problem, and that all sound regulation must take into consideration all classes of the traveling public.

Signals of different types are installed with a view of controlling and speeding up traffic, and after trial are said to be a great improvement. Usually this idea has no real foundation for the reason that no record was made of actual conditions prior to the installation. Lack of real knowledge of facts brings about honest, though mistaken, opinions. Accurate records, therefore, should be made by municipalities. Only with continued study of fairly large areas will it be possible to handle intelligently the growing traffic, minimize the delays to car riders, and prevent loss to the railway companies and to business interests.

GREATER UNIFORMITY OF SIGNS AND SIGNALS

At the present time signs of every conceivable size and description are installed to secure the same result. Caution and danger lights are many and various. It seems most obvious that simplicity and uniformity in signs and in color of lights is highly desirable and that efforts should be made to secure the adoption of a nearly universal system as to these details.

But as to general plans of traffic control, it must be realized that nearly every city has its peculiarities in street layout, in street spacing and in general topography. The volume of traffic varies on adjacent streets and there is a marked difference also in the traffic density and character in the various sections of the same street. Therefore no general rule can be broadly applied to our large cities. Because certain regulations prove very successful in one city does not warrant the conclusion that they will be helpful elsewhere.

During the recent street car strike one-way traffic was adopted for the business district and it was found that these heavy intersections carried 3,000 vehicles in an hour, indicating that the absence of street cars added 50 per cent to our street capacity.

From observations made then it appears that one-way traffic, in congested areas, increases the hazard to pedestrians and adds to the mileage of vehicles. A condition arises at street intersections where only the near-side crosswalks permit a free movement of pedestrians, the others being blocked by the turning of vehicles from lanes which occupy the full width of the street. The density of traffic at these turns delays the movement of pedestrians and consequently the near-side crosswalks are forced to carry an unusually large volume of foot traffic.

Traffic at the junction of Halsted, Milwaukee and Grand Avenue, Chicago, at 5 p.m.

It is to be regretted that we have not been able to check normal two-way traffic in the Loop district in the absence of street cars, thereby having conclusive comparative data at our disposal.

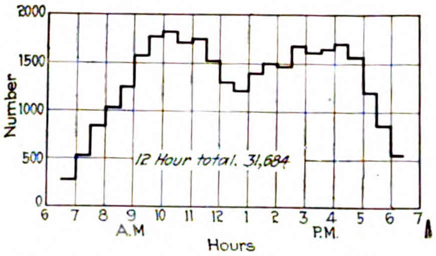
In Chicago the traffic division of the Police Department has attempted several times to control the pedestrian movement by the whistle signals which govern the vehicle movement. These experiments resulted in extreme congestion and the results were not satisfactory.

Our conclusion is that, owing to the density of pedestrian traffic, the best means of handling both classes of traffic is to permit the pedestrians to filter through the traffic without obeying the whistle signals, although there may result a slight slowing up of vehicles. This is our present practice and accidents in the Loop are nil.

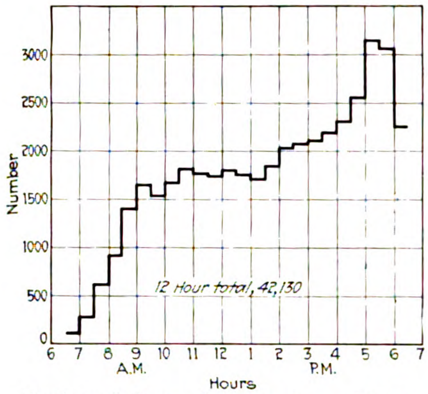
SPEED OF TRAFFIC ON MICHIGAN BOULEVARD

Michigan Boulevard has recently been improved by widening and by the installation of a double-deck bridge, separating heavy and light traffic. About $16,000,000 was spent in constructing this improvement. Today many complaints arise on account of traffic conditions on this thoroughfare, the usual complaint being based upon the low speed of automobiles. An accompanying chart shows the actual condition, giving the average speeds for the non-rush hours

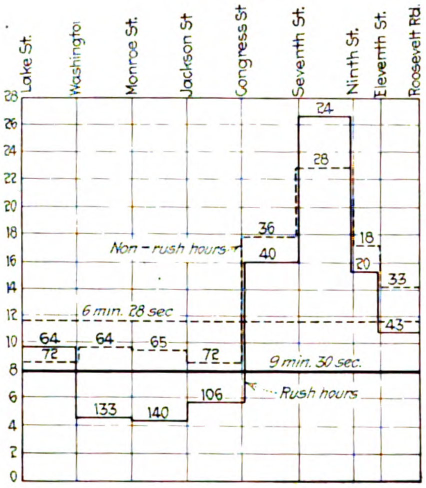
Madison Street at Wells, 8:30 a.m.



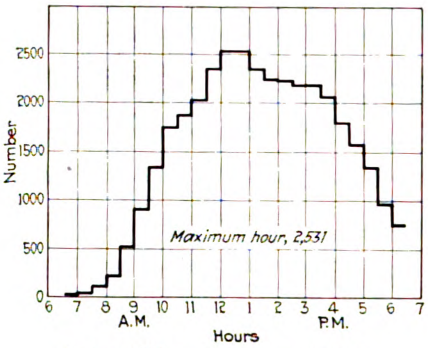
Outbound flow of commercial vehicles from Loop



Outbound flow of passenger vehicles from Loop



Average speed of autombiles along Michigan Avenue, m p.h.

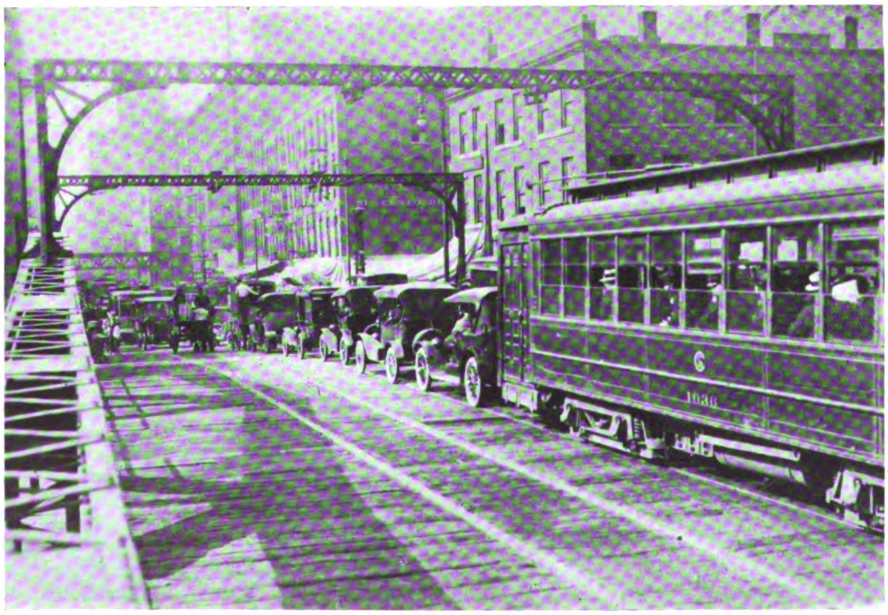


Automobiles parked on streets within the Loop

and also for the rush hour (5 p.m. to 6 p.m.) based upon several thousand observations. While these average speeds may not be all that is to be desired, yet when the volume of traffic (nearly 5,000 cars per hour pass a given point in the rush hour) is considered, it is evident that traffic conditions are really not as bad as the casual observer believes.

Another chart reproduced herewith shows the average speed of vehicles in the rush and non-rush hours between the various street intersections on Michigan Boulevard. The extremely low speed shown between Jackson Boulevard and Lake Street is due to the ebb and flow of traffic from the Loop district into this great artery, and the situation is further complexed by the movements of cars to and from the Grant Park parking space east of the Boulevard, where upward of 2,500 motor cars are stored daily. Delays to traffic on Michigan Avenue affect the adjacent streets in the Loop, for within a comparatively few minutes, a temporary blockade on Michigan Avenue is felt on the cross streets two, three and four blocks west.

Perhaps the foregoing discussion will serve to emphasize the essential need that accurate records be made for purposes of future comparisons and that traffic be continuously studied, so that as its growth rises to meet the estimate of Mr. Ford, railway and city officials will be equipped to cope with the situation. By this means alone can efficient regulation be achieved.



Dearborn Street Bridge, Chicago, at 9 a.m.

The Chicago elevated railroads have 1,664 cars, and in 1920 the average cost per car for maintenance was $1,202. In 1914 the average cost for maintenance per car was $497.

Materials Quantities in Surface Lines Electrical System

THE following compilation showing the amount of materials which comprise the electrical distribution system of the Chicago Surface Lines is interesting because it transmits energy to a network of more than 1,000 miles of track, on more than 90 per cent of which the voltage ranges between 550 and 600 during rush-hour conditions and the remaining 10 per cent is practically all above 500 volts. This is the condition that exists when there is also a considerable electric car heating load.

Substations	Number	Number of Machines	Total Capacity, Kilowatts
Chicago Surface Lines	20	67	142,400
Commonwealth Edison Company	12	33	105,000
	32	100	247,400

Positive System	
Weatherproof cables, all sizes	934.5 miles
Lead covered cables, all sizes	537.6 miles
Conduit	1,500.7 miles
Manholes	3,285
Negative System.	
Weatherproof cables, all sizes	57.1 miles
Straight track auxiliary cables	594.3 miles
Special trackwork cables	138.2 miles
Tap to "L" structures	2.6 miles
Overhead System.	
Trolley, all sizes	1,034.6 miles
Trough	46.7 miles
Poles—iron	41,682
Poles—wood	4,194
Poles—total	45,876
Electric switches	124

* Other than street railway load is also supplied from these substations.

The record for the number of cars entering the Loop in one hour on the Chicago Elevated Railroad was made on April 29, 1920, when 953 ran into the Loop in sixty minutes.

Arkansas Utilities Association

ON ACCOUNT of conflicting dates with other conventions, the executive committee of the Arkansas Utilities Association has changed the convention dates of the association from Oct. 9-10, 1922, to Nov. 7-9, 1922.

The convention will have headquarters at the Arlington Hotel, Hot Springs, National Park, Ark.

Investment Bankers' Association of America

THE eleventh annual convention of the Investment Bankers' Association of America is to be held at the Del Monte Hotel, Del Monte, Calif., Oct. 9-12. There will be reports from committees on the following subjects: Finance, membership, railroad securities, education, marine securities, municipal securities, public service securities, real estate securities, fraudulent advertising, publicity, irrigation securities, foreign securities, government bonds, business practice, industrial securities, legislation and taxation.

American Welding Society

THE fall meeting of the A.W.S will be held in Chicago, Monday, Oct. 2, to Thursday, Oct. 5. On Monday afternoon, all day and evening Tuesday, and Wednesday morning there will be papers and reports on welding practice. For Wednesday afternoon a joint meeting with the American Electric Railway Engineering Association is scheduled, with papers by C. A. McCune, president, and William Spraragen, secretary American Welding Society, and E. M. T. Ryder, way engineer, and J. S. McWhirter, superintendent of equipment Third Avenue Railway System. On Thursday morning there will be a meeting of the committee on welded rail joints on the Municipal Pier. Members of the A.W.S. will meet at the Hotel Morrison at 6 p.m. Wednesday for a get-together dinner.

Association Safety Activities to Be Co-ordinated

A MEETING of a joint committee representing the National Electric Light Association, American Electric Railway Association, American Gas Association, Pennsylvania Electric Association and the Bell Telephone interests was held during the Safety Congress at Detroit last month and means of co-ordination and prevention of duplication of the work of the safety and accident prevention committees of the several groups were discussed. The discussion developed the fact that many of the studies carried on are of common interest, and while the work of the individual committees cannot be interfered with some means of keeping intimate touch between the several committees is a necessity. After discussion of various methods a committee was appointed to prepare and submit for approval a plan that would meet the ideas expressed in the discussion.

American Association News

Judge Warwick and H. A. Wheeler Will Address Convention

A NOTABLE feature of the meeting of the American Electric Railway Association on Wednesday morning will be the address by Judge Walter Winter Warwick, whose acceptance has just been received by Charles C. Peirce of the committee on meetings and subjects. Judge Warwick was Comptroller of the Treasury during the war years of from 1915 to 1921. He has also been Judge of the United States Circuit Court, Associate Justice of the Supreme Court of the Panama Canal Zone, and a member from April, 1911, to May, 1913, of the President's Commission on Economy and Efficiency. He is now Assistant Director of the Budget, with headquarters at Washington, D. C.

Judge Warwick's topic will be "The Financing of Electric Railways."

Another prominent speaker who will address the convention on Tuesday morning is H. A. Wheeler, vice-president Union Trust Company of Chicago. Mr. Wheeler was formerly president of the United States Chamber of Commerce. Mr. Wheeler's topic will be "The Busines Situation."

Claims Association Program

THE complete program of the Claims Association was made public this week, together with certain convention committee appointments. The latter are as follows: Convention assistants to the president, G. T. Hellmuth, Chicago, and H. O. Allison, New Brighton, Pa.; resolutions, W. H. Hyland, Gloversville, N. Y.; registration, H. D. Briggs, Newark, N. J.; entertainment, Wallace Muir, Lexington, Ky., and T. B. Donnelly, Connellsville, Pa.; reception and acquaintance, C. B. Proctor, Memphis, Tenn., and S. J. Herrell, Knoxville, Tenn. The program follows:

MONDAY MORNING, OCT. 2

Registration.

MONDAY AFTERNOON

HONORARY CHAIRMAN, J. R. GUILLIAMS

Invocation.

Address of President.

Report of Executive Committee.

Papers and Addresses

A Welcome.

"The Dignity and Fundamentals of Claim Work," By J. R. Guilliams, general attorney, Chicago Surface Lines.

"The Minimizing Expenditures Through Co-operation of Trainmen in Obtaining Observers," By P. O. Solon, claims attorney San Francisco-Oakland Terminal Railways.

"Personal Specifications for Claims Men," by H. O. Allison, safety engineer Beaver Valley Traction Company.

"Titles Which Suggest and Encourage Claims," by W. F. Weh, superintendent accident department, Cleveland Railway.

"Acts of Management and Operation Which Affect Claims," by J. W. Giltner, chief claim agent Northern Ohio Traction & Light Company.

"Claim Department Practices Which Encourage Claims," by Walter E. Robinson, claim agent Cincinnati Traction Company.

"Budgetary Procedure in Claims Expenditures," by John J. Reynolds, claims attorney Boston Elevated Railway.

"The Psychology of a Smile" (a presentation), by Augustus Baker, chief of adjustment bureau Receivers of Pittsburgh Railways.

"Clerical Routine and Forms" (an exhibit).

Resolutions.

Announcement of special features.

Distribution of souvenirs.

TUESDAY AFTERNOON

HONORARY CHAIRMAN, W. F. WEH

Papers and addresses

"How to Organize a Local Safety Council," by Charles B. Hardin, general claim agent United Railways of St. Louis.

"How to Organize Company Employees for Accident Prevention," by Victor T. Noonan, superintendent department of accident prevention, Cleveland Railway.

"How to Decrease Accidents without Special Organizations." by B. F. Boynton, claim agent Portland Railway, Light & Power Company.

"The Physician's Part in Accident Prevention" (author to be announced later).

"The Effect Upon Claims from Accident Prevention," a symposium by the following:

B. D. Haskins, claim agent and director of safety work, Chattanooga Railway & Light Company.

Neil W. Funk, superintendent of claims Louisville Railway.

L. A. Edwards, chief claim agent the Pennsylvania-Ohio Electric Company.

H. J. Vosburgh, claim agent Rochester, Lockport & Buffalo Railroad.

J. J. Sharkey, claim agent New York State Railways Rochester.

Nathan Abelson, claim and tax attorney, Empire State Railroad Corporation, Syracuse.

R. S. Messenger, claims and tax agent, Wilmington & Philadelphia Traction Company.

Thomas G. Aston, claim agent Washington Water Power Company, Spokane.

H. G. Winsor, superintendent of investigations and adjustments, Tacoma Railway & Power Company.

R. H. Hatfield, claim adjuster Sioux City Service Company.

Albert W. George, general claim agent The Connecticut Company, New Haven.

"The Prevention, Investigation, Adjustment and Defense of Automobile Accidents and Claims," a symposium by the following:

Edwin J. Paige, claim agent United Railways & Electric Company of Baltimore.

C. M. McRoberts, chief claim agent Los Angeles Railway.

A. E. Shaw, chief claims agent Montreal Tramways.

George H. Conklin, claim adjuster Augusta-Aiken Railway & Electric Corporation.

R. B. Campbells, general manager Arkansas Valley Interurban Railway Wichita.

Charles A. Blackburn, claim agent Butte Electric Railway.

Charles B. Prugh, claim agent Columbus Railway, Power & Light Company.

F. J. Gatrell, general claim agent Chicago Surface Lines.

E. F. Wynne, claim agent Georgia Railway & Power Company, Atlanta.

E. M. Raver, claim agent the Lincoln Traction Company.

Charles Oldenburg, general claim agent Chicago & Interurban Traction Company.

V. J. Waltz, claim agent Community Traction Company, Toledo.

Resolutions and Special Announcements.

WEDNESDAY AFTERNOON, OCT. 4

HONORARY CHAIRMAN, J. H. HANDLON, ESQ.

Papers and Addresses

"Women Jurors," author to be announced later.

"Tricks and Crimes of Ambulance Chasers," by Joseph S. Kubu, formerly secretary of the Claims Association and by John W. Yenson, claim agent Third Avenue Railway, New York.

"Exorbitant, Contingent Fees of Attorneys and Doctors, Their Effect and Legal Aspects," by Squire, Sanders & Dempsey, attorneys at law, Cleveland.

A Message from the American Bar Association.

A Message from the American Medical Society.

A Message from the Association of Railway Claim Agents.

A Message from the International Claim Association.

"Our Experience and Opinions," a symposium by the following:

B. J. Kernan, New Orleans, La.
Roane Waring, Memphis, Tenn.
C. E. Pickett, Waterloo, Iowa.
W. P. Napier, San Antonio, Tex.
W. W. Smithers, Philadelphia, Pa.
George H. Gordon, LaCrosse, Wis.
E. A. Nell, Kansas City, Mo.

"Jury Systems and the Need for Revision," author to be announced later.

Resolutions and Special Announcements.

THURSDAY AFTERNOON, OCT. 5

HONORARY CHAIRMAN, JOHN J. REYNOLDS

"The Economic Aspect of Claims Expenditures," by William G. Fitzpatrick, general claims attorney Detroit United Railway.

"The Result of 350 Jury Trials" (with graphic charts), by William G. Marshall, chief of litigation bureau, Receivers of Pittsburgh Railways.

"The Female Plaintiff with Subjective Complaints," by James Whitney Hall, medical legal expert, Chicago.

"Medical Testimony in Defensive Litigation, with Some Suggestions to Physicians," by William A. Challener, general attorney Receivers of Pittsburgh Railways.

"Medical Defense of Litigated Claims, with Some Suggestions to Trial Attorneys." by John Leeming, M. D., medical counsel, Chicago Surface Lines.

"Inspirational Review and Outline of Probable Trend of Claims Work," by J. H. Handlon, claim agent Market Street Railway.

"Report on an Association Code of Ethics," by R. A. Sears, general claims attorney Boston Elevated Railway.

Adoption of Revised Objects of the Claims Association.

Report of Resolutions Committee.

Election of Officers—Installation.

Appointment of Committees.

Adjournment.

Interurban Round Table

THE program for Thursday, Oct. 5, of the Transportation & Traffic Association shows an "interurban hour" at 3 p.m., in charge of E. C. Spring, general superintendent Lehigh Valley Transit Company. Below will be found the program of this discussion received from President L. H. Palmer, with the request that it be published in advance because of the potential value to be realized if the interest taken measures up to the topic itself.

"Meeting Highway Competition"—This subject should bring out the unfair conditions of competition, also the point, can the automobile be made a stimulant to interurban traffic?

"Economics in Operation"—This subject should bring out the savings of car mileage and platform labor, together with dead or layover time and plotting of schedules.

"Getting Increased Passenger Business"—This subject should bring out the necessity of publicity, together with such publicity mediums as are used.

"Getting Increased Freight Business"—This subject should bring out the necessity of publicity development the same as passenger business, together with comparative rates and service with steam roads.

"Developing Favorable Public Sentiment"—This subject should bring out the capitalizing of public good will and the commercializing of the industry.

"The Necessity for Departmental Co-operation"—This subject should bring out the close touch one department should have upon the other and the results accomplished by working together. Using the entire pay roll as a booster for the service. Having all realize they are part of the whole.

As this note is printed, the following have accepted invitations to take part in this round-table discussion: F. L. Butler, C. E. Morgan, H. A. Nicholl, F. D. Norviel and E. S. Wilde.

Standard Committee Passes on Technical Reports

AT A meeting of the Engineering Association committee on standards, held in New York on Sept. 7, those parts of the technical reports which required action by the committee were considered in detail. The reports brought up were those on buildings and structures, power distribution, way matters and equipment.

The committee recommended that plans of typical shop layouts, prepared by the committee on buildings and structures, be adopted as miscellaneous methods and practices and printed thus in the Manual. The subject of good current practice in the design and construction of small bridges, culverts and trestles was referred back to the technical committee for the formulation of suggestions as to standards.

Under the subject of power distribution it was decided to recommend the suspension of the present specifications for crossings of electric light, power supply and trolley lines with steam and electric railways, in view of the revision of the National Electrical Safety Code which is now under way.

A long list of recommendations by the committee on way matters was approved. These involved detailed changes in specifications with a view to harmonizing them with existing practice, and six new specifications for railroad spikes, bolts and tie plates.

A number of suggestions by the committee on equipment, particularly as to wheel contours, were referred to the convention for action.

The meeting was attended by the following members: Martin Schreiber, chairman; N. B. Trist, C. G. Keen, C. H. Clark, John Lindall, J. A. Brooks and H. H. Norris. The committees were represented thus: way matters, H. H. George and R. C. Cram; power distribution, M. B. Rosevear, C. R. Harte; equipment, H. A. Benedict (representing R. H. Dalgleish), Daniel Durie. G. C. Hecker was secretary.

Special Arrangements for Railroad Tickets This Year

THOSE intending to get the benefit of the reduced rate to and from Chicago should be sure to secure identification certificates from the association office before purchasing their tickets. The usual plan by which identification certificates can be obtained at any ticket office is not being followed this year. The certificates to be obtained from the association office permit the purchase from any railroad office of a round-trip ticket to Chicago for a fare and one-half. After arriving at Chicago the delegate must have his ticket validated by an agent of the railroad, who will be at the Municipal Pier. The ticket is good going to Chicago from Sept. 26 to Oct. 4, and is good for return until Oct. 12. On the New York Central and Pennsylvania Railroads the ticket is not good either going or returning on the 20th Century Limited or the Broadway Limited respectively.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Politics Dragged Into Strike

Buffalo Company Carrying 100,000 Passengers Daily—Traffic on Many Lines 90 per Cent Normal

With the approach of the fall election, politics are being dragged into the strike of employees of the International Railway, Buffalo, N. Y., which has been in effect since July 1. Mayor Frank X. Schwab has thrown his support to candidates indorsed by the strikers, the jitney owners and the Nickel or Walk Club, which has been organized to fight for a reduction in the railway fare.

Despite the mud-slinging campaign with the International Railway and Mitten Management, Inc., as the targets, the number of passengers being carried on all local and interurban lines of the company is constantly increasing. Herbert G. Tulley, president of the company, says the company is now carrying more than 100,000 passengers daily and that riding is 90 per cent normal on a large number of the West Side lines in Buffalo. It is predicted that if the percentage of increase is continued, car riding will be normal on all lines within another four or five weeks.

Among the candidates indorsed by the strikers, the jitney owners and the Nickel or Walk Club is Robert C. Lacey, chairman of the board of arbitration of the Central Labor Council and former president of the organization, who is under arrest charged with the illegal possession of dynamite. The arrest was made at the time four strikers were taken into custody after the wrecking of the Buffalo-Niagara Falls high-speed line car by dynamite. Mr. Lacey is a candidate for the State Senate from a Buffalo district. Among other candidates indorsed by the strikers and running on a platform for home rule, the abolishment of the Public Service Commission and recall of judges is Leo F. Tucholka, an opponent of the International.

Unable to secure the necessary support and co-operation of the Police Department under Mayor Schwab, the International Railway is endeavoring to round up practically single-handed the jitney drivers who are operating illegally. Scores of arrests have been made by employees of the railway who have been sworn in as special officers. The arrests are made upon warrants issued by the City Court upon information obtained by International Railway employees who have secured the evidence against the jitney drivers. Fines ranging from $25 to $250 have been imposed upon those convicted and yet hundreds of jitneys are plying their trade unmolested by city police.

A second injunction against jitney drivers has been obtained by the company from Justice Pooley in Supreme Court. It names 624 individuals and was granted upon application of Henry W. Killeen, counsel for the International. The purpose of the second injunction is to cover the cases of suspected jitney drivers, who are not named in the first injunction. Justice Crosby had ruled that the first injunction applies only to those persons specifically named in the court order and cannot include "all others" as stated in the reading of the injunction.

By unanimous vote the City Council of Buffalo adopted a resolution appropriating funds for the legal battle to be started by the municipal authorities to force a return of the 5-cent fare on the local lines of the International. About $75,000 will be required to continue the fight before the Public Service Commission. The City Council was advised against proceeding with a rate case at this time especially in view of the fact that the Public Service Commission will take the earnings of the company for the last several months as a basis for a fare readjustment and as the company has had little revenue from fares during this period, an 8 or 10-cent fare might be fixed by the commission.

Despite the warning of the city's legal staff, the City Council voted to start the rate case and directed the city's legal department to begin a preliminary action for a lower fare. The Council voted to employ an expert to make an investigation into the financial condition of the railway and conduct a survey of its physical properties which will be used as a basis of a rate case.

$3,000,000 in Improvements Depending on Franchise Vote

As an opening gun in a campaign to have the people of San Diego vote favorably at the special election to be held Oct. 10 on the Sixteenth Street franchise and the proposed charter amendment to relieve the San Diego Electric Railway of paving costs in future, John D. Spreckels, president of the railway, has issued a statement in which he promises that the company will spend $3,000,000 in San Diego in extensions and improvements if the concessions asked are granted and the company is given "a fair chance to do business under modern and reasonable conditions."

In his statement Mr. Spreckels said that his railway as a public utility was simply seeking a franchise which will relieve it of obsolete requirements. He said that a negative vote on the franchise issue would compel the railway to fall behind while all other utilities were making plans with future prosperity on every hand.

Electrification Accepted

Alternative Proposal of Mr. Hobson to Equip Texas Steam Road Approved by Dallas

The city of Dallas has approved the proposal submitted by C. W. Hobson and his associates for the electrification of the Missouri, Kansas & Texas Railroad from Dallas to Denton and its use as an interurban. The offer from Mr. Hobson was made in lieu of constructing the second interurban of 30 miles in length which Mr. Hobson and other grantees of the street car franchise at Dallas agreed to build under the terms of the contract entered into with the city at the time the franchise was granted in 1917. Mr. Hobson and associates are to enter into a fifty-year contract with the Missouri, Kansas & Texas, and the work of electrifying the line is to be begun by Oct. 1. Service is to be begun by the summer of 1923.

The question of carrying out the work was put squarely up to the City Commissioners and the Mayor of Dallas. The Dallas Railway is under bond to build an interurban at least 30 miles in length out of Dallas, work to begin this month, and C. W. Hobson has posted with the American Exchange National Bank, Dallas, a certified check for $350,000 as forfeit to guarantee the carrying out of the contract for a new interurban line.

After the traction people had investigated the proposition to electrify the Missouri, Kansas & Texas from Dallas to Denton and had made surveys and estimated costs, etc., Mr. Hobson formally notified Mayor Sawnie Aldredge and members of the City Commission that the traction interests would forfeit the $350,000 if the city declined to accept the Katy electrification project in lieu of the new interurban line which they are under contract to build.

Sentiment in Dallas seemed divided as to whether the city should accept or reject the Katy electrification project. Some people suggested that the project be rejected and that the $350,000 forfeit money be taken and used to acquire and equip a large park near the city. Others suggested that the forfeit money be accepted and used as a nucleus for a fund to be used in building an interurban line from Dallas to Greenville.

Mr. Hobson in notifying the city of the determination to forfeit the $350,000 submitted a draft of the proposed contract between the interurban interest and the Missouri, Kansas & Texas Railway. The contract gives the interurban interests a lease on the railway line for a period of fifty years with exclusive rights for hauling passengers, while the steam railway retains the right to haul freight.

Voters of Grand Rapids Approve New Franchise

Eighteen Months Consumed in the Negotiation of Terms Which Have Been Overwhelmingly Approved at Polls—Initial Fare Ten Cents Cash

A NEW electric railway franchise, effective for thirty years and carrying many unique provisions, has been granted the Grand Rapids (Mich.) Railway as a result of an election held there on Sept. 12. The measure was drawn up jointly by representatives of the municipality and the company. The nature of the grant was such as to require a three-fifths majority to assure passage. When final results of the election were known, however, it was found that the majority for the franchise was nearer four-fifths. Out of seventy-three precincts in the city, seventy-one carried the measure.

In the course of an interview with a representative of the *Electric Railway Journal*, Louis J. De Lamarter, vice-president and general manager of the company, made the following statement:

> The result of the franchise vote is particularly gratifying in view of the fact that at no time since the citizens of Grand Rapids have had the franchise under consideration has the railway given the public to understand that passage of the measure would bring an immediate reduction in fare or prompt improvement in service. We have indicated, to be sure, that the defeat of the grant would entail further financial hardships on the company and render still more difficult the expansion and development of our properties.
>
> We, therefore, are more than pleased with the spirit of co-operation and fair play manifested by the people of Grand Rapids in so stanchly supporting the measure. We feel, now, that the officials of the city, in collaboration with those of the company, are in a position to proceed with the solution of the various problems presenting themselves, and that the time is not far distant when Grand Rapids citizens may enjoy an improved transportation service.

Negotiations leading up to the enactment of the new franchise ordinance in Grand Rapids have been pending since the expiration of the old franchise on April 23, 1921. The factor which presented the knottiest problem to the group of experts representing both the city and company was the equitable valuation of the property. The city was unwilling to accept the valuation figures presented by the management of the company and the company maintained that the city's figures were altogether too low. Nearly a year's time was spent in threshing the matter out, the company holding strong for an $8,000,000 valuation, as contrasted with $5,100,000, the figure named by the city. The company finally agreed, however, to accept a compromise valuation of $5,500,000, provided the new franchise ran for thirty years, with an 8 per cent return. The company owns and operates extensive recreation grounds at Ramona and North Parks and these properties were included in the valuation.

The rate of fare to be charged was another knotty problem. Several methods were considered, ranging from the sale of one cash fare for 7 cents, four tickets for a quarter, to 10 cents cash fare and seventeen tickets for a dollar. This latter rate eventually gave way to the one now in effect, which provides that the initial fare shall be 10 cents cash and that seven tickets shall be sold for 50 cents. The new franchise stipulates that the present rate shall continue until the company's earnings exceed 8 per cent, whereupon the rate of fare shall decrease, step by step, as earnings increase, until a minimum fare of 5 cents shall have been reached with thirteen tickets for 50 cents. It also is provided, however, that, regardless of earnings, the maximum cash fare shall not be more than 10 cents. The intermediate rates are 10 cents cash and four tickets for a quarter, 10 cents cash and nine tickets for 50 cents, 10 cents cash and five tickets for 25 cents, 5 cents cash,5 cents cash and eleven tickets for 50 cents, 5 cents cash and six tickets for 25 cents, 5 cents cash and seven tickets for 25 cents. On the rate of return the grant provides:

> The grantee's initial rate of return on the value of its property as determined under Sections 16 and 17 of this franchise shall be 8 per cent per annum. The grantee's rate of return shall be decreased one-quarter of 1 per cent whenever the rate of fare shall be increased one step as hereinafter in this section defined; when the cash or ticket fare in effect shall be less than 5 cents the return to the company shall be increased one-quarter of 1 per cent for each step the same is reduced.

CITY HAS PURCHASE RIGHTS

Another important provision of the franchise is that the city is given the right to purchase all of the company's properties after fifteen years or at the end of any five-year period thereafter or at the expiration of the franchise, the purchase to be negotiated on the basis of the present valuation or any valuation figure hereinafter arrived at, allowance being made for depreciation as well as additions and improvements.

The company is required to make monthly reports to the city and the company's books always are to be open for inspection by the city's authorized representatives. The city also is given the supervision of the salaries paid the company's officers and the company is enjoined from securing any indirect revenue whatsoever.

It is provided in the new franchise that any essential differences or disputes arising between the city and the company shall be settled by arbitration, the arbiters to be equally representative of both factions and their decisions to be final and conclusive.

The city has absolute jurisdiction over service, being empowered to fix the frequency with which cars shall run on all lines.

Ever since the provisions of the new franchise were made public, following approval by the City Commission on June 12, 1922, the measure has received the unqualified support of every forward-looking organization in Grand Rapids. All of the city's newspapers, the Chamber of Commerce, Rotary Club, the Trades and Labor Council and several business associations devoted their whole-hearted efforts to campaign activities in behalf of the franchise.

During the campaign Mr. De Lamarter played an open hand with all his cards on the table and the election results are interpreted as clearly demonstrating the people's appreciation of such tactics. As an after-election editorial in a Grand Rapids paper stated. "the people are fair when appealed to fairly."

FARE EQUALIZATION FUND PROVIDED

The provisions of the grant covering the fare equalization fund established is as follows:

> Sec. 21. The grantee, as soon as this franchise goes into effect, shall open a bookkeeping account denominated "Automatic Fare Equalization Account" hereinafter referred to as the "Equalization Account." The grantee shall thereafter credit the "Equalization Account" with all income received from the operation of the property and from all other sources, including the earnings on any reserve funds accrued subsequent to Jan. 1, 1922, or which may hereafter be set up, including all earnings on the net balance in said equalization account, in excess of the actual cost of operation as defined in Section 22, and shall debit said account with the return to which the said grantee is entitled under the provisions hereof.
>
> Whenever there shall be a net debit of more than $50,000 to the equalization account, then the next higher rate of fare and the next lower rate of return shall be and become effective; whenever there shall be a net debit exceeding $100,000 to the equalization account, then the next higher rate of fare and the next lower rate of return shall be and become effective and the rate of fare shall be further increased from time to time in like steps until the debit to the said equalization account is wiped out. Whenever the net credit to the equalization account exceeds $50,000 the next lower rate of fare shall be and become effective; whenever the net credit exceeds $100,000 the next lower rate of fare shall be and become effective and all amounts to the credit of the equalization account in excess of $100,000 shall be used as a basis for further reductions in fare and in like steps.
>
> All increases and all decreases in the rate of fare shall be made on the first day of the second month following the one in which the results of operation show that such increase or decrease is demanded under the terms hereof; Provided, however, the grantee in order to avoid frequent changes in the rate of fare or an increase in the rate of fare which in its judgment may decrease its gross earnings, may to such an extent as it may be able or deem expedient, and subject to the approval of the City Commission, refrain, from time to time, from debiting the equalization account the full return to which it may be entitled, but to such extent as it does so refrain it shall be entitled to debit said account, without interest, before a reduced rate of fare shall be established under the terms hereof. Any tickets outstanding when change of price thereof is made shall be redeemed by the grantee at the price at which the same were sold.

Another Effort to Restore Service in Saginaw

Another effort is to be made looking to the resumption of electric railway service in Saginaw, Mich. Initiatory petitions are being circulated calling upon the Council to submit to the voters at the general election on Nov. 7 a franchise ordinance to Otto Schupp, trustee in bankruptcy of the Saginaw-Bay City Railroad. The term of the grant is twenty-five years. Mr. Schupp represents the holders of more than $400,000 of first mortgage bonds on a property that has not been in operation since Aug. 10, 1921.

Under the terms of the proposed ordinance the rates of fare for the first two years are to be: twenty tickets $1, four tickets 25 cents, 10-cent cash fare, free transfers. After the expiration of the initial two-year period, the rates are to be fixed by the State Public Utilities Commission. The operators of the property agree to rebuild certain of their tracks next year, keep the pavement between the tracks in repair and operate motor coach extensions to various parts of the city not served by the electric railway.

Jitney bus and intercity motor bus competition along the lines of the Michigan Railroad is prohibited.

It is further provided that in case of any disagreement between the city and company that can not be adjusted amicably the question in dispute is to be submitted to the Public Utilities Commission for settlement. The city is to have the right to purchase the railway property at any time at a price to be fixed by arbitration. The company is not to be required to pay for paving or repaving other than the extra ballast required because of the presence of its tracks in the streets.

Five-Mile Interurban Extension by Pacific Electric Railway

Announcement has been made by D. W. Pontius, vice-president and general manager of the Pacific Electric Railway, that application will be made immediately to the California State Railroad Commission for authority to extend the company's Monrovia-Glendora interurban line from Glendora to San Dimas, which is approximately 5 miles. This proposed extension will close up the gap between the Monrovia-Glendora Line and the San Bernardino Line.

The new extension will be constructed as soon as permission is received from the Railroad Commission. When completed it will shorten the route from South Pasadena, Pasadena, Sierra Madre, Monrovia, Azusa and Glendora to San Dima, Pomona, Ontario, Upland, Riverside, Redlands and the San Bernardino district and will result in a considerable saving of time to passengers. It will also expedite freight shipments.

It is estimated that after the Railroad Commission acts favorably on the company's application work on the proposed extension will be started at once and that it will be completed within four or five months. The expenditure to be made for carrying out this work will be about $370,000. The construction of the line will be the first extensive addition to the electric interurban lines made by the company since before the war.

Prior to the war, the Pacific Electric Lines purchased the right-of-way for the purpose of making this line extension to a connection with the San Bernardino line at San Dimas; but during the war all railway construction was held up as a war measure. It has not been feasible to attempt any further construction prior to the present time.

Compulsory Arbitration Bill Introduced

A bill for the compulsory incorporation of labor unions and compulsory arbitration of industrial disputes has been introduced in the House by Representative Fairchild of New York and referred to the committee on labor, which will consider it at the December session of Congress.

The measure would provide that all labor unions be enrolled as "national unions" under the Department of Labor, for which purpose the bill would create the office of commissioner of enrollments, with an annual salary of $7,500 a year. Employers of more than twenty-five workers also would be obliged to enroll. A penalty in the form of a tax of $5 a year would be levied upon all members of unions not enrolled in the national union.

The national unions, to be organized according to occupations, would be obliged to write into their by-laws a provision against disturbing the regular commercial life of the country and agree to submit all controversies which cannot be composed by private negotiation to the courts of the United States and to accept their decision on final appeal without further controversy.

A violation of the latter clause would be considered a misdemeanor punishable by a fine of $5 a day and no employer would be able to hire a worker not a member of a national union on penalty of fine of $5 a day for each outside worker employed.

Differences in Ottawa Settled

F. D. Burpee, general manager of the Ottawa (Can.) Street Railway, and F. W. McRae, president of Amalgamated Division 279, signed an agreement on Sept. 14 which brings to a final settlement the differences between th railway management and the men. The settlement is based on the finding brought in about three months ago by the Board of Conciliation and Investigation and has nothing to do with wages. No dispute has arisen in this respect since the finding of the board which reduced wages 12½ per cent. This decision was referred to in the *Electric Railway Journal*, issue of June 3. The chief clause in the new agreement states that the company will treat with its men through their properly accredited representatives of the Amalgamated upon questions which may arise, including dismissals after suspension. It is understood, though, that the company reserves the right to treat separately with men who are not members of Division 279 of the Amalgamated.

Reported Rehearing Petition Will Be Denied

Denial of the petition of the city of Indianapolis for a rehearing of the case in which the Indiana Public Service Commission relieved the Indianapolis Street Railway from paying for paving between its tracks appears likely. The question is one of prime importance in Indiana, since most cities require the street railway to pave streets and keep in repair the paving between their tracks and 18 in. on each side. At the conclusion of the arguments, Edgar Blessing, a member of the commission who wrote the original order, said he personally favored denying the petition to reopen the case. It is regarded as likely that other commissioners will take the same attitude. Counsel for the railway declared that the commission, the Legislature and the city had no authority to compel the railway to pave between its tracks. He said there was sufficient authority for the city to provide for the paving out of the general fund.

The Sporting Mayor of Indianapolis

How times have changed! Recently while Mayor Lew Shank of Indianapolis adorned the Tippecanoe County Fair racetrack rail and rooted for Peter Hall, a trotting horse owned by his wife and others, the mayors and city attorneys of a score of other Indiana cities assembled in Indianapolis and formed the Public Utilities Committee of Indiana Cities, an organization Lew had demanded since his memorable citizens' march last spring on the Statehouse to denounce the Public Service Commission. Mayor John C. Quick of Muncie, with whom Lew joined in the call for the organization meeting, could not explain the Indianapolis Mayor's absence. He did not attribute Lew's lack of enthusiasm to the latter's "peace visit" to the commission's office the day before when Mr. Shank and the members of the Indiana Public Service Commission gave every evidence of having patched up their difficulties.

In the organization of the public utilities committee Mayor Quick was elected president, Taylor Groninger, corporation counsel of Indianapolis, vice-president, and J. N. Brissey, city attorney of East Chicago, secretary-treasurer. The committee will work in conjunction with the Indiana Municipal League, it was said. The movement was started this year when Lew fought a proposed merger of several electric companies and opposed increases in utility rates. The annual meeting will be held the first Wednesday in September each year.

Construction of Bay Shore Interurban in Prospect

Acceptance of the franchise offered by the City Commission of Houston to the promoters of the proposed new interurban electric railway is said to insure the construction of the line. John Henry Kirby, wealthy lumber manufacturer and oil operator; W. C. Munn, John S. Bonner and Jacob F. Wolters, all of Houston, are the organizers of the Bay Shore Interurban Railway Company, and they have given bond in the sum of $7,500 to the city for the faithful performance of the franchise and contract. Under the terms of the franchise, work on the new line must begin by March, 1923, and cars be in operation by the first of 1924.

The city of Houston will secure a franchise from Harrisburg which will permit the new line to connect with the tracks of the Galveston-Houston Interurban Company at the point where it leaves the tracks of the Municipal Belt Railroad.

The Bay Shore Line will use a quarter of mile of the Municipal Belt track and part of the right-of-way of the municipal railroad. Under the franchise the city has the right to purchase an interest in the right-of-way which will be secured by the interurban line beyond the Municipal Belt Railroad so that the railroad can be extended if the city should desire.

Subway for Tokio in Prospect

An underground electric railway will soon be part of the life of Tokio if plans now under way come to a successful termination. The Tokio Underground Railway, Ltd., recently issued a prospectus in which the fact was brought out that the electric railway operated by the Municipal Electric Bureau is insufficient to carry the vast throngs of people which have been increasing in alarming numbers.

The statement is made that the projected line of the underground railway is to have connections with the high-speed electric railway system operated by the government Department of Railways between the capital and Yokohama. The subway will be extended 9½ miles.

Board of Estimate Receives Mayor's Plan of Construction

In a recent statement to the Board of Estimate John F. Hylan, Mayor of New York, as part of his rapid transit construction program, has promised the construction of seven tracks within the next five years, which will relieve the present congestion on the upper west side. The first stage in the construction of the new west side line will be the operation of the line from Fifty-ninth Street and Seventh Avenue to Broadway and Dyckman Street. The next step will be the continuation of the line as a four-track main line south on Amsterdam Avenue from Seventy-second Street to the Battery and Brooklyn. The third stage will be the extension from Broadway and Dyckman Street to Yonkers. According to the Mayor's statement when these three stages are completed the city will have another four-track subway running through the entire west side with a two-track connection with the present Broadway subway.

It was announced at the second public hearing on Mayor Hylan's plan for new subways that estimated cost of constructing new west side line from Seventy-second Street and Amsterdam Avenue to the Battery is $31,000,000.

Wages Go to Arbitration

A typographical error, in which an entire line was dropped from the story on page 407 of the *Electric Railway Journal*, issue of Sept. 16, with respect to the wage controversy between the management and employees of the Boston & Worcester Street Railway, destroyed the sense of that item. The sentence should have read: "Several conferences were held previous to the expiration of the contract and it was agreed that all articles of the contract other than articles pertaining to wages were satisfactory." As indicated previously, the wage matter has gone to arbitration for settlement.

Joint Engineering Council Formed

Proposals have been approved by representatives in conference of the leading British engineering institutions for closer co-operation between these bodies. They are the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Institution of Naval Architects and the Institution of Electrical Engineers. An Engineering Joint Council composed of representatives of the four bodies has been formed. The objects in view are to improve the status of engineers, to secure the better utilization of their services in the country's interests, to secure the appointment of properly qualified individuals to responsible engineering positions and to prevent unnecessary duplication of activities.

Proposed Expenditures in Tennessee Total $2,000,000

Public utilities of Tennessee will spend more than $2,000,000 within the next year in improvements and renewals. Figures giving this amount have been supplied the State Utilities Commission following a resolution of the commission to review all construction plans and determine what progress has been made. The contemplated expenditures of the railway companies in the state are as follows:

	Estimated Sum to Be Spent During Current Year	Sum Spent in Past Six Months
Knoxville Railway & Light Company	$250,000	$136,000
Chattanooga Railway & Light Company	175,000	100,000
Memphis Street Railway	200,000	100,000
Tennessee Power Company	300,000	65,000
Nashville Railway & Light Company	300,000	100,000

Co-operative Welfare Association Entertains Employees and Their Families

On July 5 the Louisville (Ky.) Railway chartered the steamer *East St. Louis* for three trips of three hours each on the Ohio River for the employees of the company, their families and their friends.

There were 900 people on the morning boat, which left the wharf at 9:30 a.m. This boat carried the late trick employees and their families, as it was planned to give every employee of the company an opportunity to make the ride. Motion pictures were taken of a special car discharging passengers for the morning boat ride, of the people approaching and boarding the boat and also showing the *East St. Louis* backing out into midstream. These pictures are a part of a film that the company is preparing of all of its activities and will be shown at gatherings of employees during the fall and winter.

The offices and shops closed for the afternoon, and as many as it was possible to relieve went on the afternoon trip. There were 1,218 passengers on the afternoon boat, leaving the wharf at 2:30 and returning at 6 p.m.

The evening boat, leaving the wharf at 8 p.m. and returning at 11:30 p.m., of course, carried the largest crowd. The capacity of the boat being 1,800 people, the government inspector insisted on raising the gangplank after 1,775 people had boarded the boat. Quite a number were disappointed but other entertainment features carried out during the summer made up for the loss.

On July 7 there was a boat ride for the colored employees of the company on the steamer *America*, leaving the wharf at 2:30 p.m. and returning at 6 p.m.

On Aug. 2 Fontaine Ferry Park, an amusement resort on the Ohio River, was taken over by the company for an all-day outing for white employees and families. The park was opened at 10 a.m. and employees were urged to pack lunch baskets and bring the kiddos, wives, fathers, grandfathers and grandmothers and spend as many hours at the park as possible.

There was a program of music in the bandstand at 1:30 p.m. and 8 p.m., with a radio concert at 7:30 p.m., as well as contests for the boys and girls at 2:30 p.m. Moving pictures were taken of all events at the park.

Free tickets were provided, covering carfare to and from the park, admission to the park and rides on most of the amusement devices in the park.

Invites Public Criticism.—In an effort to render a faithful and efficient service to its passengers the North Carolina Public Service Company, Greensboro, N. C., has invited the patrons of its lines to send in service suggestions. Constructive criticism is sought as the first step toward improvements in the railway department of the company.

Financial and Corporate

Elevated Merger Sanctioned

Illinois Commission Has Approved the Chicago Merger—Move a Measure For Greater Simplicity

Permission was granted on Sept. 14 by the Illinois Commerce Commission for the proposed $76,000,000 merger of the Northwestern, Metropolitan and the South Side elevated lines and for the purchase by the consolidated corporation at a judiciary sale of the properties of the Chicago & Oak Park Elevated Railroad, which has been in the hands of a receiver since Nov. 13, 1911. A meeting of the stockholders of the three companies will be held later in the month to ratify the consolidation plan.

In citing benefits to be derived through the merger, the elevated railroads, in their petition filed with the commission last May, stated the lines could be operated more efficiently and economically as one company, and that the proposed consolidation would better the credit and raise the financial standing of the properties and enable the company to purchase new equipment.

ONE HUNDRED NEW CARS

The consolidation will permit the company to go forward with its plan of purchasing 100 new cars at a cost of $23,000 each. A petition to purchase the new equipment was filed with the commission a few days ago.

Britton I. Budd. president of the roads, said the consolidation will mean an improvement in service.

> We will start service with longer trains shortly after March 1, when delivery of the new cars will begin. Such service will be of great benefit to the public during rush hours. This involves lengthening of station platforms and several other physical changes.
>
> Because of inability to attract new capital and because of closed mortgages the elevated lines have not developed to anything like their potential ability to give the people the service which is the crying need of the hour. This is the first step in that direction.

The valuation of all the elevated lines for rate-making purposes as of June 30, 1919, was $86,250,000. Since then additions to capital have increased the value to $86,682,899. The proposed consolidation corporation is to have stocks and bonds of $76,106,500, which will be increased to $83,806,500 with the acquisition of the Oak Park line.

The merger will eliminate $2,936,815 of floating indebtedness and $2,984,581 of receivers' liabilities. The consolidated corporation is authorized to make a first lien and refunding mortgage of $1,600,000 and an adjustment income mortgage of $17,120,000, and to issue $19,172,500 in capital stock with which to retire the stock of the three companies and pay off indebtedness. It is also authorized to issue $2,600,000 in stock to cancel certain receivers' liabilities in connection with the purchase of the Oak Park "L."

Fails to Meet Cost of Operation

Owing to heavy reconstruction and other maintenance expenses the Boston (Mass.) Elevated Railway was unable to earn its cost of operation last August, falling $217,128 behind. It carried 26,877,682 revenue passengers of whom 6,001,000 were carried for the 5-cent fare and 20,876,682 for the 10-cent fare. The total receipts from operation amounted to $2,443,075 and the cost of the service was $2,660,204. The payroll cost per revenue passenger was 4.759 cents as against 5,287 cents in August a year ago. The cost of service per revenue passenger was 9.898 cents as against 10.546 cents in August last year. The trustees report that the work is well advanced on 100 new surface cars and shipments will begin at the end of September. Since Jan. 1 the company has overhauled and painted 571 cars and snow plows, as compared with 389 during the same period last year.

New Merger Bill

Another Measure Has Been Introduced Designed to Effect Consolidation of Washington Companies

A new bill for the voluntary merger of the electric railway and electric power companies of Washington, bearing the indorsement of the District of Columbia Public Utilities Commission, has been introduced in the House by Representative Focht. It is understood that this measure will be urged before the District of Columbia committee to displace the several other bills on this subject which are pending before that body, two of them having been passed by the Senate.

VOLUNTARY CONSOLIDATION PROPOSED

The Focht bill would provide for the voluntary consolidation of all the railway companies of the capital city upon a vote of three-fourths of the stockholders of each of the separate corporations. It would provide that consolidation with the Potomac Electric Power Company could not be had as a separate merger by any of the individual railways, but would have to be effected, if at all, after the consolidation of the car lines. The measure also would provide means for consolidation of the Washington Gas Light Company and the Georgetown Gas Light Company.

GROSS RECEIPTS TAX REPEALED

The 4 per cent gross tax on receipts would be repealed after July 1, 1922, and the bill would levy a tax of 50 per cent on net operating income in excess of 6 per cent and not above 7 per cent and a tax of 75 per cent on net operating income in excess of 7 per cent of the fair value of the property of all traction companies. The measure would relieve the traction companies, if consolidated, from paying the cost of street paving 2 ft. on each side of the tracks and between the rails and after consolidation would reduce the tax on net income to 4 per cent on gross revenue.

A clause in the new bill would empower the Public Utilities Commission to control the salaries of officials of the merged properties.

Conspectus of Indexes for Sept., 1922

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	Sept. 1922 **7.01**	Aug. 1922 **7.01**	Sept. 1921 **7.21**	May 1921 **7.24**	**4.84**
Street Railway Materials*	Aug. 1922 **189**	July 1922 **181**	Aug. 1921 **160**	Sept. 1920 **247**	**100**
Street Railway Wages*	Sept. 1922 **208**	Aug. 1922 **209**	Sept 1921 **215**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	Aug. 31 1922 **5.95**	July 30 1922 **5.78**	Aug. 31 1921 **4.53**	Apr. 30 1917 **12.18**	**5.91**
U.S. Bank Clearings Outside N. Y. City (Billions)	Aug. 1922 **12.34**	July 1922 **12.30**	Aug. 1921 **11.08**	March 1920 **18.54**	Av. Mo. 1913 **6.12**
Business Failures	Aug. 1922	July 1922	Aug. 1921	Jan. 1922	Av. Mo. 1913
Number	**1,669**	**1,568**	**1,642**	**2,722**	**1,213**
Liabilities (millions)	**36.83**	**42.15**	**50.38**	**105.7**	**24.64**

	Latest	Month Ago	Year Ago	Peak	1913
Eng. News-Record Construction costs	Sept. 1922 **185.0**	Aug 1922 **173.4**	Sept. 1921 **188.3**	June 1920 **273.8**	**100**
U.S. Bur. Lab. Stat. Wholesale Commodities	Aug. 1922 **155**	July 1922 **155**	Aug. 1921 **142**	May 1920 **247**	**100**
Bradstreet's Wholesale Commodities	Sept. 1 1922 **12.08**	Aug. 1 1922 **12.07**	Sept. 1 1921 **11.09**	Feb. 1 1920 **20.87**	**9.21**
Dun's Wholesale Commodities	Sept. 1 1922 **172.5**	Aug. 1 1922 **173.6**	Sept. 1 1921 **162.6**	May 1 1920 **263.3**	**120.9**
U.S. Bur. Lab. Stat. Retail food	Aug. 1922 **139**	July 1922 **142**	Aug. 1921 **155**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	Aug. 1922 **154.5**	July 1922 **155.6**	Aug. 1921 **162.0**	July 1920 **204.5**	(1914) **100**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Traffic and Transportation

Read While You Ride

Newspaper Vending Machine Installed on Dayton Cars Attracts Attention from Railways Elsewhere

Increased interest has been aroused in other cities in the system of vending newspapers which has been in successful use on street cars in Dayton, Ohio, now for many months. The plan is known as the Read-Wyl-U-Ryd Street Car Selling Plan for morning papers. The two largest of the five street railways in Dayton at first agreed to install the system without any return to themselves, but the Dayton *Journal* subsequently agreed to give the companies a selling commission of one-half cent for each copy sold.

Both William L. Smith, general manager of the Dayton Street Railway, and W. E. Boileau are on record as being strong proponents of the Read-Wyl-U-Ryd boxes. In fact, in a letter to the Dayton *Journal* Mr. Smith said that he would gladly recommend the idea to any street or interurban railway. In granting permission to put the boxes on the cars of his company Mr. Smith said he did so because his action:

1. Afforded his patrons the opportunity to read the morning paper while riding to office or factory, which, from personal experience, was a pleasure and tended to shorten the ride.
2. Prevented his patrons being annoyed by newsboys, and, what was more essential, eliminated the possibility of an accident to such boys who carelessly and thoughtlessly jumped on and off the cars.
3. Added to the pleasant relations which existed between the press and the company, and further proved the desire of the railway to co-operate with the newspapers in giving "service" to the public.

Mr. Boileau said:

> The boxes have proved very popular with the car riders in the morning, enabling them to obtain the morning paper when they get on the car and they are thus enabled to read it while en route to their office. A great many of our passengers have commented very favorably on the enterprise of both the Read-Wyl-U-Ryd Company and ourselves. It is our opinion that the plan fills a long-felt want and the increase in the number of papers taken from the boxes each morning indicates their increasing popularity.

Thomas E. Howell, general manager of the City Railway, is also an advocate of the use of the system. In fact, the new system of vending the papers was the outcome of an order issued by Mr. Howell a year ago to keep all newsboys off the cars of that company. This order followed personal observation by Mr. Howell of a Dayton *Journal* boy who boarded a car at a regular stop, proceeded through the car and after selling several papers walked to the front, pulled the lever which opened the doors and jumped off while the car was in motion.

This order by Mr. Howell was a measure of self-protection by the railway manager, but it affected the circulation figures. Therein Mr. Howell had reckoned without taking into account C. D. O'Rourke, the circulation manager of the Dayton *Journal*. Mr. O'Rourke was quick to see Mr. Howell's stand from the safety point of view, and Mr. Howell was equally quick to see Mr. O'Rourke's point of view when the circulation manager suggested the self-service newspaper box idea, which Mr. O'Rourke has since fully developed.

New Interurban Rates Arranged

The Louisville (Ky.) Railway which operates the Louisville interurban lines as well, has arranged for a new form of tariff on its interurban lines. The rates are and have been on the basis of 3 cents a mile all along, but under the old method the fare to the city limits was figured at 5 cents. Now there will be a minimum fare of 7 cents figured from the city limits to any point inside of the city. From the city limits the lines will be divided into zones of one-third of a mile each, all stations within a given zone being given a number, which will also represent the amount of fare necessary to go to that station from the limits or from the city limits to the station. Then 7 cents is added to the station number on fares to the city depot. This system makes it easier for the conductor as well as customers to figure the fare, and is a more equitable basis for the customer in that the rate is 1 cent for a third of a mile plus the city fare.

Under the new plans going into effect on the local lines in the city of Louisville children under five years of age will be hauled free, the age limit having been raised from three years, at which it had been held probably from the time that street cars were first operated in Louisville.

Bargain Beach Days Increase Good Will

As an advertising feature and to give the families of workingmen a chance to enjoy the beaches, Claus Spreckels, manager of the San Diego (Calif.) Electric Railway, started "bargain beach days," when a flat rate of 10 cents for the round trip was granted every Thursday during August to any of the San Diego beaches. The move proved so popular that the first two Thursdays in September were also made "bargain beach days," and when Mr. Spreckels' attention was directed to the fact that many working people could not get away during week days, two Sundays in September, the tenth and seventeenth, also were included. This makes a round trip fare of 10 cents, from outer or inner zone, as compared with regular fares as follows: Coronado, outer zone, 25 cents; inner zone, 20 cents; Ocean Beach or Mission Beach, outer zone, 30 cents; inner zone, 25 cents.

Manager Spreckels announced that the plan had been a huge success and though it might not have shown a profit financially (returns not yet tabulated) it proved wonderful in adding to the good will toward the company.

Five-Cent Issue Falls Flat

Even ex-Governor Eugene N. Foss of Massachusetts Is Unable to Arouse People There—Issue Dead

Boston has had another 5-cent fare experience. It was promised by a number of politicians, including former Gov. Eugene N. Foss, that if they were elected to public office they would secure the 5-cent fare on the Boston Elevated. The side which had been clamoring for the nickel fare during the campaign did not figure very prominently in the primary election returns, but on Sept. 18 the issue came to a more clear-cut test.

PUBLIC HEARING POORLY ATTENDED

On that date the Massachusetts Public Utilities Department gave a public hearing on the 5-cent fare question, as directed by the Legislature, and found practically no representatives of the public on hand to advocate the idea. The commission waited a considerable time before anybody appeared at the hearing, except some railway officials, and Chairman Attwill commented on the fact that there had been so much talk about the fare reduction in the political campaign and now all the advocates of the issue seemed to desert it when a tribunal which had authority to act on it met to afford them an opportunity to discuss it on its merits. The commission had set aside two days, with two sessions each day, for the presentation of this cause, and nobody appeared to urge it or discuss it.

Only two speakers appeared. They were the city solicitor of Malden, who opposed the 5-cent fare as provided for in the bill which Mayor Curley of Boston presented to the Legislature, and the city solicitor of Somerville, who merely contended that a mistake was made in not holding the Boston Elevated Railway to the twenty-five year contract which provided for a 5-cent fare.

ISSUE WENT BY DEFAULT

Although the issue went practically by default the commission decided to give the public one more opportunity to come forward and discuss the fare situation, setting aside Sept. 21, for the purpose.

Council Condemns One-Man Cars

In a resolution passed by the Council of Clarksburg, W. Va., operation of one-man street cars in the city is condemned as being dangerous to life and health and as tending to reduce a service the public should have from a public utilities corporation. The city attorney was instructed to take such action as he deemed necessary against the Mongahela Power & Railway Company, which operates the electric railway system in this city.

Training Plan Successful

Efficiency Superintendent Describes Plan Which Has Improved Morale of Dallas Railway's Trainmen

Some time ago the Dallas (Tex.) Railway asked C. J. Crampton, director of the Dallas Chamber of Commerce, department of industrial efficiency and vocational training, to assist in the study and solution of its difficulties. Accordingly Mr. Crampton, who is now superintendent of the safety and efficiency department of the railway, made a detailed analysis of conditions and worked out, in lesson form, the various duties of trainmen. A capable superintendent of employment and training was employed with the understanding that he co-operate and carry out Mr. Crampton's plans. Employment tests were instituted. These included mathematical tests, general intelligence tests, sensory tests and sensory-motor tests. Each applicant was required to pass these before acceptance.

Twenty of the most expert motormen and conductors were selected as instructors. These men were ranked as "instructor," with a special cap band; their authority was increased. They were taught what to teach new men and how to go about the teaching. Instructors' meetings were, and still are frequently held. Students were sent only to regular instructors. A student under the new plan has but one instructor, who is entirely responsible for his training. This instructor takes him over every line in the city and teaches him all details of equipment and operation. Under this plan the time required to train an operator has been decreased from twenty to nine and ten days.

In writing about the system in the *Texas Industrialist* Mr. Crampton says that men trained under the new system are first taught to appreciate their job, and those who do not like it are encouraged to seek other employment at once. Courtesy and safety of operation are stressed at every point. After the student has mastered the duties of a trainman, he is approved by his instructor as fit for employment. He then passes a written examination which covers in detail the many phases of operation. These papers are preserved as an evidence, that he received proper training, and are an effective means of eliminating future excuses based on the plea of ignorance.

New men are employed for a three months' probationary period. During this time they report twice monthly to the superintendent of employment and training for review of their record and questions. At the end of three months' successful trial they are permanently employed.

Instructors are held responsible for the success of their students. Cumulative records are kept of each student and each instructor. On these records are noted such things as accidents, reckless actions, courtesy, unusual merit, etc. In this way the efficiency of instruction is stimulated and measured.

Mr. Crampton offers as a proof of the success of the plan statistics of traffic during the last State Fair. Approximately 50 per cent of the traffic during this period was handled by men trained under the new system. Traffic dangers were greatly increased by numerous strangers who were unfamiliar with the city. During the sixteen days of the fair there were only nineteen accidents that involved personal injury. None of these was serious. Not a bone was broken. On this basis the personal injury record represented one accident for each 190,000 passengers carried. On children's day, when free fair and railway tickets were provided, not a child was hurt.

Another Company Installs the Zone Pass

Since July 24 the Houghton (Mich.) County Traction Company has been using the unlimited ride, transferable weekly pass. The lines constitute what is practically an interurban railway, the chief headways being one hour or thirty minutes, although four cars an hour are operated between the twin cities of Hancock and Houghton.

Necessarily, the passes are sold on the zone basis. The rates are $0.98, $1.80 and $2.25 as against cash fares of 9, 18 and 27 cents respectively. Coincident with the installation of passes, S. B. Tuell, receiver, was permitted to discontinue the 8 cents per zone ticket rate.

As the passes were installed during the low-ride summer weeks and in a period of great depression, they have not yet had a chance to show what they can achieve in ride stimulation and revenue increase. However, with the pass sales equal to about 10 per cent of the total revenue, it is noted that the company without suffering any loss in revenue has been able to give a greatly decreased fare per ride to its regular customers. Walter Jackson co-operated with the receiver of the company in working out the rates and the publicity program.

May Adopt One-Way Traffic Plan

That one-way traffic in the city of Portland, Ore., must be tried in the congested district of the city was the consensus of opinion recently among City Councilmen. A resolution has been passed directing City Attorney Grant, Chief of Police Jenkins and City Engineer Laurgaard to make a survey of traffic conditions and prepare an ordinance requiring one-way traffic. The resolution was adopted without dissent. Mayor Baker introduced the resolution. Should the survey of traffic conditions develop that other reforms are necessary to relieve congestion on Portland's narrow downtown business streets such reforms will likely be included in the report. Although the plan of one-way traffic is expected to meet with some opposition, it appears that the Councilmen have determined to give it a fair trial.

Transportation News Notes

One Man Cars in Use.—The Port Arthur-Fort William Street Railway, Port Arthur, Ont., on Aug. 4 put into operation one-man cars.

One-Man Interurban Cars Started.—The Louisville (Ky.) Railway will start operating one-man cars on its Jeffersontown and Okolona interurban lines. Some of its cars have been remodeled so that passengers will enter and leave by the front door, and only one man will be required for handling the cars.

Traffic Decreases in August.—Figures filed with the Board of Public Utility Commissioners of New Jersey by the Public Service Corporation show fewer persons traveled on the company's lines in New Jersey in August than in July. Passengers in August numbered 34,370,155, compared with 36,666,407 in July.

15,644 Passengers to Bay View Beach.—According to the report of Superintendent Warwick of the Wisconsin Public Service Company on the operation of the Green Bay Park Railway leading to Bay View Beach, 15,644 passengers were carried in August. There were 9,758 paid fares and 5,886 passengers rode on transfers from city lines.

Three Cents a Mile Authorized.—The Indiana Public Service Commission has authorized the Union Traction Company to charge 3 cents a mile, with a minimum rate of 10 cents for rides within the city of Indianapolis. All traction lines entering Indianapolis now have a 10-cent fare. The old rate was 5 cents and placed the interurban lines in competition with the Indianapolis Street Railway lines.

Fares Reduced.—The Southwestern Traction Company, which operates an electric railway between Temple and Belton, Tex., with local service in both cities, has announced a 12 per cent reduction in fares between the two cities. The fare from Temple to Belton and from Belton to Temple has been reduced from 42 cents to 35 cents and fares between intermediate points in proportion.

Transfers to Settle Issue.—The Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., has informed the Borough Council of Morrisville that it is unable to run its cars from that place to Trenton, N. J. The Morrisville borough solicitor appeared before the Public Service Commission of Pennsylvania and asked that the company be made to run cars across the Delaware River Bridge. Minot J. Hill, general manager, stated that service was discontinued because the receipts did not meet operating expenses. The Pennsylvania & New Jersey Railway will issue transfers at 6 cents good on the Philadelphia line.

Personal Mention

D. J. Graham Goes to Youngstown

There's a new engineer of maintenance of way on the Youngstown (Ohio) Municipal Railway. He is Dale J. Graham, recently engineer with the American Steel Wire Company, Worcester, Mass., and before that with the Railroad Administration, and previous to that with the New York State Railways at Rochester, and before that with the Pennsylvania Railroad. This summary of Mr. Graham's activities accounts for all his time since he was graduated from the University of Pennsylvania in 1910 except two years with the Santa Fé Railroad in Kansas, Oklahoma and far Southern states. Mr. Graham's appointment was effective early in August.

J. P. Cantu is engineer maintenance of way for the Boston & Maine Railroad. F. A. Merrill formerly held this position.

J. F. McLaughlin is now superintendent of lighting and power of the El Paso (Tex.) Electric Railway, the position formerly held by Prentice M. Hatch.

R. E. Bowen is now associated with the Galveston (Tex.) Electric Company as purchasing agent. F. V. Schneider formerly had charge of this work.

F. C. Coley is now general passenger agent of the Providence, Warren & Bristol Railroad, Providence, R. I. A. B. Smith was heretofore general freight and passenger agent.

A. M. Lynn, of Pittsburgh, Pa., has been elected president of the Steubenville, Wellsburg & Weirton Railway, Wellsburg, W. Va. He succeeds R. B. Keating, who is now vice-president.

F. A. Bryan is now vice-president, instead of Henning Chambers, of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich. C. B. Calvert is secretary, filling the place formerly held by L. W. Botts.

C. B. Luscombe is now associated with the Western Light & Power Company, Boulder, Colo., as assistant general manager. Paul Lee is second vice-president. Paul R. Jones formerly held this post.

F. W. Walker has been elected a vice-president of the Milwaukee Northern Railway, Cedarburg, Wis. He continues his duties as general manager and chief engineer, which he has carried for some time. F. V. Benz now holds the position of purchasing agent, formerly held by Otto Maske, and more recently by A. Walker.

Joseph G. Gahm is associated with the Columbus (Ga.) Electric Company as student engineer. Mr. Gahm is connected with Stone & Webster, which controls the Columbus Electric Company. This company owns the Columbus Railroad, the Gas Light Company of Columbus and controls the Columbus Power Company.

Tudor W. Jones Acting Auditor

The appointment of Tudor W. Jones as acting auditor of the Union Traction Company of Indiana, Anderson, Ind., has been announced. The appointment was effective Aug. 15. Mr. Jones succeeds Walter Shroyer, who is now treasurer in place of W. H. Forse, who resigned.

Mr. Jones has been chief clerk in the accounting department. He knows the ways of the work, for since joining the company in 1905 he has held every position in the department. His experience also includes that as ticket agent at the Anderson station. This work he did from September, 1905, until March, 1906, when he was first affiliated with the accounting department. Since then his life has been a succession of promotions.

T. W. JONES

N. A. Sinclair Elected President

Changes in the personnel of the Cape Fear Railways, Raleigh, N. C., have been made recently. N. A. Sinclair of Fayetteville has been elected president to succeed H. L. Jones, of Norfolk, Va. He has assumed the duties of general manager in addition. L. H. Couch becomes vice-president and Alan Turner, secretary and treasurer. G. M. Wislar is in charge as superintendent. W. L. Jones was previously general manager.

Henry Sherman has been appointed chief engineer of the Tide Water Power Company, Wilmington, N. C.

W. C. Slade is superintendent of power and lines of the United Electric Railways, Providence, R. I.

E. W. Hodges is now auditor of the Pacific Gas & Electric Company, Sacramento, Cal.

George C. Wright is traffic manager of the Minneapolis, Northfield & Southern Railway, Minneapolis, Minn.

W. A. Baehr has been elected president of the St. Cloud (Minn.) Public Service Company, to succeed A. G. Whitney.

E. E. Sullivan is purchasing agent of the Marshall (Tex.) Traction Company, a position formerly held by J. E. Meadors. J. C. Kennedy is general manager.

J. C. Martin was recently elected president of the Fort Scott & Nevada Light, Heat, Water & Power Company, Nevada, Mo. He succeeds W. C. Gunn.

S. Murroy holds the position of chief engineer of the Yakima (Wash.) Valley Transportation Company. E. F. Kidder formerly was chief engineer for the company.

S. Fox is superintendent of power and H. W. S. Kelly is engineer of overhead construction of the Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio.

Obituary

Charles F. Franklin died at his home at Toledo, Ohio, on Sept. 18 after an illness of several weeks, at the age of sixty-three years. He had been retired from active business about five years. Mr. Franklin's first traction affiliation was with the Newburgh (N. Y.) Electric Railway (now the Orange County Traction Company), with which he served as superintendent from 1895 to 1899. He early saw the possibilities in handling freight by electricity and introduced the system on that property. Mr. Franklin later was superintendent of the Winona Interurban Railway, Warsaw, Ind., and president and general manager of the Toledo & Western Railroad, Sylvania, Ohio. The latter property was one of the pioneers in going into the freight business on a steam road basis, and through Mr. Franklin's influence and efforts many producers were induced to locate on the line, especially in towns not served by steam railways. Mr. Franklin is survived by his wife and five children.

R. L. Waddill, a director of the Texas Electric Railway, died at his home in McKinney following an operation. Mr. Waddill was interested in financing and building the interurban line promoted by the late Col. J. F. Strickland. He had been a member of the directorate since the line was built.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Large Steel Rail Orders Reported

Almost record tonnage orders for steel rails have been reported since the announcement by the Steel Corporation of an advance in price of rails to $43 on Oct. 1. Among the orders so far placed are said to be some sizeable ones for electric railways, but such business is of course a very, very small part of the total rail business of the country. So far as the steam railroads are concerned the orders actually placed were generally expected to exceed 300,000 tons by Oct. 1, when the advance in price becomes effective. At least one other large roller of rails has announced an advance to meet the increase by the Steel Corporation.

It is, of course, impossible to estimate with any real degree of accuracy the added cost to the electric railways during the next year of the advance in the price of rails, but the rail bill of the electric railways for the coming year will probably be up another $750,000 over the sum for the last year. This figure looks puny when compared with the levy of additional cost that will be exacted from the steam railroads, but to some electric railways the extra cost, while it may not be a great burden, will be quite a serious factor.

In 1921 there was nothing like the disposition among electric railways to go ahead with new and reconstruction work that has been manifested this year, but even last year 150 miles of new track were built in the form of extensions and 615 miles of track were rebuilt. The track rebuilt last year was only a little more than 1 per cent of the total mileage of the country, but the prospects early in this year were that the sum spent for rehabilitation and renewal work, to say nothing of extensions, would greatly exceed the total so spent for the last year.

Electrification of Mexican Road Proposed

Information has been received at Orizaba, Mexico, that at the recent annual meeting of the shareholders of the Mexican (Vera Cruz) Railway, held in London, England, provision was made for electrifying the 30 miles of mountain division of the road between Orizaba and Esperanza. The announcement of the proposed improvement came from Vincent W. Yorke, London, chairman of the board of directors. The electric power for operating trains on this portion of the line will be obtained either from the hydro-electric plant of Lord Cowdray and associates situated near Orizaba or an entirely separate plant will be built by the railroad, it is stated.

Mr. Yorke further said that at the shareholders' meeting the action of the Mexican Railway in obtaining a concession for a proposed railroad to run from a point on its Mexico City-Vera Cruz main line to Tampico was ratified and that financial provision for the early construction of this new line has been made. He announced that the cost of its construction would be approximately $8,000,000 United States currency. Both of these projects are to be carried out whether or not the administration of President Alvaro Obregon is recognized by England.

Plans for Louisville Improvements to Be Announced Soon

The Louisville (Ky.) Railway at meetings within the next few days will decide on just what expenditures the company will make in improvements to its power plants, and also what purchases of new cars and equipment will be made. The company has a considerable fund for improvements, held out from the difference between a 5- and 7-cent fare during some nineteen months that the higher fare was in the courts. It is planned to improve the power plant materially and to put on a number of one-man cars. Sam Riddle, vice-president of the company, stated that a definite plan for improvement of equipment, etc., would probably be ready for announcement within a week.

Reasons Given for Decline in Latin-American Trade

The decline in the trade of the United States with Latin America during 1921 is explained by the Bureau of Foreign and Domestic Commerce as being due to a number of factors, chief among which might be mentioned the highly inflated prices in 1920, which gave the impression that the volume of trade, compared with previous years, was larger than was actually the case; the overstocked markets, which were a result of the feverish buying in 1919 and 1920; the steady deflation in prices, which caused merchants generally to keep orders down to a minimum in the expectation of still lower prices; and the appreciation of the American dollar.

Some competition was encountered from other countries trading in the Latin-American field, but aside from the general depression experienced in all of these countries, the greatest obstacle to our trade was the high quotation of the dollar, which tended to throw trade to European countries, whose currency was in most cases greatly depreciated. The details of the United States trade with Latin America are given in the departments' *Trade and Economic Review* for 1921, No. 9.

Record Coal Loadings Reported

A total of 195,142 cars were loaded with coal during the week which ended on Sept. 16, according to reports just received from the railroads by the Association of Railway Executives.

Of this total, 175,326 cars were loaded with bituminous coal, an increase of 17,316 cars over the week before, when, however, there was a falling off in coal loadings due to the observance of Labor Day. The remaining 19,816 cars were loaded with anthracite coal during the past week, which was the first week of production since the recent agreement was reached between anthracite operators and miners.

On the basis of these loadings, coal production during the week ended Sept. 16 approximated 10,633,000 tons, of which 9,650,000 tons consisted of bituminous coal and 983,000 tons were anthracite coal.

A total of 5,088 cars were loaded with anthracite coal on Sept. 16, the largest number for any one day since operations were resumed in the anthracite fields, and 384 cars in excess of the preceding day. This was within 363 cars of the average daily loading in September last year.

Loading of bituminous coal on Saturday amounted to 25,073 cars, 2,798 cars below the preceding day. Coal loadings in the bituminous fields, however, always show a decrease on Saturday compared with other days in the week.

Easterners Negotiating for Barney & Smith Plant

It is said to be probable that the Barney & Smith Car Company's plant at Dayton, Ohio, will be sold to Robert J. McGare, New York. Mr. McGare was in Dayton on Sept. 14 to confer with Valentine Winters, president of the Winters National Bank and receiver of the car company. It was explained that all of the necessary machinery to resume car building is installed in the Dayton plant, one of the largest in the country.

Tenders Out for Bombay Electrification

It is reported that tenders have been asked in London for the electrification of the Bombay Suburban Railways. It is understood that the total expenditure will probably approximate £2,000,000.

Metal, Coal and Material Prices

Metals—New York	Sept. 19, 1922
Copper, electrolytic, cents per lb.	14.00
Copper wire base, cents per lb.	15.625
Lead, cents per lb.	6.10
Zinc, cents per lb.	7.00
Tin, Straits, cents per lb.	32.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.075
Somerset mine run, Boston, net tons	4 875
Pittsburgh mine run, Pittsburgh, net tons	4.625
Franklin, Ill., screenings, Chicago, net tons	4.425
Central, Ill., screenings, Chicago, net tons	3.625
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., cents per lb.	6.00
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	91.50
White lead, (100-lb. keg), N.Y., cents per lb.	12.50
Turpentine, (bbl. lots), N.Y., per gal.	$1.32

Rolling Stock

New Brunswick Power Company, St. John, N. B., has converted all its open cars into closed cars, thereby eliminating the necessity of purchasing additional rolling stock.

Wisconsin Public Service Company, Green Bay, Wis., will spend approximately $10,700 on the new one-man interurban cars which will replace the two-man cars now in operation. This improvement has been referred to previously in these columns.

Municipal Railway, San Francisco, Calif.—Contracts have been awarded by the city and county of San Francisco for twenty car bodies and their equipment. The bodies will be built by the Bethlehem Shipbuilding Company, Twentieth and Illinois Streets, San Francisco, at $152,520, the trucks will be supplied by the Standard Motor Truck Company at $28,551, the motors by the Westinghouse Company at $119,777 and the airbrake equipment by the Westinghouse Traction Brake Company at $11,008.

Washington Railway & Electric Company, Washington, D. C., has placed an order with the J. G. Brill Company for ten 28-ft. 5-in. closed motor car bodies. These cars will be equipped with automatic safety devices and are intended for one-man operation. The cars are different from the standard Birney cars, particularly in that they are to be mounted on maximum traction trucks with G. E. 257 motors and will have monitor deck roofs. The construction will be composite in that the underframe will be of steel and the frame of the superstructure of wood.

Track and Roadway

Wisconsin Public Service Company, Green Bay, Wis., has extended its line 2 miles to the West Walnut Street line.

Savannah Electric & Power Company, Savannah, Ga., has recently installed a new curve in the track at West Boundry and York Streets.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been granted a franchise to construct either a single or double track line on the Port Washington Road to Lincoln Park.

Gloucester, N. J.—The board of directors of the Gloucester, N. J., Chamber of Commerce has discussed a proposed belt line from one end of the city to the other. A survey will be made by an engineer to determine just where the line can best be run to connect with all manufacturing plants.

Ohio Valley Electric Railway, Huntington, W. Va., will make a big improvement in service on the Twelfth Avenue line by the installation of a switch between Eighth and Ninth Streets. Work on the switch which has been started may delay the service temporarily. The company's Sixth Avenue line is undergoing repairs.

Georgia Railway & Power Company, Atlanta, Ga., announced some time ago that it would begin immediately the repair work between the car tracks in Lee Street from Park Street to McCall's Crossing. F. L. Butler, general manager of the company, said that it was the purpose of the company to lay new rails between Park Street and Gordon Street.

Kansas - Oklahoma.—The proposed construction of an interurban railway which will link the Kansas coal fields with the lead and zinc deposits of northeastern Oklahoma has been announced by J. J. Heim, president of the Joplin & Pittsburgh Railroad. It is proposed to extend the line from Columbus, Kan., to Picher, Okla., a distance of 11 miles. The Chamber of Commerce at Columbus, Kan., has been asked to issue bonds of $20.000 to aid in securing the extension into Oklahoma.

Seattle, Wash.—A. E. Pierce, Construction Engineer of the Seattle Municipal Railways Department, announces that railway construction and maintenance work now proceeding in the city will total a cost of $1,250,000. The largest of the present undertakings is the retracking of First Avenue and First Avenue South, estimated to cost $250,000. Next year's renewal and reconstruction work is to cost approximately $824,460.

Kansas City (Mo.) Railways during the past few months has completed two track rehabilitation jobs. The first of these was the reconstruction of Eighth Street from Wyandotte to Broadway. This work, completed about Aug. 5, cost in the neighborhood of $14,000. The reconstruction of Grand Avenue from Twelfth Street to Fifteenth Street was begun on Aug. 1 and is to be completed this month at an approximate cost of $35,000. These improvement plans were referred to in the issue of July 22.

Power Houses, Shops and Buildings

The Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., has started work on its new terminal on Oak Street, Leamington.

Eastern Wisconsin Electric Company, Sheboygan, Wis., will spend $50,000 for the erection of a new carhouse and repair plant in Oshkosh to replace buildings burned in June.

United Electric Railways, Providence, R. I., has received permission from the town of East Providence to erect a large carhouse of brick on North Broadway, near Massasoit Avenue. It is planned to start construction in a few weeks and to have the structure completed by Jan. 1, 1923.

Boston (Mass.) Elevated Railway has awarded the contract to the Simpson Brothers Corporation, Boston, for the substructures and foundation work in connection with the construction of two 160 x 300-ft. and two 53 x 56-ft. car repair shops and a 80 x 731-ft. transfer yard, etc., to cost $3,000,000, at Everett, Mass. Dwight P. Robinson & Company, New York, are the engineers.

Salt Lake City, Utah.—Actual construction of the passenger depot of the Salt Lake Terminal Company at the southwest corner of West Temple and South Temple Streets will commence as soon as the necessary changes can be made in the drawings and contracts for the work let. The structure will cost approximately $200,000. This announcement has been made by W. C. Orem, president and general manager of the Salt Lake & Utah Railroad, which company, together with the Bamberger Electric railroad, forms the Terminal company. Sale of certain bonds upon which work on the building has been pending has resulted in the above announcement. Construction work is expected to be completed not later than next spring.

Trade Notes

National Railway Appliance Company, New York, N. Y., has moved its offices from 452 Lexington Avenue, corner of Forty-fifth Street, to the Transit Building, 7 East Forty-second Street.

The Ward Leonard Electric Company, Mount Vernon, N. Y., announces the appointment of Willis D. Bishop of Montreal, Quebec, as selling representative in the Province of Quebec. He has been closely identified with the design, application and sale of control apparatus and switchboards since 1904, and is therefore well qualified to represent the Ward Leonard line of electrical control apparatus.

Louisville Frog & Switch Company, Louisville, Ky., announces that F. W. Carter, formerly assistant manager of the heavy traction division of the Westinghouse Electric & Manufacturing Company, has now become president of the Louisville company. Mr. Carter was connected with the New York office of the Westinghouse company for four years doing heavy traction work.

Westinghouse Traction Brake Company announces that G. B. Pierce of St. Paul, Minn., has been appointed air brake engineer for the Far East and will sail for Japan in September to establish headquarters in Tokyo with W. G. Kaylor, manager of the Westinghouse Traction Brake and Westinghouse Air Brake interests in the Orient. Mr. Pierce will also represent the Westinghouse Air Brake Company. He will collaborate with Mr. Kaylor in a territory covering Japan, China, Manchuria and Korea. Mr. Pierce has been with the Westinghouse Air Brake Company as a mechanical expert in St. Paul for twelve years. He was formerly a locomotive engineer and acting road foreman of engines on the Montana division of the Northern Pacific Railroad. One of Mr. Pierce's chief duties in the Orient will be that of instructing railway employees in the operation and maintenance of Westinghouse brake equipment.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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Prompt Report of the Convention Assured

ALTHOUGH the convention this year will be held one thousand miles from New York and the sessions of the affiliated associations will not be finished until late Thursday afternoon, the *Electric Railway Journal* expects to publish its first report number on Saturday, Oct. 7. This number will contain a report of all the meetings of the American, Transportation & Traffic and Engineering associations, including in the report of the Engineering Association the joint meeting of the Engineering and Accountants' associations. The report of the Accountants' meetings, it is expected, will be published in the issue of Oct. 14 and that of the Claims Association in the issue of Oct. 21. This division is to be adopted because of the large amount of material which has to be published.

As in former years, a verbatim report of the meetings or the publication of the reports and addresses will not be attempted. Those who need the full report of these meetings will be able to find it in the proceedings of the various associations when published. The reports in this paper should, however, give to the reader a clear idea of the important matters taken up at the Chicago convention, both in the formal addresses and reports and in the discussion which takes place on the floor.

This paper acknowledges the assistance which it has received from many sources in preparing for its report issue. A large number of those who expect to present reports or addresses at Chicago have furnished advance material. The assistance of the executive secretary of the association and his staff is also acknowledged.

Advance Distribution of Convention Reports Can Be Overdone

HERETOFORE the American Association has been lavish in the distribution of advance copies of papers and committee reports. This was done in the hope (a partly vain one) that the pamphlets would be carefully read in advance. The practice was, theoretically, commendable, but practically its efficiency was low. With all the coaxing that could be done it was difficult to get "copy" for these advance publications until perilously near convention time; thus the packages arrived at the offices of busy executives just when they were trying to clear their desks for a few days absence. With two or three reports in which they were individually interested came many for which they did not care a rap.

This year every one who wanted advance copies got them by the simple expedient of asking for them. The engineers received all of their technical committee reports, anyway, because these consisted largely of specifications and other details which positively cannot be taken up in detail at the meeting. Votes, to be intelligent, must be based on information, hence the wisdom of this particular distribution. Of course, all persons invited in advance to take part in discussion, also received advance copies. It would appear, then, that the attendants at the convention will be as well prepared as ever to discuss topics on the program and, judging by the splendid work done by the committees, the discussion ought to be a huge success. A lively discussion not only "heartens" a committee, but brings out practical information in support or rebuttal.

Detroit Municipal Discovers Way of Reducing Operating Expenses

ONE of the advantages claimed for municipal ownership and operation of street railways is that funds for their capital account can be borrowed at lower rates than if the enterprise were owned by individuals. Thereby, the advocates of municipal ownership point out, an immediate saving is secured in the overhead charges. Of course, broadly speaking there is no saving in this ability to use public credit to conduct a business enterprise. Municipal bonds sell at a lower interest rate than bonds of private corporations for two reasons only. One is that their principal and interest are exempt from taxation. The other is that taxation can be depended on to make up a deficiency in earnings if any should exist. Neither of these has any real economic merit because the burden is shifted, not removed. Freedom from taxation simply means that taxes have been taken from one enterprise to be laid on another, while the presence of public credit in a municipal project is an added burden to the citizens and may often be quite costly to those who pay taxes.

Reports from Detroit this week indicate that still another short road to a favorable income account for the municipal railway there has been discovered. This is to transfer to the city the cost of constructing and maintaining pavement between the car tracks that was formerly paid by the railway company. Mayor Couzens has recommended this to the Council, which has approved it, and it will now be placed before the voters as a charter amendment at the November election. The statement is made in Detroit that this will save the municipal street railway system several millions annually. It is rather amusing to note that in advocating this plan in his message to the Council, the Mayor points out that the former method was an inheritance from the horse car days, when the horses wore out the pavement, but at present it makes no difference to the car rider whether there is any pavement between the tracks or not.

Now this may be a very good reason why the city should relieve the railway system of the paving burden, and there may be other reasons, but would this amendment have been indorsed by the Mayor and Council and submitted to the voters if the Detroit United Railway was still operating the line and put forward these same arguments?

More Speed—More Economy—More Revenue

IN MANY of the smaller cities it is our observation that the street railways are suffering from needlessly slow schedules. There is about the entire operation an attitude of leisureliness that in the aggregate makes a very expensive operation and one that not only does not attract patronage but actually inspires disgust with the service. It is obviously such a wasteful practice that it is hard to understand how any management could permit the condition to exist. Yet it is not uncommon. More speed—more snap generally to the service—would mean more car-miles per car-hour. This could be translated into fewer platform-hours to pay for, or, better, more service with no increase in platform time. On either basis, that is, more rapid service with no change in headway, or more rapid and more frequent service, the number of riders carried would be practically certain to increase. For in the smaller cities so many of the movements of the people are within easy walking distance that either infrequent or slow service tends to lose many fares that frequent and rapid service would secure. It is difficult to find any satisfactory explanation why the average miles per hour schedule speed should not be as great in the small cities as it is in the larger ones, yet the speed in the latter is almost invariably higher. The traffic congestion the smaller company must contend with is less, the loading lighter and the number of stops per mile fewer. The reason seems to lie in the attitude of mind of the management and men—a thing readily improved if attention is turned to it.

Interest in Pulverized Fuel Is on the Increase

A SIGNIFICANT development in the power field in recent months has been the renewed interest in the burning of coal in pulverized form under power plant boilers. There are now several systems available for this purpose and much credit for their persistence in overcoming great obstacles is due the engineers who have seen the possibilities of this kind of firing. The high prices of coal have forced attention to boiler room economies, and, naturally, the first possibility to suggest itself is that of increasing furnace efficiency. Adaptation of stoker and furnace construction to the kind of fuel available is the problem before the combustion engineer. This is the foundation of combustion engineering.

One unsettling feature in this whole situation has been the variation in the quality of the coal available for a given plant. And at the same time electric railway managers have been looking around to see if cheaper grades of coal than their present ones cannot be had. These facts, especially the latter, have had the result of making easier the securing of orders for pulverized fuel equipment. The orders indicate that the hesitancy in taking so radical a step as that involved in changing to pulverized fuel is passing. This hesitancy has been due to the comparative newness of the development, but as the working exhibits increase in number engineers have an opportunity to do as is their wont, namely, visit the plants now operating and study their operation in person. The result is one convert after another.

The present interest in the burning of pulverized fuel is due to its novelty. In due course it will find its own sphere and will take its place as a possibility whenever the layout of a boiler furnace plant is considered.

Committees Deserve More Thanks than They Usually Get

THOSE railway men who have seen the mass of reports issued from the American Association office in connection with this year's convention have some concept of the volume of work done by the committees during the past year. These committees do an educational and professional service for the industry which is only dimly visualized by many. They prepare for their fellow workers helpful material which would cost large sums to get in any other way, and they supplement the activities of the technical press in the electric railway field. These journals necessarily cover a wide range of topics and can give only limited space to details such as specifications. There is no limit to the reasonable size of the reports and a few always run to considerable size. The committeemen form a consulting staff five hundred strong. Those who remain at home as well as those who attend the convention profit by their labors.

Plain Span Overhead in High-Speed Service

ONE of the interesting things about the physical plant of the Chicago, North Shore & Milwaukee Railroad in relation to the remarkable development of the business of the company is that the plain span type overhead designed for a comparatively slow-speed service is still being used with good success in what has come to be very high-speed service. Part of the ability to get along under these circumstances is no doubt attributable to the development of the sliding shoe trolley, which is undoubtedly far superior to the wheel for fast train operation from the standpoints of quietness within the car, freedom from dewirement and consequent delay, and wear on the trolley wire and ears. But the main lesson to be derived from the experience of the North Shore Line is not that direct suspension construction has been proved satisfactory, but rather that a company can give reliable, popular, high-speed service in spite of this handicap. It has been accomplished at the price of persistent and painstaking maintenance and inspection. The plain span must be kept in a high state of repair. Even so it is not ideal. This accounts for the fact that a catenary system will probably some day be strung on this line.

The Toonerville Trolley—It Meets All Trains

FONTAINE FOX, with his inimitable humor, has made a national character of the skipper and his Toonerville trolley. Railway men have not always relished the puns upon their kind of service but they have had to laugh at the predicaments of the skipper and the picturesque postures of the very little car. Too, they have sometimes feelingly sympathized with the skipper in his adversity. But underneath all the humor, is there not a characteristic of the Toonerville service in which railway men can take pride and use in countering the friend who compares the trolley in real life with that in the cartoons? The "Toonerville Trolley" is a joke, but don't forget that "it meets all trains," for that bespeaks the great dependability of the service. Whatever other attributes a trolley line may have, lack of reliability would be the final censure. But as long as the service is ever available and dependable, as that pictured, oblivion is not in the offing for the trolley.

Conclusion of the discussion begun in last week's issue on the performance experience with successive car designs in Chicago—The section this week treats of the cars purchased since the three-year rehabilitation period ending with 1909, including the near-side cars, trailers and one-man cars

Developing Chicago's Street Cars

By WRAY T. THORN

Assistant Engineer Cars and Equipment
Board of Supervising Engineers, Chicago Traction

THE cars added to the rolling stock equipment of the Chicago Surface Lines since the end of the three-year, or rehabilitation period, have been varied in design and equipment. They will be treated in the general order in which they were acquired as indicated in the table published last week with the first half of this article.

The group of 215 double-truck arch-roof cars added in 1912 may be subdivided into two groups, one of seventy-one cars with an over-all length of 44 ft., and one of 144 cars, 45 ft. in length over all, the only difference being in length of platforms. They were planned in general for service on the lighter trunk and crosstown lines and therefore were restricted in length to the dimensions above stated. These cars are interesting because they mark the adoption of the arch roof as standard car construction for Chicago.

An attempt was also made for the first time to break away from the use of four 40-hp. motors when equipment of somewhat lesser capacity would perform the service. Hence these cars have four-motor equipments, each motor rated at 35 hp. at 500 volts. They are also the first lot of cars to be built in the companies' shops since the 1907 ordinances. A plan, elevation and section are shown in Fig. 4.

The arch roof is supported by light-weight pressed steel carlines of sufficient depth to provide an air chamber for use with the motor-driven exhaust fan ventilation system, as will be seen from the cross-section. The concave-convex car sides are again employed with top and bottom wood side panels separated by a guard rail. The sash in these cars are made of brass as it was then evident that the steel sash used previously would not meet expectations. While the first cost of the brass sash was rather high, it was felt that this would be justified by reason of the saving in the cost of refinishing at overhauling periods. It was planned to let these sash take a natural finish, and thereafter no more work on them would be necessary.

SEAT SPACING AND EQUIPMENT OF 1912 CARS

The sectional plan shows the seating arrangement, and it will be noted that the cross-seats are placed on 30½-in. centers. This was done to provide the required seating capacity in the comparatively short car body and at the same time allow for a generous length of longitudinal seat cushions.

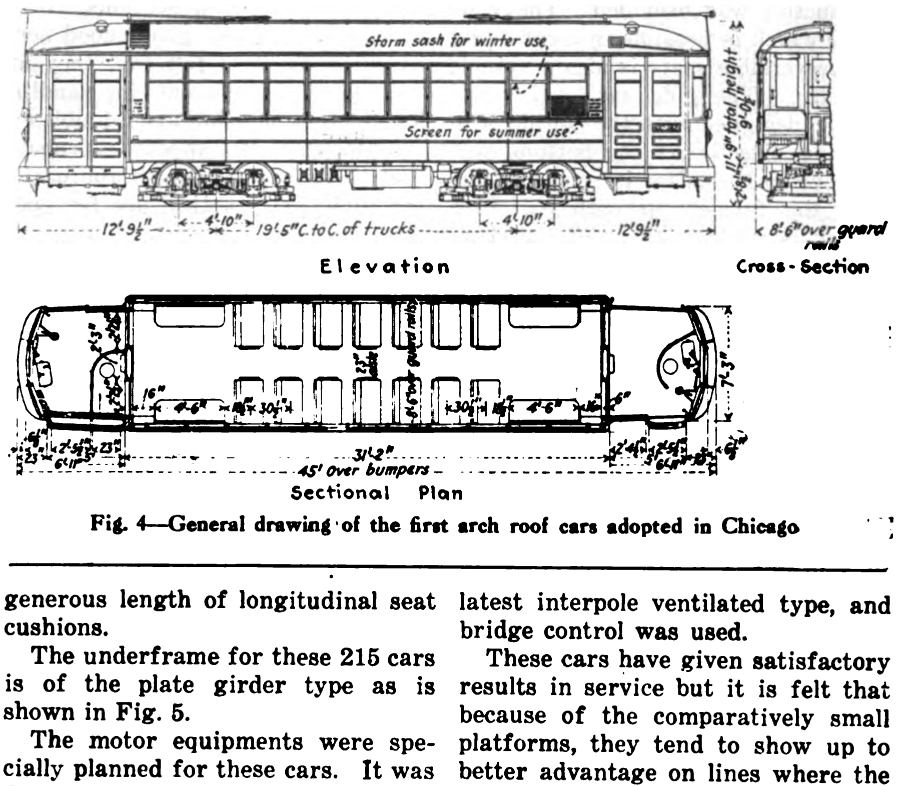


Fig. 4—General drawing of the first arch roof cars adopted in Chicago

The underframe for these 215 cars is of the plate girder type as is shown in Fig. 5.

The motor equipments were specially planned for these cars. It was desired to obtain a four-motor equipment which in capacity would be in keeping with the size of the cars. Formerly when a four-motor equipment was selected, practically the only choice for street railway service was a motor rating 40 hp. at 500 volts, whether the car weight to be handled (less motors) were 15 tons or 20 tons. Since these cars were to be comparatively light in weight, about 18 tons (less motors) as compared to former cars of about 22 tons (less motors), it was felt that a motor of somewhat less capacity, and therefore lower weight than those used on the large cars would be suitable. Motors rated at 35 hp. each at 500 volts were therefore secured, or a total of 140 hp. per car, which gives substantially the same rating in motors per ton of car weight for these cars as for the heavy cars. The motors were of the latest interpole ventilated type, and bridge control was used.

These cars have given satisfactory results in service but it is felt that because of the comparatively small platforms, they tend to show up to better advantage on lines where the traffic is not very heavy.

During 1911 new developments in car design known as the "near-side" car came out. One of the Chicago companies desired to make a thorough try-out of the "near-side" car and the Board of Supervising Engineers authorized a trial on a scale large enough to equip an entire line, as it was not thought a fair test to mix new and old types of cars on the same route. Accordingly 125 near-side cars were purchased in 1912.

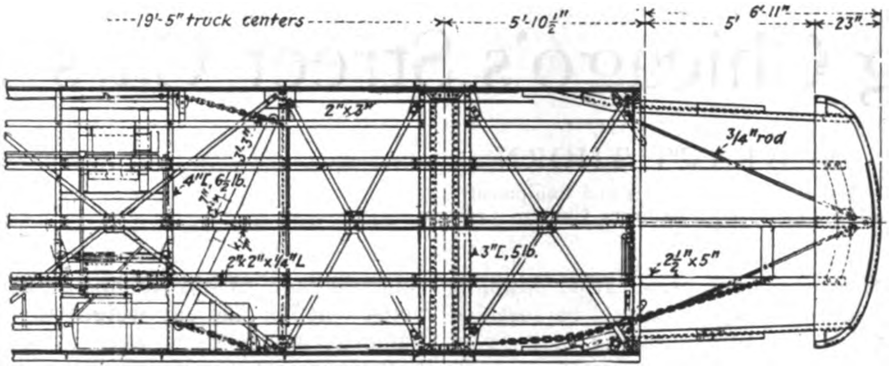


Fig. 5—Underframe construction of the 215 cars of 1912

These cars mark the introduction into Chicago of the maximum traction truck, and also the first lot of cars with the entrance as well as exit closed when the car is in motion. On these cars was also used for the first time in Chicago the ramp in the car floor, making possible lower car steps. An emergency exit door at the rear, under the control of the conductor, was provided. The wide aisle which is possible in a car using non-reversible seats is also a notable feature. The side sash raise and are so designed with the Gothic sash resting directly on the bottom sash that when the latter is raised it carries the former up with it. Provision is made in the roof structure so that both top and bottom side sash can be raised up to the level of the letterboard, making this a semi-open type car. As an additional convenience to the public these cars were fitted at the front end with special route signs of the roller type and illuminated at night. The arch roof used contributed to the light weight of these cars as compared to earlier cars. Other reasons for the light weight were: One platform only; maximum traction trucks; two-motor equipment, and single-end control.

CARS CONSTRUCTED WITHOUT THE CUSTOMARY BULKHEAD

These cars are also constructed without the customary bulkheads so that the platform, which is fitted with folding doors, closed when the car is in motion becomes virtually a part of the car-body space. The platform folding entrance and exit doors are operated by the motorman. The conductor is stationed opposite the entrance and against the platform side inclosing structure, and his duties are limited practically to the collection of fares.

The underframe of these near-side cars is of all-steel construction with cast-steel body bolsters. The design is a combination of girder and over-truss type, the overhang of the platform being carried largely by the over truss. Diagonal bracing is amply provided and thoroughly riveted in place. The crossings are of lattice bar construction which permits a somewhat stiffer member for equal weight as compared to rolled sections.

These cars have given good service although it is felt that they are not quite as efficient in handling heavy traffic as the large double-end equipment. It appears probable that their over-all length approaches the limit for practical use for operation as a single-end car, because it is not always possible to get good distribution of the passenger load and full use of the carrying capacity in the peak hours. The time for handling passengers also appears to be somewhat greater than for the large double-end cars. Single-end equipment is further handicapped by the necessity for loops or wyes at terminals.

In 1913 one of the companies added 100 more double-truck double-end pay-enter cars to its passenger equipment. These cars were constructed with arch roof and equipped with maximum traction type trucks. A general plan, elevation and section are shown in Fig. 6. The seating arrangement is somewhat different than that used in previous equipment, the plan being to provide the maximum possible seating capacity in the car, including the platforms. To accomplish this result the platforms are equipped with seats which are folded up out of the way in the rear end of the car. The platforms are provided with folding doors and steps which on the rear are manually controlled by the conductor. The motorman controls the front exit door as on previous equipment.

The arch-roof construction was adopted for these cars following its successful use on the 215 cars and the near-side equipment. The saving in weight and the light roof made possible by this design were strong factors in its continued use. To reduce step heights, the car-body floor is sloped downward from the bolsters to the end sills, saving about 3 in. in floor height. The slope is at the rate of about ½ in. to the foot and has been found satisfactory in service.

The cross-section shows the concave-convex car side design used again in these cars, and the wood panels are not covered with steel plates. The upper roof structure is constructed so that the lower side sash of comparatively great height can be raised up to the level of the

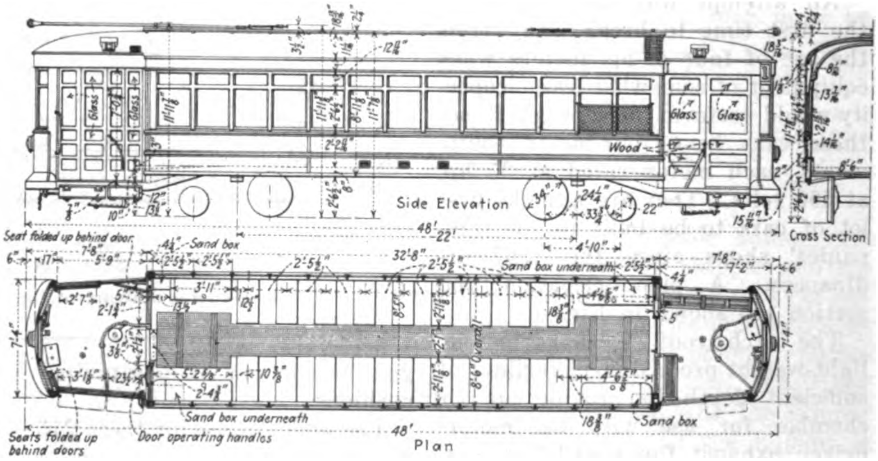


Fig. 6—General drawing of the 1913 cars

bottom of the upper or Gothic sash. This gives a maximum side window opening for summer operation.

200 Cars of 1913-1914 Were Larger and Introduced Straight Sides

By 1913, owing to the increase in business, the need of the companies for additional passenger equipment capable of rapidly handling the traffic on heavy lines was felt. It was therefore decided to purchase 200 more cars which should have the platform facilities and carrying capacity of the largest cars on the system. These cars were built according to the general plan, elevation and section shown in Fig. 7.

The arch roof is suported by pressed steel carlines of deep section similar to the 215 cars of 1912. This construction provides a light and stiff roof structure. The open space between the roof and the ceiling is used as the exhaust chamber of the motor-driven fan ventilation system. The plan shows the seating arrangement which is laid out to give maximum seating capacity and at the same time provide for the rapid movement of passengers. Folding platform seats accommodating a total of five passengers are installed on these cars. The double sliding doors in the body end bulkheads and the cross-seat spacing of 30 in. result in securing maximum seating capacity in the car body. The platform is arranged to facilitate the rapid movement of passengers, and in size is practically the same as that on the largest (1908) cars. The platform folding doors remain in the open position on the rear end of the car, which facilitates the rapid handling of passengers.

The folding step on the exit side of the front platform is operated in conjunction with the exit door, both of which are controlled by the motorman. The folding step on the entrance side is folded up with the closing of the folding doors so that on the blind side of the car there is no opportunity afforded for stealing a ride. A ramp of 2½ in. is built at each end of the body floor from the bolsters to the end sills to make the steps that much lower. The slope in this ramp is about ½ in. to the running foot and it has been found satisfactory in service.

These 200 cars are notable as they introduced in Chicago car design, the "straight side" body, in which the car side from the bottom sill to the windows is of steel and is also the load-carrying girder of the car framework. It is obvious that this construction makes possible the most economical car structure as to weight, because of the maximum depth of girder and the elimination of duplicate parts in the side framing.

The underframe for these cars is shown in Fig. 9.

These 200 cars were very carefully designed with a view to producing a car of the least weight consistent with good design, and the result is seen in the very low weight of less than 36,000 lb. for a complete car having the capacity of the largest equipment on the system. These cars have given satisfactory service in the efficient handling of very heavy traffic.

To provide the necessary equipment to meet traffic growth, 228 double-end cars of large carrying capacity and capable of handling the traffic on trunk lines were added in 1914-1915. These were very similar in exterior appearance to the 1913-1914 cars shown in Fig. 7. The

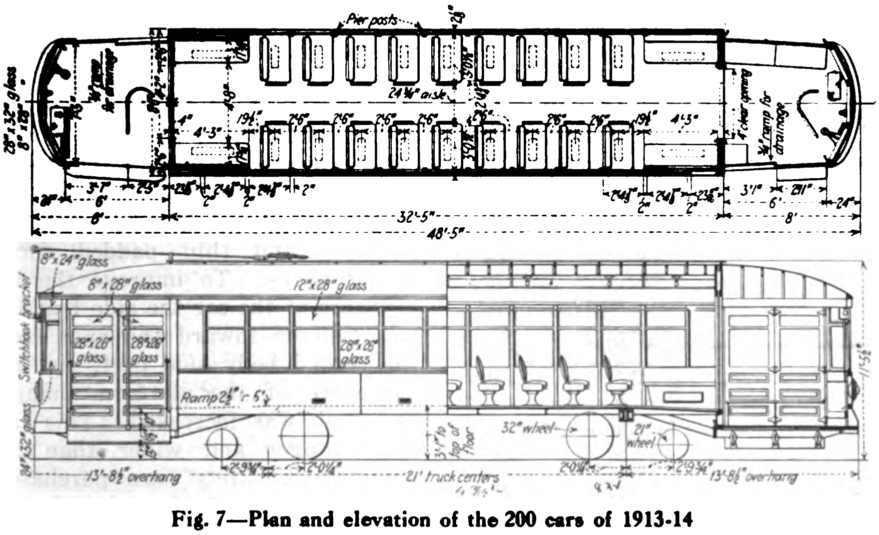


Fig. 7—Plan and elevation of the 200 cars of 1913-14

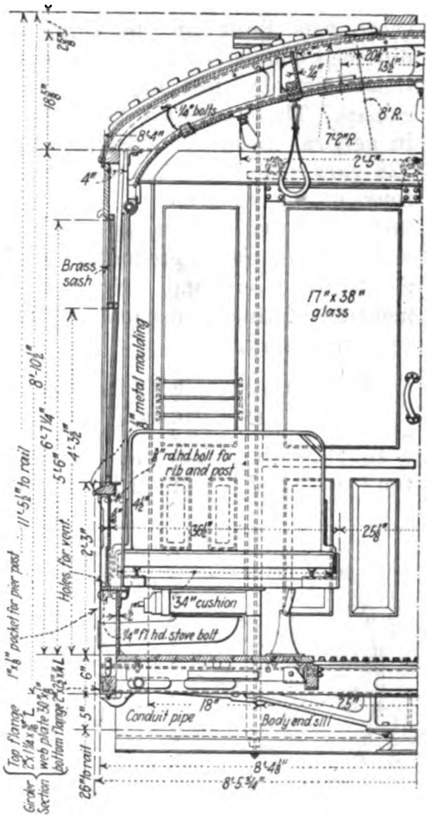


Fig. 8—Cross section of first straight-side car

floor plan is very similar to that used for the 100 cars added in 1913. Fig. 6.

The cross-seat spacing is 2 ft. 5½ in., in order to get the maximum seating capacity in the allowed body dimensions. The straight side car construction with steel girder from bottom sill to side window opening adopted in 1913 was again followed in this equipment. In order to provide low steps a 3-in. ramp was placed in the body floor from the bolsters to the end sills, the slope being approximately ½ in. to the foot.

The underframe is shown in Fig. 10. All load-carrying members are of steel and the body bolsters, following standard Chicago practice, are of cast steel. The underframe is thoroughly cross-braced so that it will withstand side swipes and vehicle collisions without getting out of alignment. The substantial and neat construction of this underframe is evident from the drawing which shows the strongly built platform structure, designed to carry the heavy loads of peak service without sagging.

The weight of these substantially built cars was kept to the reasonable figure of 40,180 lb. These cars have been operated on important routes and the service results have been satisfactory.

Following the cars just described,

there was built by the companies nineteen double-truck cars to replace those lost by fire or from other causes. These cars are very similar in general layout and design to the 228 cars just described except that four motor equipments were used instead of two motors, as the trucks and motors for four-motor equipments were on hand. No extended mention of this equipment is therefore necessary.

THE SAFETY CAR INTRODUCED IN CHICAGO

In 1920 the companies purchased ten so-called standard one-man single-truck safety cars for trial. They were placed in operation on outlying routes where the traffic was within their capacities. They have given quite satisfactory results. Experience with these has indicated, however, that they possess certain limitations. The important ones are:

1. Excessive time for passenger interchange due to single narrow doorway which must be used by both boarding and alighting passengers.

2. Congestion in the cars due to narrow aisle and limited space at the ends of the car for passenger movement.

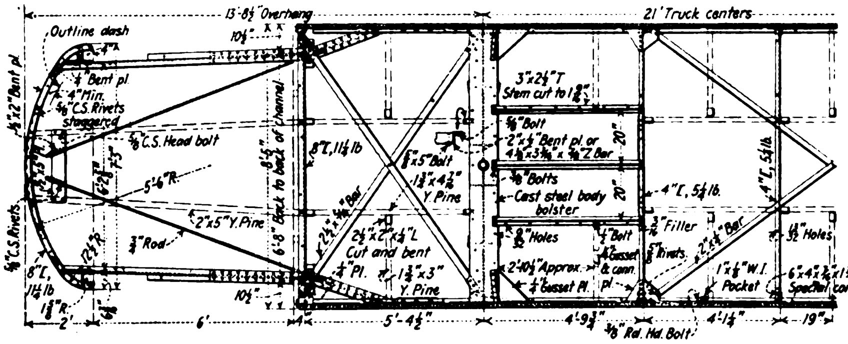

13'-8½" Overhang
21' Truck centers
Outline dash
10½"
¼" Bent pl
4" Min.
⅝" C.S. Rivets staggered
⅝" C.S. Head bolt
5'-6" R.
2"x5" Y. Pine
¾" Rod
8" [, 11¼ lb
6'-8" Back to back of channel
2½"x2"x¼" L Cut and bent
¼" Pl.
1¾"x3" Y. Pine
1¾"x4⅞" Y. Pine
⅝"x5" Bolt
3"x2½" T Stem cut to 1⅜"
⅝" Bolt
2"x½" Bent pl. or 4⅛"x3⅛"x⅛" Z Bar
⅝" Bolts
Cast steel body bolster
2'-10½" Approx.
¼" Gusset Pl.
4" [, 5¼ lb.
3/16" Filler
1"x⅛" W.I. Pocket
6"x4"x⅞"x1⅛" Pl. Special conn.
⅜" Rd. Hd. Bolt
2'
6'
5'-4½"
4'-9¾"
4'-1¼"
19"

Fig. 9—Underframe of first straight-side car, 1913-14

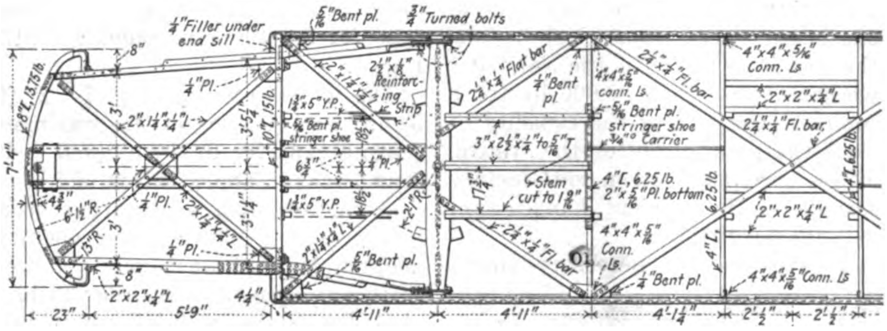

¼" Filler under end sill
5/16" Bent pl.
¾" Turned bolts
8"
8" L, 13.75 lb.
7'-4"
¼" Pl.
2"x1¼"x¼" L
3'-5¼
10" [, 15 lb.
1¾"x5" Y.P.
5/16" Bent pl. stringer shoe
2½"x⅛" Reinforcing Strip
2¼"x¼" Flat bar
¼" Bent pl
3"x2½"x¼" to 5/16" T
Stem cut to 1 9/16"
4"x4"x5/16" conn. Ls
5/16" Bent pl. stringer shoe
¾" Carrier
4" [, 6.25 lb.
2"x5/16" Pl. bottom
2¼"x¼" Fl. bar
4"x4"x5/16" Conn. Ls
2"x2"x¼" L
6'-1½" R.
13" R.
2"x2"x¼" L
23"
5'-9"
4¼"
4'-11"
4'-11"
4'-1¼"
2'-½"
2'-½"

Fig. 10—Underframe of 228 cars of 1914-15

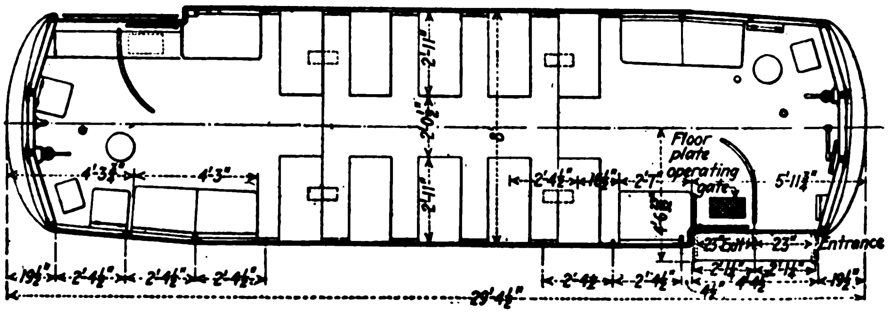

2'-11"
2'-0½"
8'
2'-11"
4'-3½"
4'-3"
2'-4½"
16½"
2'-7"
Floor plate operating gate
5'-11¾"
4'-6"
23"
23"
Entrance
19½"
2'-4½"
2'-4½"
2'-4½"
2'-4½"
2'-4½"
2'-11"
2'-11"
19½"
29'-4½"

Fig. 11—Floor plan of one-man single-truck safety car designed by Chicago Company

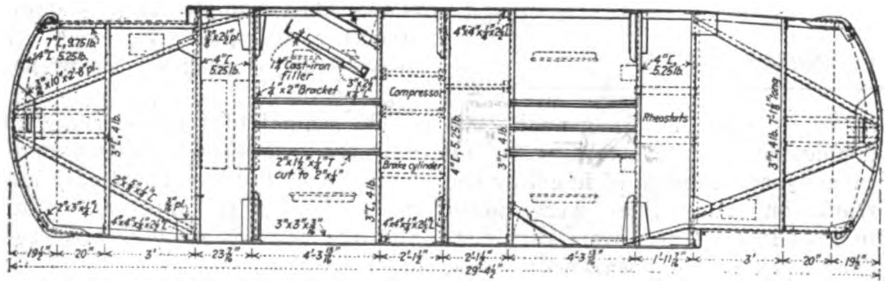

7" [, 9.75 lb.
4" [5.25 lb.
⅜"x10"x2'-8" pl.
3" [, 4 lb.
2"x⅝"x¼" L
2"x3"x¼" L
4"x4"x⅜"x2½" L
4" [, 5.25 lb.
¼" Cast-iron filler
¼"x2" Bracket
2"x1½"x¼" T cut to 2"x¼"
3"x3"x⅜"
Compressor
Brake cylinder
4" [, 5.25 lb.
3" [, 4 lb.
Rheostats
3" [, 4 lb. 7'-1⅛" long
19½"
20"
3'
23 7/16"
4'-3 13/16"
2'-1½"
2'-1½"
4'-3 13/16"
1'-11 7/16"
3'
20"
19½"
29'-4½"

Fig. 12—Underframe construction of single-truck one-man safety car designed in Chicago

3. Light framing construction which results in considerable damage even in comparatively light collisions.

It was therefore decided to construct and thoroughly try out in service a single-truck safety one-man car which would be free as far as possible from the above limitations and yet not exceed in weight that of the ten safety cars already in operation. A sample car was therefore designed under the direction of the superintendent of shops and equipment, with the approval of the board, and constructed in the company's West Side shops. A detailed description of this car was published in *Electric Railway Journal* for Jan. 14, 1922, page 65. The floor plan is shown in Fig. 11 and the underframe in Fig. 12.

The notable features of this car is the double doorway at the ends, providing for the simultaneous movement of entering and leaving passengers; operation of the folding doors for both doorways at the same time by one movement of the brake handle; a car width of 8 ft. in order to provide a wider aisle; and a seating capacity of thirty-six with a total weight of only 16,375 lb. In order to insure the proper use of the doorways by passengers and to simplify the work of the operator, the exit passageway is provided with a swinging gate or barrier, opening outward only, and released by the weight of a passenger standing on a floor plate or treadle. This treadle is located so that when a passenger desires to alight he must stand on it as he approaches the exit door. By the use of longitudinal seats at the ends of the car body and a wide aisle, provision was made for the expeditious and easy movement of passengers. The seats have spring cushions and thin padded form-fitting backs. To improve the appearance of the car the side framing was tapered toward the ends from the second body side post, and the curvature of the platform bumper and dash was increased. This car, while longer and wider than the single-truck safety cars purchased, weighs less. The reduction in weight was accomplished by close attention to all details of design and by a redistribution of weight as compared to the cars purchased. In this sample car more weight was put into the bottom framing and less into the superstructure, resulting in a lighter and stronger construction and a car better able to withstand collisions with vehicles and other equipment.

This sample single-truck, double-doorway, one-man safety car has been in service since September, 1921, and has satisfactorily overcome the limitations of the ten purchased safety cars. At points of heavy passenger interchange, those entering and leaving are separated with no special supervision from the operator and the length of stop is shortened as compared to the single-passageway car.

TRAILERS INTRODUCED IN 1921 WITH 101 CARS

A thorough investigation of trailer operation having been made, it was decided, with the approval of the board, to build a double-truck trailer in the company's shop, and give it a thorough service trial. The car was built and placed in service in June, 1920, and was in trial operation for more than nine months. It proved successful and so fifty additional cars of the same design were built in the company's shop and fifty others purchased. The design of these cars was thoroughly treated in an article in *Electric Railway Journal* for July 17, 1920, page 110.

For hauling trailers for peak service only it was thought that one of the large double-truck cars of the 1908 class would have the necessary reserve capacity. One of these cars was equipped with couplers, air-operated doors, and the other electrical and air brake equipment required and it proved satisfactory for hauling a trailer in rush-hour service.

The trailers are of the double-truck, double-end, center-entrance type. The general floor plan is shown in Fig. 13 and the underframe construction in Fig. 14. The total weight of these cars, completely equipped, less passengers, is approximately 26,000 lb.

The plan shows the general arrangement of the seats and the loading platform or well at the center of the car. The loading platform or well, 15¾ in. above the top of rail, is of generous dimensions and is reached with one step so that passengers are very rapidly handled. The double sliding doors, each operated by a pneumatic engine, are controlled by a hand valve located convenient to the conductor's position. A ramp in the car floor of approximately ½ in. per foot makes possible the easy step from the street into the well.

The underframe is of the deep plate girder type with steel framing around the center door opening. Crossings are of steel sections and body bolsters are of cast steel. Ample cross bracing is provided, and the rounded end framing is substantially built so as to stand up in collision. The superstructure above the belt rail is constructed principally of wood, following the usual design in cars for Chicago service. These trailers have met with the approval of the riding public and have contributed in no small degree to a considerable improvement in service, especially during the peaks.

While the one-man single-truck safety car built by the company has given satisfactory results, it was felt that the field of the single-truck car under Chicago service conditions is rather limited. It is also impractical to get a single-truck car which will ride as easily as a car equipped with double trucks. Furthermore, the larger car body which can be mounted on double trucks gives the carrying capacity required to meet the wide range of operating conditions which exist in large cities. It was therefore decided to construct in the company's shops a double-truck, double-end, one-man safety car and

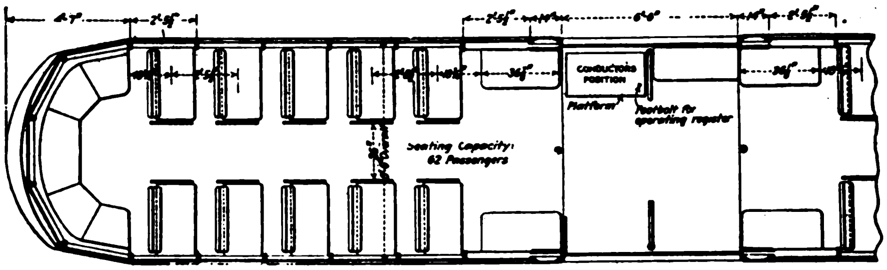

4'-7"
Conductor's position
Platform
Footbolt for operating register
Seating capacity: 62 Passengers

Fig. 13—Floor plan of 101 Chicago trailers

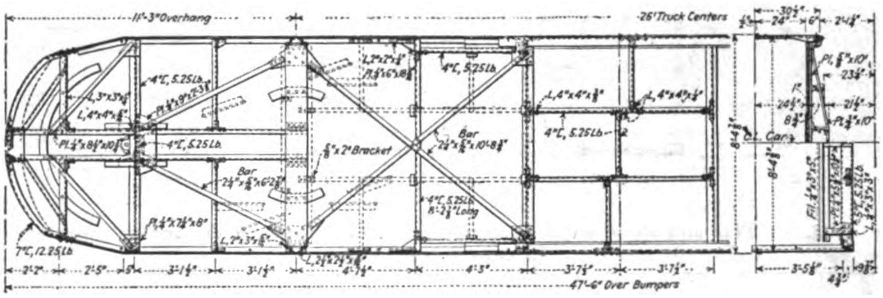


Fig. 14—Underframe construction of Chicago trailers

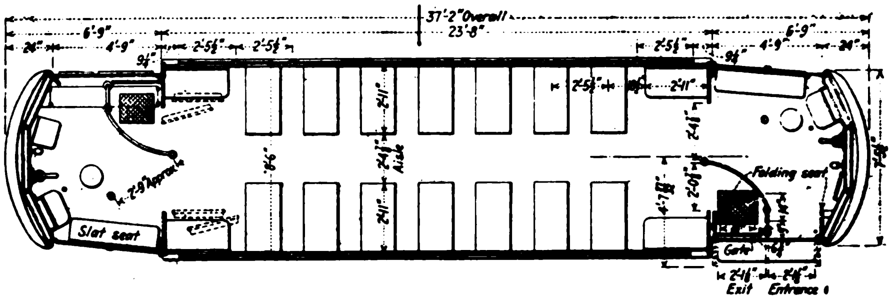


Fig. 15—General plan of sample double-truck one-man safety car. The forty-five new one-man cars will be the same except for lengthening by one window and one more pair of cross seats and the use of maximum traction trucks

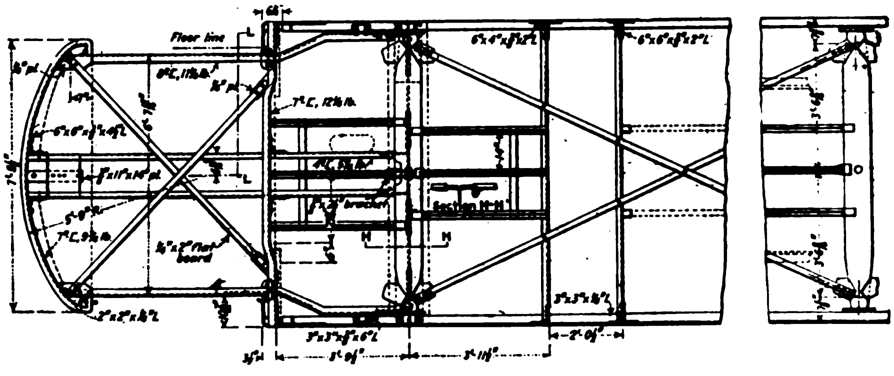


Fig. 16—Underframe construction of double-truck Chicago safety cars

give it a thorough service trial. This car was described and pictured in detail in *Electric Railway Journal* for Jan. 14, 1922, page 65.

The design of this car made under the direction of the superintendent of shops and equipment and approved by the board, incorporates the good features of the single-truck, one-man safety car built by the company. A general plan of the sample double-truck, one-man safety car is shown in Fig. 15 and the underframe in Fig. 16.

In this first double-truck, one-man car it was decided to try out a four-motor equipment. In arriving at the over-all length of the car body and hence its passenger capacity, it was felt that this dimension must be enough to make the investment in double-truck equipment worth while and yet not so great as to discourage full use, by the passengers, of the capacity in the rear end of the car. It was believed that the dimensions as shown would meet the requirements.

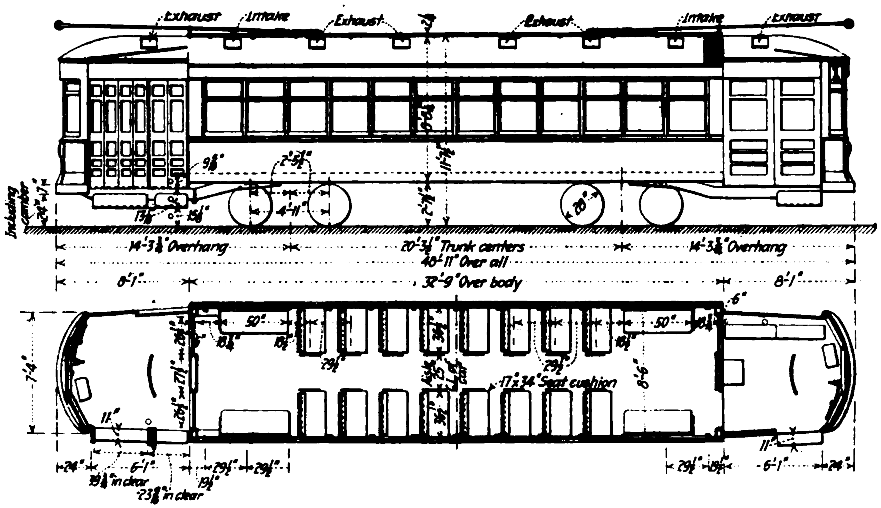


Fig. 17—Plan and elevation of sixty-nine two-man cars now under construction for Chicago Surface Lines

The general construction details, embodying a straight steel girder side car, follow closely those of the single-truck car built in the shops except where modified by the fact that the structure is of greater length and is for mounting on double trucks. Post spacing was increased 1 in. over the single-truck construction, as it was felt that in a double-truck car seat centers should be substantially the same as on the other double-truck equipment already in service. The over-all width was made about 6 in. more than the sample single-truck car so as to give the aisle width necessary in a long car body where entrance and exit are at the same end and passenger movement frequently occurs simultaneously in both directions through the car. The steel post and letter-board construction which was successfully used in the one-man car was followed in this double-truck design.

To provide an easy access car, the platform floors were dropped 6 in. below the level of the car body floor, which gives easy steps from platform to top of rail. Careful attention was given to all details in the design in order to secure a car of the lightest possible weight and at the same time sacrifice nothing required for strength or for reasonable upkeep cost.

This car was originally equipped with a swinging gate or barrier, in the platform exit passageway, which is controlled by a treadle in the platform floor as previously described in connection with the single-truck, one-man safety car built by the companies. As a result of many observations a further development resulting in an improved arrangement has been worked out. This consists in the elimination of the swinging barrier or gate and the use of the exit door itself as a barrier, it being operated by an independent air engine which is automatically controlled by the floor plate or treadle.

Experience with this car in service has shown that fairly heavy passenger loads are handled with little crowding and confusion, and the exit-door equipment has functioned quite satisfactorily. It is believed that this new exit door arrangement goes far toward the solution of difficult problems connected with the operation of one-man cars.

As a result of the performance of this sample double-truck, one-man car, it has been decided to build additional equipment of this design. Plans were recently approved for the construction of forty-five such cars.

Experience with the first car indicated that a car of somewhat greater capacity would probably be desirable and practical, and therefore the forty-five additional cars will be increased in length by the amount necessary to add one more cross-seat in the car body. Otherwise, the details are substantially the same as for the first car built. These cars are now under construction in the company's shops.

It has been decided, however, to adopt a two-motor equipment for these forty-five additional cars because of saving in weight, energy consumption, cost of motor maintenance and first cost. This decision was strongly influenced also by the fact that the same motor can be used as for the sixty-nine large double-truck, four-motor cars which are being built to replace the equipment lost in a fire early this year. Thus only one type of motor equipment will be added to the system instead of two types. Five of these sixty-nine double-truck cars will be so designed and equipped that trailers can be hauled in all-day service, while the remaining cars will have the capacity and equipment for such service, except that they will not be fitted at this time with couplers. A general plan, elevation and section of these sixty-nine latest two-man cars is shown in Fig. 17.

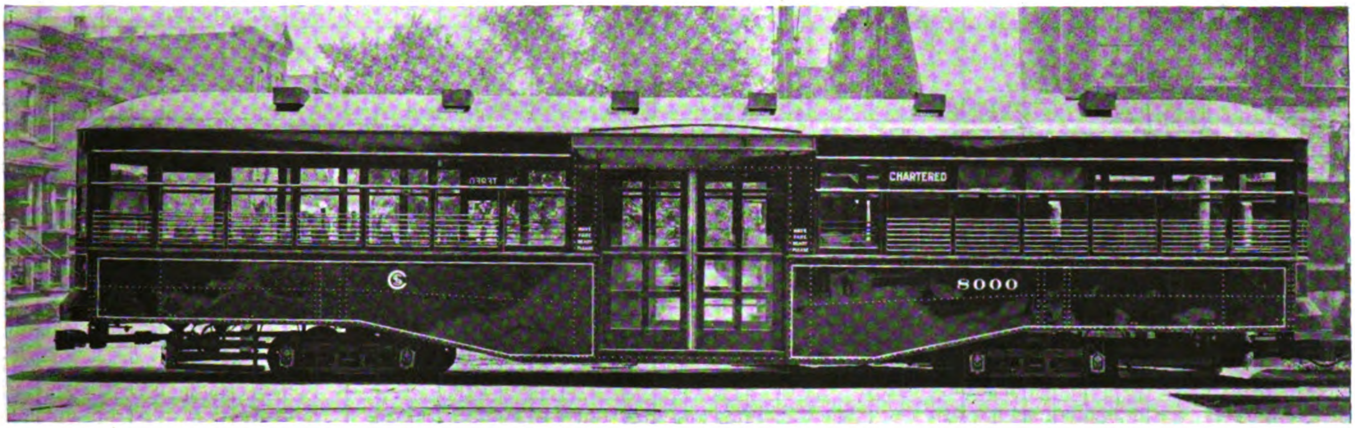
DETAILS OF 1922 TWO-MAN CARS

The total weight, completely equipped, less passenger load, is expected to be approximately 45,500 lb. The plan shows the seating arrangement laid out so as to provide clearance space around the doors at the car ends, standard Chicago practice, and so spaced as to give the maximum capacity in the car body. Platform seats with a total capacity of six passengers are placed as shown. The platform length is such as to make possible a wide entrance passageway and an exit opening of ample dimension. The platforms will be equipped with folding doors, closed when the car is in motion and operated by pneumatic engines. Body-end bulkheads with sliding doors typical of Chicago equipment will be installed as tests have indicated that such a design provides a car more comfortable and one much easier heated than a design without end bulkheads.

Study and experience of Chicago Surface Lines on this subject was partly related in last week's issue and is concluded herewith. The proper determination of heater capacity, results obtained with thermostatic control and development of a radiation constant are among the points which are discussed in this section.

Heating and Ventilating Chicago Street Cars

By CHARLES GORDON
Engineer of Equipment
Chicago Surface Lines



Standard exhaust and intake automatic ventilation as installed on arch roof Chicago cars

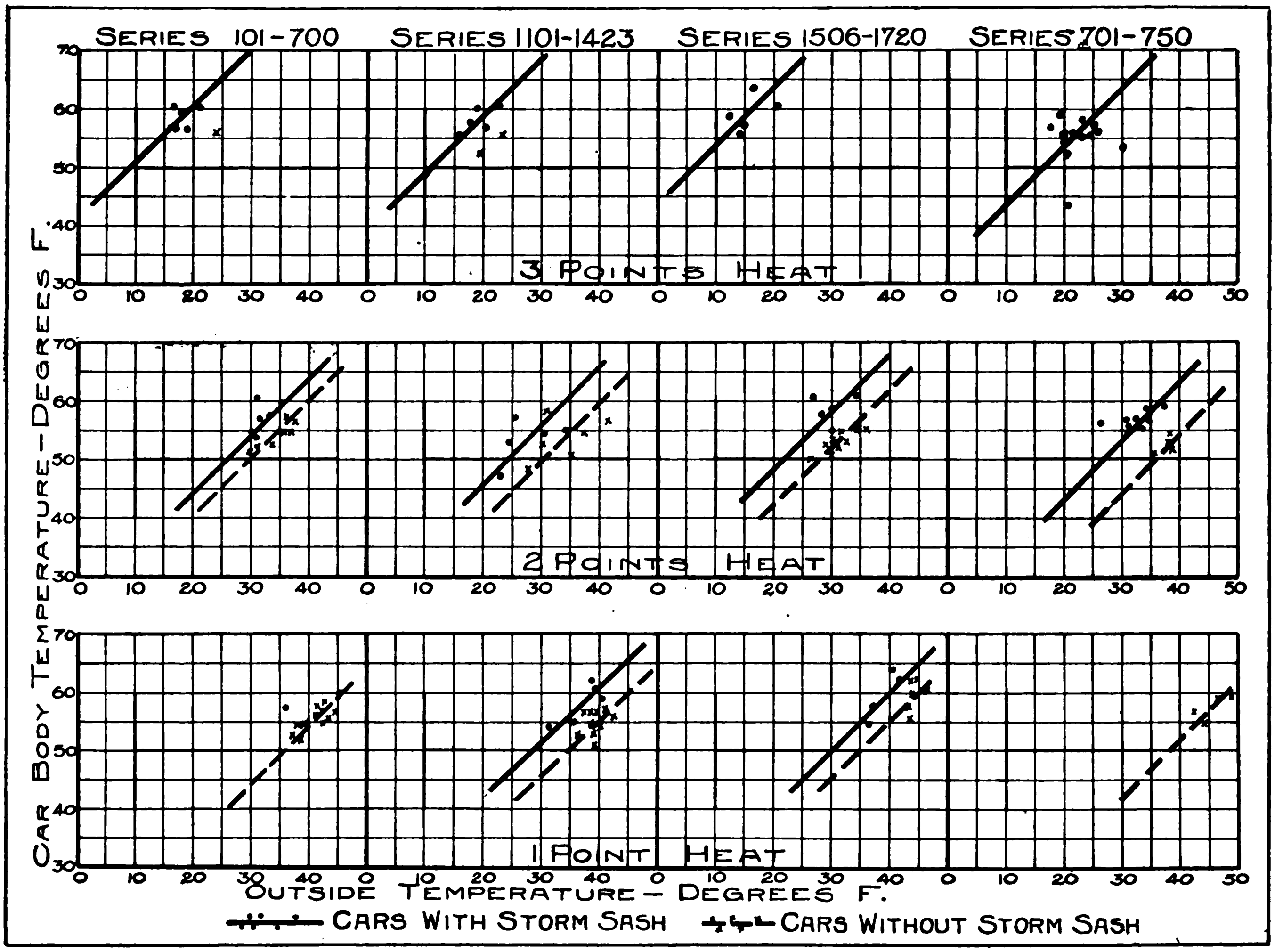
THE primary object of all heating tests is, of course, to obtain data which will enable determinations to be made of the heating capacity required for a given type of car. Checking the capacity of a given heater equipment installed in a car to determine whether or not it is suitable for maintaining certain required conditions involves a great many variables and, to assure an average result, requires a number of observations taken under different conditions and the elimination of any unusual factors which would not represent the general conditions of service.

Checks of this kind in Chicago were of two general classes. The first class consisted of observations on cars in service carrying passengers under the conditions found existing while the observer was on the car. By carefully noting all factors which might influence the results obtained, it is possible to accumulate a quantity of data from observations of this kind, which enable the results obtained to be corrected to a common basis, for the purpose of comparing the heating equipment in different classes of cars.

The second class of observations which were made on a great many different types of equipment are represented by tests in which the cars were allowed to stand in the open under certain conditions of weather and ventilation, while periodic observations were made of the temperature rise within the car above the surrounding outside atmospheric temperature. The elimination of the variable factors encountered in service, namely, opening and closing of doors, starting and stopping of car, etc., enables a very careful comparison to be made of the relative capacity of different heating equipments, or a determination of the relative heater equipment capacity required for different types of cars. It was found by carefully analyzing the results from a large number of tests of this character that it was possible to predict the average operating temperature in service from these standing tests. This will be described in more detail below.

The illustration on page 506 represents graphically the results obtained from more than 225 sets of observations conducted on various types of cars in service under different conditions of weather and temperature, for the purpose of determining average temperature rise above atmosphere, which could be maintained by the existing equipments. Observers were assigned to this work and readings taken throughout a round trip on each car entered. They were equipped with test thermometers, one of which was mounted on a bracket designed to be quickly fastened on the storm sash catches so that the thermometer could be read from the interior of the car through the window. A second test thermometer was mounted inside the car adjacent to the car thermometer and a record was made every five minutes of the temperatures observed. Notes were carefully made of all related conditions which would affect the results, such as number of passengers, total time doors were open in seconds during the round trip, window openings, wind velocity and direction of motion of car, condition of ventilating apparatus, etc. By taking the observations for a complete round trip on each car, it was possible to eliminate the effect of a number of variables.

The original data obtained were corrected, averaged and summarized for each round trip, so as to be in form for comparison on a common basis. These average data are compiled in the illustration which is presented below for four different types of cars and are only typical of similar data collected for other types of equipment. The data are arranged in three groups representing observations made on cars where three, two and one point of heat respectively were being used. Under the more moderate temperature conditions obtaining in the fall and spring, a number of observations were made on cars with and without storm sash. The data are therefore further subdivided according to this classification. The solid line in each set of observations represents cars equipped with storm sash, whereas the broken line is made up for observations obtained on cars not equipped with storm sash.



Service checks of car temperatures under various conditions as indicated

It was one of the primary objects of these observations to determine the average rise above outside atmospheric temperature which could be expected with the heater equipment then installed in the different classes of cars. These observations were for the double purpose of determining, first, whether the requirements of the city ordinances were being met with the equipment in service, and second, if the requirements were not being met, what additional heater capacity was necessary. In the case of one group of cars, it will be found by a study of the data presented, that the ordinance requirements were not being met at that time. This was for the car series 701-750, which were of all steel construction, and in which additional heating equipment was installed as a result of these tests. In the illustration above outside temperatures between 0 and 50 deg. F. are plotted as abscissa, while body temperatures between 30 deg. and 70 deg. F. are plotted as ordinates. Each point in a group represents the corrected average car temperature for a given type of car at the average outdoor temperature encountered during the observations. Since it was impossible to obtain all the desired combinations of average car temperature and outdoor temperatures desired in these tests, it was necessary, in order to get a readily comparable picture of the results, to convert the data to some fixed outdoor temperature. This temperature was taken at 10 deg. F. since it is the critical point mentioned in the heating ordinances. If a straight line is drawn through each group of results in a position representing approximately their average, at an angle of 45 deg., any point on this line represents a fixed rise above the outside temperature. The purpose of the straight line plotted as shown is to bring all the recorded data to the same basis as regards outdoor temperature. Since the rise above outside temperature is a fixed value in degrees for a given combination of conditions, this arrangement forms a readily interpreted picture of the average results for each equipment. In the case of the steel cars, 701-750 mentioned above, it is apparent that since the 45 deg. line falls below the intersection of lines drawn through 10 deg. outdoor temperature and 50 deg. car temperature (the ordinance requirements) more heater capacity was shown to be required. The data are of further interest in pointing out in quite a striking way the effect of storm sash on the results.

In Figs. 8, 9 and 11 are presented graphically the results of standing tests which are typical of a great many tests of this kind conducted for the purpose of investigating some of the various factors which influence the results obtained with any given equipment. Because of limitation in space, these curves are presented with just a brief note of explanation, since the data included are almost self-explanatory. In passing, however, it is well to note that Fig. 8 shows in an interesting way the effect of various deck sash openings. Fig. 11 illustrates the results

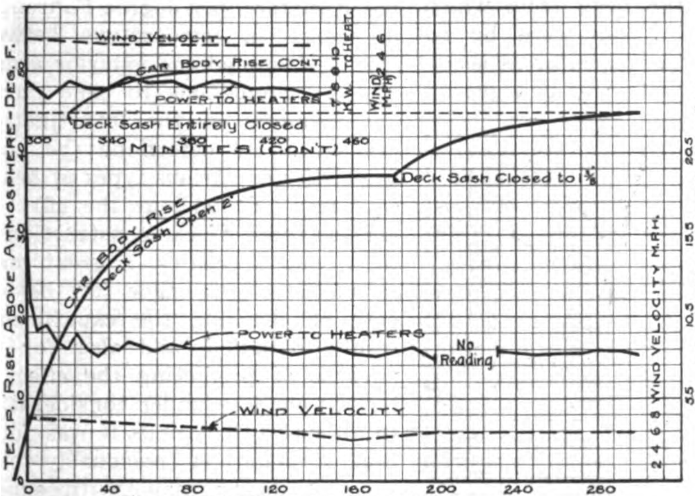


FIG. 8

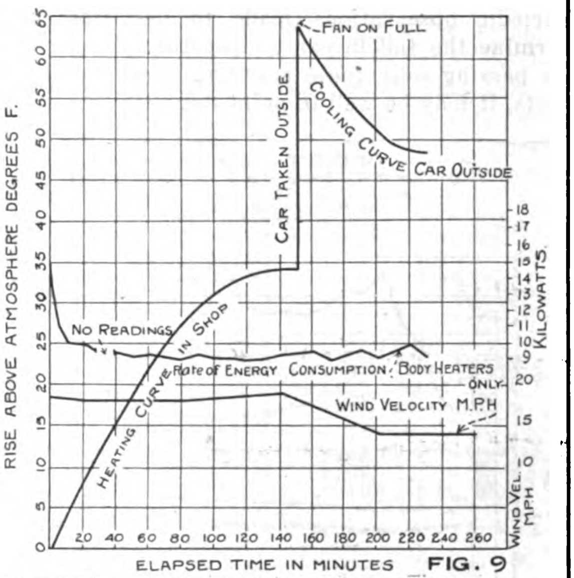


FIG. 9

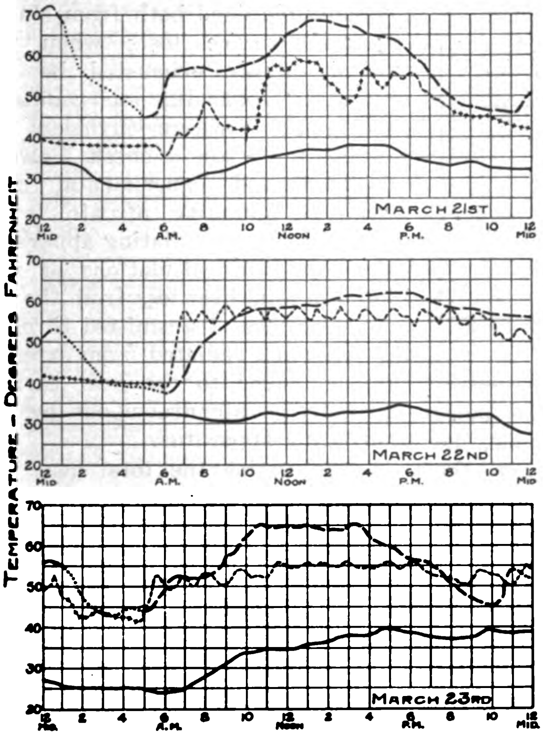


FIG. 10

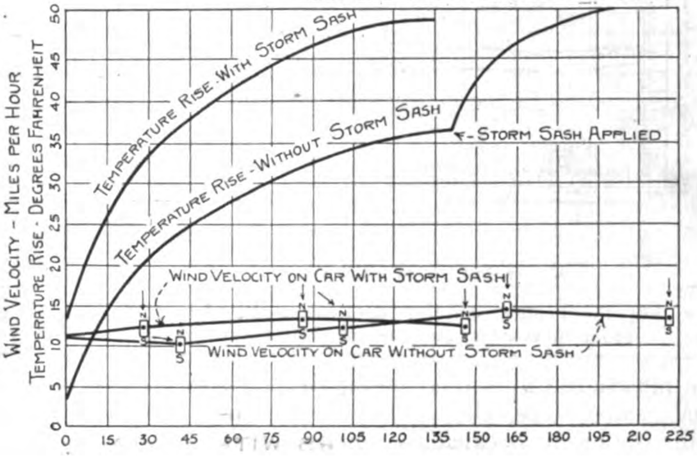


FIG. 11

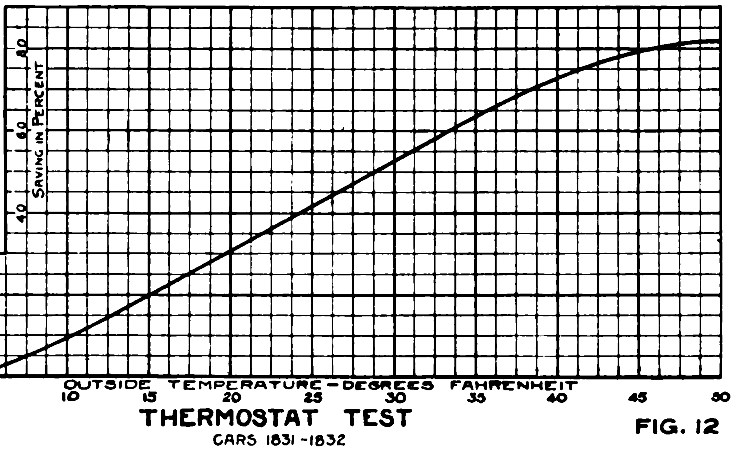


FIG. 12

Fig. 8—Effect of open deck sash on car temperature, car standing.
Fig. 9—Effect of storm sash on car temperature, car standing.
Fig. 10—Car heating and cooling test, car standing.

Fig. 11—Effect of thermostats in maintaining a uniform temperature in the car.
Fig. 12—Saving in heating energy by use of thermostats.

obtained on one car with and without storm sash and Fig. 9 gives a graphic picture of a heating and cooling curve with the car standing, showing the similarity in the shape of these two curves. In this latter test the car was heated in the building to a temperature rise of 34 deg. above the surrounding air in the room and then run outdoors, the ventilating fan turned on and periodic observations made to determine the fall in car temperature. In passing over these standing rise tests, it may be well to point out the time involved in attaining the maximum temperature rise which the heater equipment is capable of maintaining once this rise has been obtained. It is evident that if these cars are placed in service cold, it will require even a longer time to obtain the maximum temperature which will represent a balanced condition. This points out very emphatically the necessity for preheating cars before placing them in service in extreme weather, if satisfactory heating conditions are desired.

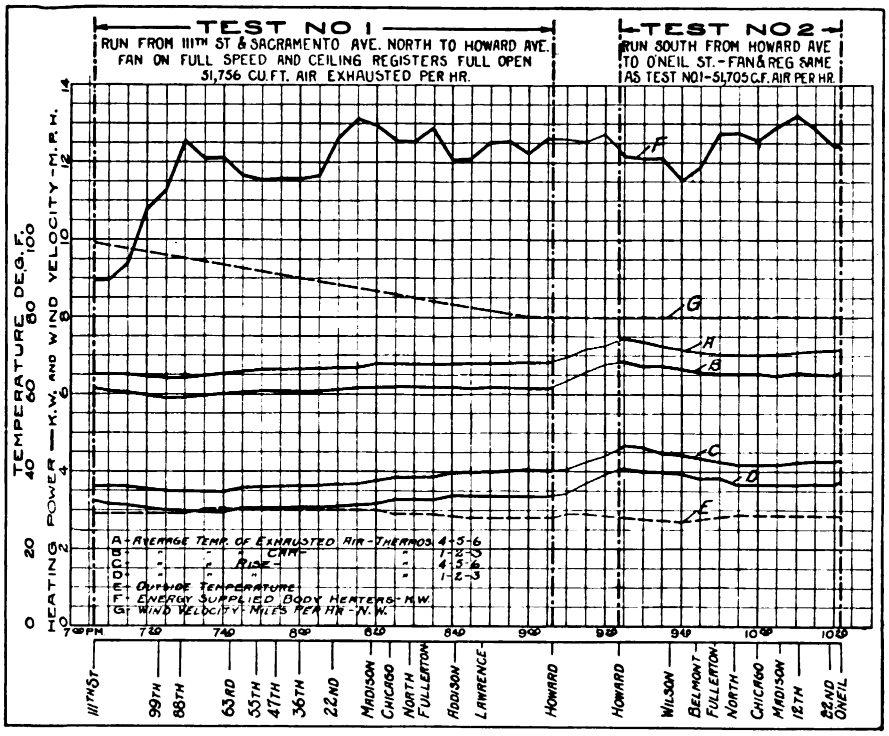


Fig. 13—Typical sample of data recorded in determining relation between radiation constant and volume of air exhausted by ventilating system

Chicago was one of the pioneers in the use of thermostats for regulating car-heating apparatus. A number of very interesting and exhaustive tests were conducted at various times as a result of which all passenger cars are now equipped with this device.

Fig. 10 gives a very clear picture of the results taken from one set of such tests, in which two cars, one equipped with thermostats and the other not so equipped, were followed carefully throughout an entire winter. These cars were prepared for the test by installing watt-hour meters in the heater circuits and graphic thermometers inside the body. The data in Fig. 10 are plotted directly from these graphic thermometer readings. Although the thermostats used in the tests from which these data are taken were by no means as well developed or as sensitive in their action to changes in temperature as some of the more modern apparatus now available, the curves show to a striking degree the desirability of including this form of regulator as part of the heating equipment.

Fig. 12 furnishes a further basis for this conclusion. Here the curve shown represents the saving in energy consumption on the car equipped with a thermostat, expressed in percentage of the energy used on the car not equipped. It is apparent that the greatest saving obtained, expressed in percentage, should be at the higher outside temperatures, when it is necessary to use the heater equipment only a comparatively small portion of the time. The fact that the saving on the tests from which these data were taken reaches 0 at approximately 5 deg. outdoor temperature indicates that the continuous operation of all the heaters in this car gave an average car temperature rise of 45 deg. F. The thermostats were set to cut off the car heaters when the temperature within the car reached 50 deg. F.

STUDY OF RADIATION CONSTANT

The radiation constant for a car expresses the heating energy lost through the exposed walls, in British thermal units per square foot of exposed surface, per degree Fahrenheit difference in temperature between the interior and the exterior atmosphere. From time to time during the progress of the investigations carried on to determine the characteristics of various types of heater equipment, as well as the effect of various types of car construction on these characteristics, a great many calculations were made for the purpose of checking the experimental results obtained, and also for the purpose of predicting the effect of certain changes under consideration. In all such calculations it was found that although a reasonably close check could be made with experimental results by applying radiation constants obtained both from standing and service tests when the amount of air exhausted by the ventilating apparatus was comparatively small, it was nevertheless impossible to obtain a check between calculated and experimental data when the quantity of air interchanged by the ventilating apparatus was large. In calculations of this kind, the total heat loss from the car consists of that transmitted through the walls and radiated from exterior surface, added to the heat carried off with the air drawn out by the ventilating apparatus.

To determine the total heat lost through the walls of the car by the application of predetermined radiation constants obtained in tests conducted for this purpose was a comparatively simple matter. It was also a simple calculation to determine the total quantity of heat carried off with a given quantity of air heated to a given temperature. However, when these two calculated quantities of heat lost were added together, it was invariably found that they indicated a required heater capacity far in excess of that which experiment showed to be necessary to maintain a given temperature rise within the car body. This recurring discrepancy between calculated and experimental results led to a carefully planned test designed for the purpose of determining the effect on

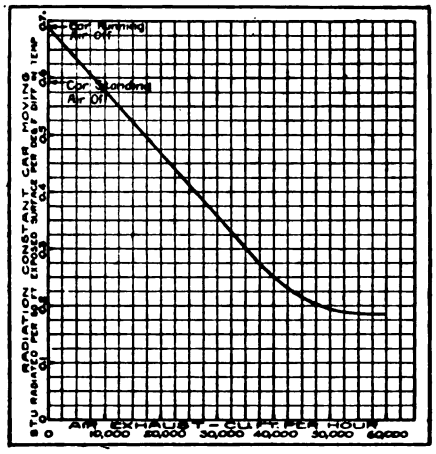


Fig. 14—Relation between radiation constant and volume of air exhausted by ventilating fan

the quantity of heat lost through the walls of a car of drawing a large quantity of air through the comparatively small space within the car.

Fig. 13 is a graphic log of one section of this test. It illustrates the character of data obtained. Each section of the test was run for a sufficient period of time to insure the balancing of temperature conditions. In addition, to obtain a check on the results, each section of the test was run in duplicate.

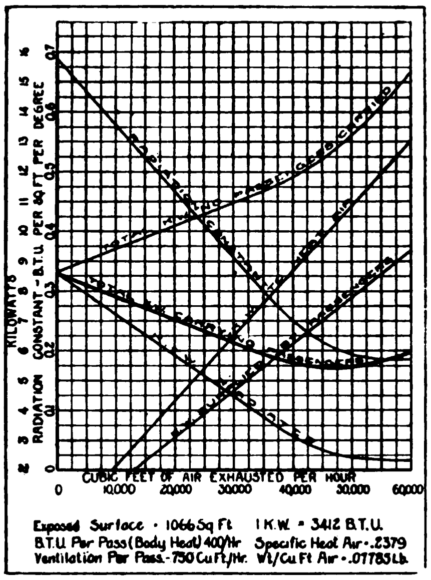
Briefly stated, the object of this test was to determine the relation between the variation, if any, in the radiation constant and the quantity of air exhausted by the ventilating fan. The detailed data, which are entirely too voluminous to be presented here except in this brief way, were finally compiled so as to give the curve in Fig. 14, which shows very strikingly that the quantity of heat lost through the walls of the car during forced ventilation falls off very materially as the quantity of air drawn in the car increases.

It is at once apparent that this curve is of extreme importance in connection with any heating calculations applied to cars where the volume of air interchanged in a given period of time is large compared with the total volume of the interior of the car. It strikingly points out the difference between the heat loss from a relatively small interior such as is represented by a street car, where the quantities of air used for ventilation are so large that the currents formed along the walls are of sufficient velocity to interfere with the normal transmission of heat from the air of the interior to the material of the wall, through which it must be conducted before being radiated to the surrounding atmosphere, as compared with building ventilating practice where the spaces being ventilated are very much larger in comparison with the number of occupants and the volumes of air required.

In order to illustrate the method of compiling the data, the calculation below shows the method for determining one point on the curve of Fig. 14. It is taken from the data obtained in test No. 2 of Fig. 13.

The applications of the curve given in Fig. 14 are very interesting. Fig. 15 is a graphical representation of the conditions existing when various quantities of air are exhausted from a car carrying passengers, and when the heat losses are theoretically balanced for each quantity of air exhausted. This set of curves is also based upon carrying a sufficient number of passengers at each point, so that each is being supplied with 750 cu.ft. of air per hour.

The curve marked "Radiation Constant" is practically a duplicate of the curve in Fig. 14. The curve marked "Kilowatts Radiated" represents the variation in heat loss through the walls of the car as the quantity of air exhausted is increased, and is obtained simply by multiplying the radiation constant for each point by the temperature rise within the car, which is taken as 40 deg. F., and by the total effective square feet of radiating surface, transforming, of course, British thermal units into kilowatts on the basis of the mechanical equivalent of heat, namely, 3,412 B.t.u. = 1 kw.-hr. The curve "Kilowatts to Heat Air," represents the total amount of heating energy carried off by the exhausted air. The curve "Kilowatts Supplied by Passengers" represents the heating energy furnished by the bodily heat of the passengers within the car, on the basis of 400 B.t.u. per passenger per hour. The curve "Total Kilowatts, No Passengers Carried" is the arithmetical sum of the "Kilowatts Radiated" curve and the "Kilowatts to Heat Air" curve, while the curve "Total Kilowatts Required When Carrying Passengers" is the difference between the "Total Kilowatts, No Passengers Carried" curve and the "Kilowatts Supplied by Passenger" curve. The shape of this last curve illustrates the value of thermostat control. Under the theoretical conditions assumed in these calculations, it is apparent that the quantity of heat required from the car heaters actually decreases as the number of passengers increases, and as the ventilation is increased, so as to maintain a constant interchange of 750 B.t.u. per passenger, up to a point where the air interchange reaches approximately 45,000 cu.ft. per hour. The accompanying tabulation of calculations illustrates the method of preparing the curves in Fig. 15.



Exposed Surface · 1066 Sq Ft 1 K.W. = 3412 B.T.U.
B.T.U. Per Pass (Body Heat) 400/Hr Specific Heat Air - .2379
Ventilation Per Pass. - 750 Cu Ft/Hr. Wt/Cu Ft Air - .07785 Lb.

Fig. 15—Heat balance in car carrying passengers, showing variation in amount of heating energy required with passenger load

HEATING AND VENTILATING CALCULATIONS

Calculations based on a temperature rise from 10 deg. to 50 deg. F. = 40 deg. F.

1. Exhaust air—cu.ft. per hour	0	10,000	20,000	30,000	40,000	50,000	60,000
2. Radiation constant	0.69	0.577	0.467	0.355	0.248	0.193	0.185
3. Exposed area = 1,066 sq.ft.							
4. Temperature rise = 40 deg. F.							
5. Square feet-degrees = 42,640							
6. B.t.u. radiated per hour	29,422	24,603	19,973	15,137	10,575	8,230	7,888
7. Kilowatts radiated per hour	8.62	7.21	5.85	4.43	3.10	2.41	2.31
8. Weight per cubic foot, air at 50 deg. = 0.07785 lb.							
9. Total weight of air in pounds	0	778.5	1,557.0	2,335.5	3,114.0	3,892.5	4,671.0
10. Specific heat of air = 0.2379 B.t.u. per pound							
11. Total B.t.u. to heat air	0	7,408	14,816	22,224	29,632	37,040	44,448
12. Total kilowatts to heat air	0	2.17	4.34	6.52	8.68	10.86	13.03
13. Total kilowatts from heaters when no passengers carried = (7) + (12)	8.62	9.38	10.19	10.95	11.78	13.27	15.34
14. Passengers that could be carried with each receiving 750 C.F.H.	0	13.3	26.6	40	53.3	66.7	80
15. B.t.u. furnished by passengers at 400 B.t.u. each	0	5,320	10,640	16,000	21,320	26,680	32,000
16. Kilowatts furnished by passengers	0	1.56	3.12	4.69	6.25	7.83	9.38
17. Kilowatts to be furnished by heaters to maintain 40 deg. rise	8.62	7.82	7.07	6.26	5.53	5.44	5.96

How Stores Are Accounted for on the Chicago Elevated Railroads

Organization, Duties of the Various Departments and System of Stores Operation Are Described, Together with Illustrations of the Various Forms Necessary for Carrying Out the Work

By E. E. KRETSCHMER
Purchasing Agent
Chicago Elevated Railroads

THE Chicago elevated system includes four railroads operating as separate companies and keeping separate accounts. Four storerooms and three storage yards are necessary. Each storeroom is in charge of a storekeeper. The store department clerical force for the entire system is located in the office of the general storekeeper. An accompanying illustration shows the organization maintained.

Some of the duties of the store department include the maintenance at all times of a sufficient supply of material on hand to meet the requirements of the various departments of the railroad and to receive, check delivery, store and safely care for as well as account for and issue on requisition all material.

It is essential that the store department keep the stock of materials at a minimum, otherwise the company's funds will be tied up so as to make a large yearly turnover. In order to give the maximum of service to all other departments, the closest co-operation of all is necessary. Where materials become obsolete or overstocked, these are reported promptly so that they may be disposed of to the best advantage. It should be remembered that on a railroad system the size of the Chicago Elevated Railroads a great variety of material is required. There are various types of motors, electrical equipment, cars, etc., for which repair parts must be available, and a large number of these parts are more or less special. A railway storekeeper cannot always work to a definite schedule as might be the case with a manufacturing concern where a definite manufacturing program can be outlined.

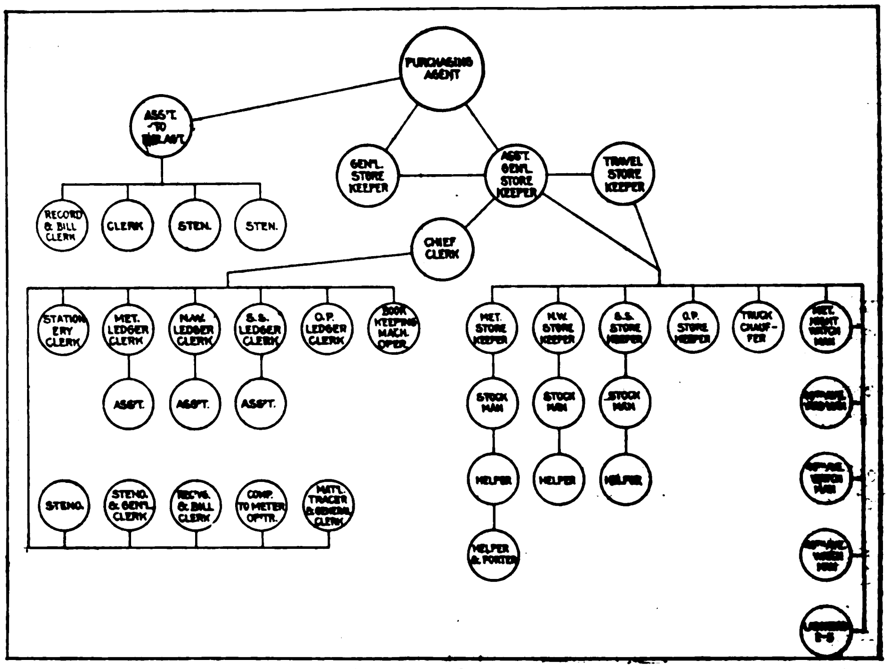
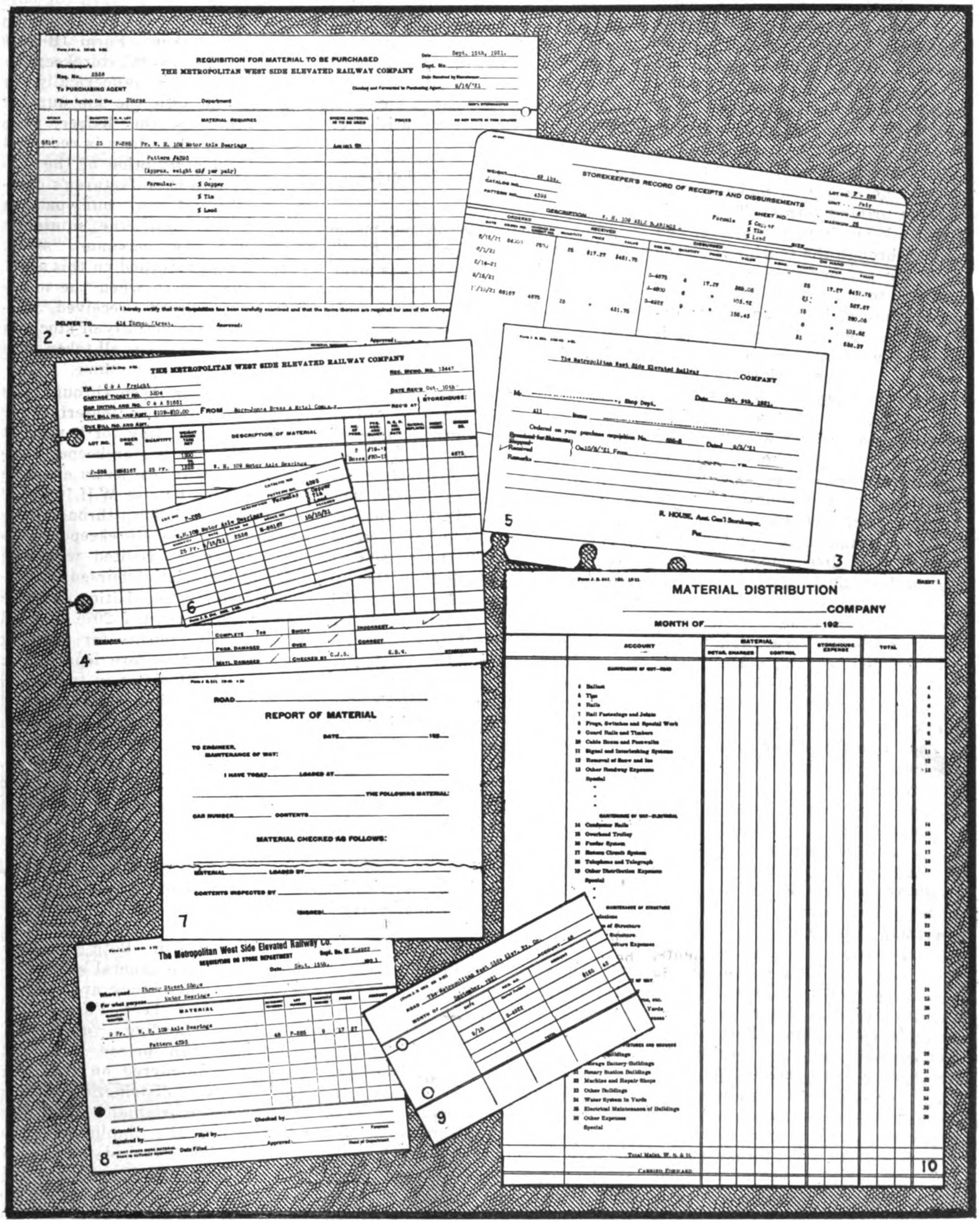

PURCHASING AGENT
ASS'T. TO PUR. AG'T.
GEN'L. STORE KEEPER
ASS'T. GEN'L. STORE KEEPER
TRAVEL STORE KEEPER
RECORD & BILL CLERK
CLERK
STEN.
STEN.
CHIEF CLERK
STATIONERY CLERK
MET. LEDGER CLERK
N.W. LEDGER CLERK
S.S. LEDGER CLERK
O.P. LEDGER CLERK
BOOK KEEPING MACH. OPER.
ASS'T.
ASS'T.
ASS'T.
STENO.
STENO. & GEN'L. CLERK
REC'VG. & BILL CLERK
COMP. TO METER OP'TR.
MAT'L. TRACER & GENERAL CLERK
MET. STORE KEEPER
N.W. STORE KEEPER
S.S. STORE KEEPER
O.P. STORE KEEPER
TRUCK CHAUFFER
MET. NIGHT WATCH MAN
STOCK MAN
STOCK MAN
STOCK MAN
HELPER
HELPER
HELPER
HELPER & PORTER

Fig. 1—Organization chart of the stores department, Chicago Elevated Railroads

With the system of storekeeping used each of the many thousands of items is given, for record purposes, what is called a railroad lot number. This corresponds to what manufacturers would call a catalog number. Each item of material is assigned to a certain class. The classifications of materials are shown on form JB-206-A, included in the accompanying illustrations. Each class has its own series of railroad lot numbers. For example, Class 125 is assigned R.R. Lot Nos. 1 to, say, 25. Class 126 would have R.R. Lot No. 26 to some other figure, and so on, depending upon the number of items in each class. Classes 134 to 158 inclusive, most of which include a great many small items, are each assigned lot numbers beginning with one (1), excepting we prefix the number with a letter. Letter "A" would designate Class 134, "B" Class 135, "C" Class 136, and so on. In other words, our lot number A1 would classify the material as being in Class 134, Lot No. 1. It will be seen, therefore, in Classes 125 to 133 the lot number itself designates the class of the material. On the remaining classes the letter prefix classifies the material. It is necessary on Classes 134 to 158 to begin with No. 1, otherwise the railroad lot numbers would run into four and five figures and it would be difficult to maintain a properly divided series of numbers.

The larger items of material are received and unloaded and stored in our storage yards, which are convenient to steam railroad connections. All other items are in the storehouse or storehouse yard, which in each case is adjacent to the repair shop of the individual road.

In the storeroom all materials belonging to a certain class are



REQUISITION FOR MATERIAL TO BE PURCHASED
THE METROPOLITAN WEST SIDE ELEVATED RAILWAY COMPANY

Storekeeper's Req. No. 2538
To PURCHASING AGENT
Please furnish for the Stores Department
Date Sept. 15th, 1921.
Dept. No.
Date Received by Storekeeper
Checked and Forwarded to Purchasing Agent 9/16/'21

68167	25	P-285	Pr. W. H. 109 Motor Axle Bearings	
			Pattern #4393	
			(Approx. weight 48# per pair)	
			Formula:- % Copper	
			% Tin	
			% Lead	

I hereby certify that this Requisition has been carefully examined and that the items thereon are required for use of the Company
DELIVER TO 414 Throop Street.
Approved:
Approved:

2

STOREKEEPER'S RECORD OF RECEIPTS AND DISBURSEMENTS

Weight 48 lbs.
Catalog No.
Pattern No. 4393
Lot No. P - 285
Unit Pair
Minimum 6
Maximum 25
Description W. H. 109 AXLE BEARINGS
Formula % Copper % Tin % Lead
Sheet No.
Size

Ordered Date	Order No.		Received Quantity	Price	Value	Disbursed Req. No.	Quantity	Price	Value	On Hand Quantity	Price	Value
8/15/21	84000	2850	25	817.27	$481.75							
9/1/21						S-4675	4	17.27	869.08	25	17.27	$451.75
9/14-21						A-4800	6	"	103.52	21	"	387.67
9/15/21						S-4922	9	"	155.43	15	"	260.05
10/10/21	68167	4675	25	"	431.75					6	"	103.62
										31	"	535.37

3

THE METROPOLITAN WEST SIDE ELEVATED RAILWAY COMPANY
Rec. Memo. No. 13447
Via C & A Freight
Cartage Ticket No. 3804
Car Initial and No. C & A 51651
Frt. Bill No. and Amt. $109-$10.00
Due Bill No. and Amt.
From Horn-Jones Brass & Metal Company
Date Rec'd Oct. 10th
Rec'd at Storehouse:

Lot No.	Order No.	Quantity	Weight	Description of Material	No. of Pkgs.					Order No.
			1300 75 1225		2 Boxes	#19-1 #20-1				4675
P-285	68167	25 Pr.		W. H. 109 Motor Axle Bearings						

Remarks
Complete Yes
Pkgs. Damaged
Matl. Damaged
Short
Over
Checked by C.J.S.
Incorrect
Correct
E.S.Y. Storekeeper

4

The Metropolitan West Side Elevated Railway COMPANY
Mr. , Shop Dept.
Date Oct. 9th, 1921.
All Items
Ordered on your purchase requisition No. 898-B Dated 9/9/'21
Promised for Shipment / Shipped / Received } On 10/9/'21 From
Remarks

R. HOUSE, Asst. Gen'l Storekeeper.
Per

5

Lot No. P-285
Catalog No. 4393
Pattern No.
Description W. H. 109 Motor Axle Bearings
Formula: Copper, Tin, Lead

Quantity	Date	Requisition No.	Order No.	Received
25 Pr.	9/15/21	2538	S-68167	10/10/21

6

ROAD
REPORT OF MATERIAL
DATE 192
TO ENGINEER, MAINTENANCE OF WAY:
I HAVE TODAY LOADED AT
THE FOLLOWING MATERIAL:
CAR NUMBER CONTENTS
MATERIAL CHECKED AS FOLLOWS:
MATERIAL LOADED BY
CONTENTS INSPECTED BY
SIGNED:

7

The Metropolitan West Side Elevated Railway Co.
REQUISITION ON STORE DEPARTMENT
Dept. No. S-4922
Date Sept. 15th, 1921
Where used Throop Street Shops
For what purpose Motor Bearings

Quantity Wanted	Material		Lot Number	Quantity Issued	Price	
9 Pr.	W. H. 109 Axle Bearings	48	P-285	9	17	27
	Pattern 4393					

Checked by
Extended by Foreman
Received by Filled by
Date Filled Approved Head of Department

8

Road The Metropolitan West Side Elev. Ry. Co.
Month of September, 1921
Account 48

Date	Req. No.	Amount
9/15	S-4922	$155 43

9

MATERIAL DISTRIBUTION
COMPANY
MONTH OF 192
Sheet 1

Account	Material: Detail Charges	Material: Control	Storehouse Expense	Total	
MAINTENANCE OF WAY—ROAD					
4 Ballast					4
5 Ties					5
6 Rails					6
7 Rail Fastenings and Joints					7
8 Frogs, Switches and Special Work					8
9 Guard Rails and Timbers					9
10 Cable Boxes and Footwalks					10
11 Signal and Interlocking Systems					11
12 Removal of Snow and Ice					12
13 Other Roadway Expenses					13
Special					
MAINTENANCE OF WAY—ELECTRICAL					
14 Conductor Rails					14
15 Overhead Trolley					15
16 Feeder System					16
17 Return Circuit System					17
18 Telephone and Telegraph					18
19 Other Distribution Expenses					19
Special					
MAINTENANCE OF STRUCTURE					
of Structure					20
Structure					21
Structure Expenses					22
					23
of Way					
					24
etc.					25
Yards					26
					27
Fixtures and Grounds					
Buildings					29
Storage Battery Buildings					30
31 Rotary Station Buildings					31
32 Machine and Repair Shops					32
33 Other Buildings					33
34 Water System in Yards					34
35 Electrical Maintenance of Buildings					35
36 Other Expenses					36
Special					
Total Maint. W. S. & B.					
Carried Forward					

10

Some of the forms used by purchasing and stores department, Chicago elevated railroads

Form J-31-A (Fig. 2) Form used for requisitioning material to be purchased.

Form JB-380 (Fig. 3) Ledger sheet used by storekeeper for record of receipts and disbursements from stores.

Form J-341 (Fig. 4) Memo made out by storekeeper upon receipt of new materials.

Form JB-384 (Fig. 5) Form used by stores department for notifying other departments of receipt of material ordered by them.

Form JB-358 (Fig. 6) Form kept in storekeeper's file for making record of each order placed for particular material.

Form JB-111 (Fig. 7) Receiving form used in place of J-341 when material is received in carload lots at storage yards.

Form J-207 (Fig. 8) Form used for requisitioning materials from stores department.

Form JB-138-A (Fig. 9) Summary of distribution made monthly for notifying department heads of material charged to each account.

Form JB-241 (Fig. 10) Monthly distribution form for giving department heads summary of totals of individual account summaries on Form JB-138-A.

stored in the same series of shelving, each compartment of this shelving being carded or tagged, showing the lot number and a description of the material, the compartments being numbered consecutively as far as it is possible to do so.

To follow the system through, it will be necessary to make use of various printed forms. To do this I will take an item of material and follow through the routine from the time the storekeeper orders this material to the receipt, storage and accounting of it in the stores department, then disburse some of it from the storeroom and follow through the accounting until the material is charged to some operating or other account and credited to the storekeeper's account. All materials received are charged to the storekeeper's account and are held there until disbursed for use to some other account.

As an example, let us take the item of W.H. 109 motor axle bearing, pattern 4393. First the storekeeper's order, Form J-31, is made up by the storekeeper in triplicate, all copies being forwarded to the general storekeeper's office, where a storekeeper's requisition number is assigned and quantities are checked against past consumption as shown on the ledger sheet, Form JB-380. If correct, the order is approved by the general storekeeper. The original copy is forwarded to the purchasing department, the duplicate is retained by the general storekeeper and the triplicate is returned to the storekeeper. This form is also used by operating departments in ordering special materials. They make an extra copy for their own files and assign their own department number for record. After the storekeeper's requisition (Form J-31) has gone through the routine, the purchasing department's purchasing order (Form 31) is placed and a copy of this purchasing order is forwarded to the general storekeeper and to the storekeeper of the individual road concerned. These copies of orders are filed in the store department alphabetically until completion of the order, when they are filed numerically in binders for future reference. The storekeepers record on their copies of Form J-31 the purchase order number.

Form JB-358 is a card kept in the storekeeper's file for making a record each time an order is placed for this particular material. This card also serves as a guide to him as to approximately how fast this particular item of material is used and also the approximate quantities to order.

RECEIPT OF MATERIALS IS FOLLOWED CLOSELY

After shipment, receiving memo Form J-341 (numbered in duplicate) is checked. This form is made out by the storekeeper, the original copy being sent to the general storekeeper's office, while the duplicate is retained by the storekeeper and filed numerically. The storekeeper also makes a record on his copy of the "purchase order" and the "receiving memo number."

All invoices from vendors are sent direct to the general storekeeper's office in duplicate. The original receiving memo is filed alphabetically in the general storekeeper's office until the receipt of the invoice, at which time the invoice is checked for quantities and description with the receiving memo, and if correct, this is so certified on the face of the invoice as shown and the original invoice is then forwarded to the purchasing department for price checking, approval for payment and forwarding to the auditor as authority to charge the storekeeper's account and vouchering for payment. The duplicate copy is retained in the general storekeeper's office for entry on the stock ledger (Form JB-380) and is then filed numerically. The receiving memo number and date are also recorded on the general storekeeper's copy of the purchase order and then both purchase order and receiving memo are filed numerically.

The form for "receipt of material" (Form JB-384) is used only where special materials are ordered by other departments. It is used also as general information to those departments to indicate when this material is promised for shipment, shipped or received.

The form for "report of material" (Form JB-111) is used in place of the receiving memo (Form J-341) when material is received in carload lots at the storage yards. All material received in the storage yards is unloaded by the maintenance of way department. This form is also used when material is loaded in the storage yard for outshipment.

The ledger sheet (Form JB-380) is kept in the general storekeeper's office. It is filed numerically in binders and with the lot number also acting as the ledger page number. On this sheet is recorded the general description of the material, weight, manufacturer's catalog number, if any, our pattern number, the unit, the minimum stock and the maximum stock. There is also recorded on this sheet information as to when the material was ordered, received, disbursed and the quantity of stock on hand. This process is all taken care of by a bookkeeping machine.

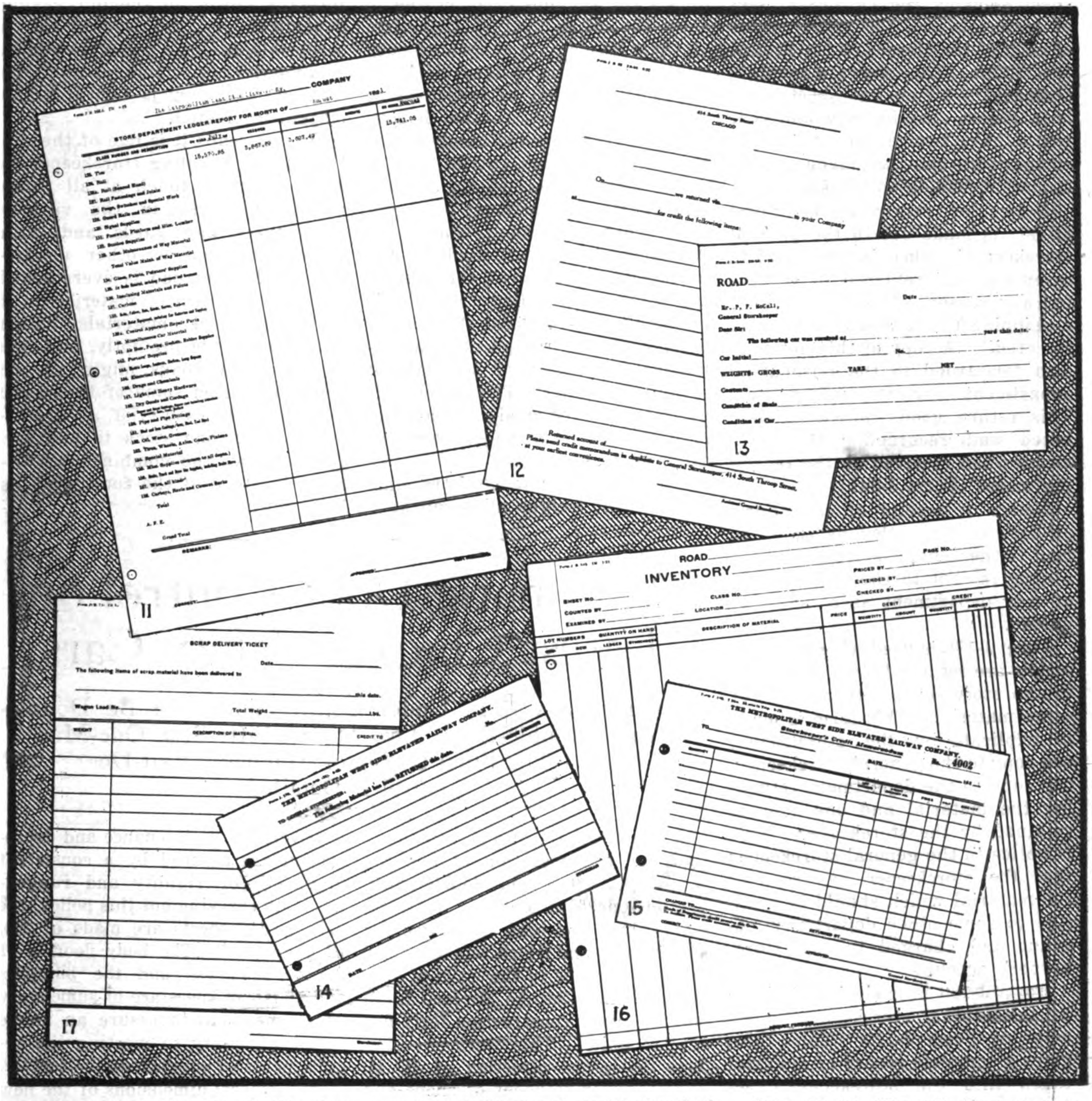
We have now been through the system of ordering material for stock and accounting for it until it is charged to the storekeeper's account. We will now as an example disburse nine pair of W.H.109 axle bearings and follow through the system until the storekeeper's account is again credited with the value of material disbursed.

The form of "requisition on store department" (Form J-207) is used by other departments for drawing material from the store department. The form is filled out in triplicate, the third copy being retained by the department requiring the material, the department also assigning its own department letter and number. A different letter is used by each of the departments, to designate whether it is shop, road or electrical department. The original and duplicate requisitions are presented to the storekeeper, who fills the order and inserts the lot number as shown on the bin from which the material is drawn. Both copies are then sent to the general storekeeper's office, where they are entered on stock ledger sheet (Form J-380) under the heading "disbursed." They are then priced, extended, checked and entered on the form for summary distribution (Form JB-138). The original is then filed numerically, the duplicate (also priced) being attached to a duplicate of Form JB-138. This duplicate copy of JB-138 and duplicate copies of requisition attached are forwarded monthly to the department head controlling the account, which gives him in detail all materials charged to any one of his individual accounts during the month.

The summary of distribution (Form JB-138) is made in duplicate in the general storekeeper's office, a set being made up for each account showing the totals of each requisition charged to that account during the month. The original copy is filed numerically according to account number in the general storekeeper's office. It will be seen from this form that it is possible to locate by number all requisitions chargeable to any individual account during any month.

The form for monthly distribution (Form JB-241) consists of five sheets showing the various accounts. This is made up in the general storekeeper's office and is a complete summary of the totals as shown on Form JB-138 for each account. The original is forwarded to the auditor, who credits the total amounts shown to the storekeeper's account, charging the various operating accounts plus a percentage to cover storehouse expense.

The monthly "store department ledger report" (Form JB-206A) is made up in the general storekeeper's office and is a monthly recapitulation of the ledger class control sheets. For the ledger class control sheets a copy of Form JB-380 is used, on which are recorded daily in money value only the debits and credits for the class of material. This information then at the end of the month is transferred to Form JB-206A. This report is valuable in that it analyzes the amount of funds tied up in each class of material and also shows the monthly turn-over in the various classes.


COMPANY
STORE DEPARTMENT LEDGER REPORT FOR MONTH OF
11
12
ROAD
13
ROAD
INVENTORY
SCRAP DELIVERY TICKET
THE METROPOLITAN WEST SIDE ELEVATED RAILWAY COMPANY
4002
14
15
16
17

Form JB-206-A (Fig. 11) Monthly store department ledger report.

Form JB-90 (Fig. 12) Form used in returning materials to manufacturer when rejected for any reason.

Form JB-348 (Fig. 13) Yardman's notice to general storekeeper of receipt of carload of material.

Form J-179 (Fig. 14) Form used for returning materials to storehouse.

Form J-180 (Fig. 15) Storekeeper's receipt for materials returned on Form J-179

Form JB-342 (Fig. 16) Sheet used in making check inventory against perpetual inventory.

Form JB-73 (Fig. 17) Notice of sale of scrap material sent to stores department by purchasing department.

This report also must agree with the auditor's report of total debits and credits to storekeeper's account.

As a matter of general information, there is also made up in the purchasing department a report sheet showing the various classes of materials and the money value of each of the classes on the first of the month. This shows a monthly comparison all on one sheet; that is, a report covering a whole year would have twelve columns and a comparison can be made month against month on any class.

Notice of return goods (Form JB-90) is made out in the general storekeeper's office in triplicate to cover material returned to vendors for any reason. It serves both as a shipping notice and as a request for credit. A copy of this notice is also forwarded to the purchasing department for its information. This return goods notice is numbered and recorded with credit memo when received on the receiving memo (Form J-341).

Notice of receipt of car (Form JB-348) is forwarded by the yard man to the general storekeeper and a copy is sent to the maintenance of way department as a notice to unload.

Form J-179 is used when any materials are returned by departments to the storehouse, either new or scrap material. This form is made in triplicate by the storekeeper, one copy to the general storekeeper, one copy to the department returning the material and one copy is retained by the storekeeper. This is notice to the general storekeeper that the storekeeper has received the material which should be credited to some other department account and charged to the storekeeper's account.

Form J-180 is made in triplicate by the general storekeeper on receipt of Form J-179. This form gives a complete record of material taken into the storekeeper's account and a copy of the form is sent to the auditor as authority to credit one account and charge the storekeeper's account, one copy being retained and the other copy being forwarded as a credit memorandum to the department whose account is credited.

The stock ledger provides a perpetual inventory record, but test inventories are taken, a few items at a time, continuously, to check actual material balances in the storehouse against stock ledger balances. A check inventory sheet (Form JB-342) is used for this.

The purchasing department, in placing orders, shows the railroad lot number for each item and requests the vendors when billing to show the lot number of each item on their invoice. It is then an easy matter, when the ledger clerk receives the invoice, to turn over to the page number in the ledger, which is also the lot number, and make the necessary entries.

All scrap materials are turned into the store department for credit to the proper account when sold. All sales of scrap are made by the purchasing department, the sale being given a so-called "scrap sale number." The general storekeeper receives from the purchasing department a notice of the sale of scrap to a dealer. The material is delivered to the dealer in accordance with the terms under which the sale was made.

The storekeeper, with the traveling storekeeper, weighs all scrap as it is delivered to the buyer. On delivery of scrap a receipt is obtained. Form JB-73 is then filled out and sent to the purchasing department as a record of material delivered on the sale and proper accounts credited. The sale of scrap is then formally closed in the purchasing department by the issuing of a scrap sale, giving a complete record of all materials sold under that sale number, and copy is forwarded to officers interested.

On our roads it is one of the duties of the traveling storekeeper to keep in actual touch at all times with the stocks in the various storehouses and yards and with work being done by other departments. If one road is overstocked on a certain item of material or if it has in stock materials which might not move promptly, and one of the other roads might at the same time need some of this same material, the material is transferred from one stock to another. In that way the combined investment in stock of the four roads is kept down.

Automatic Door Control on Latest Chicago Safety Cars

Forty-five New Cars Under Construction Will Be Double-Truck, Double-Door, Two-Motor, Fifty-Seat, One-Man Type—The Final Design of Automatic Exit-Door Control Is Detailed

AS A RESULT of a careful study of the operation of car No. 3092—one-man, double-truck, four-motor, double-door forty-six-seat—which has been in service for nine months and which was described in these columns in the issue of Jan. 14, 1922, the Chicago Surface Lines now has under construction forty-five similar units. This work is being done under the direction of H. H. Adams, superintendent of shops and equipment. A general view of the first of these cars to be completed is shown herewith.

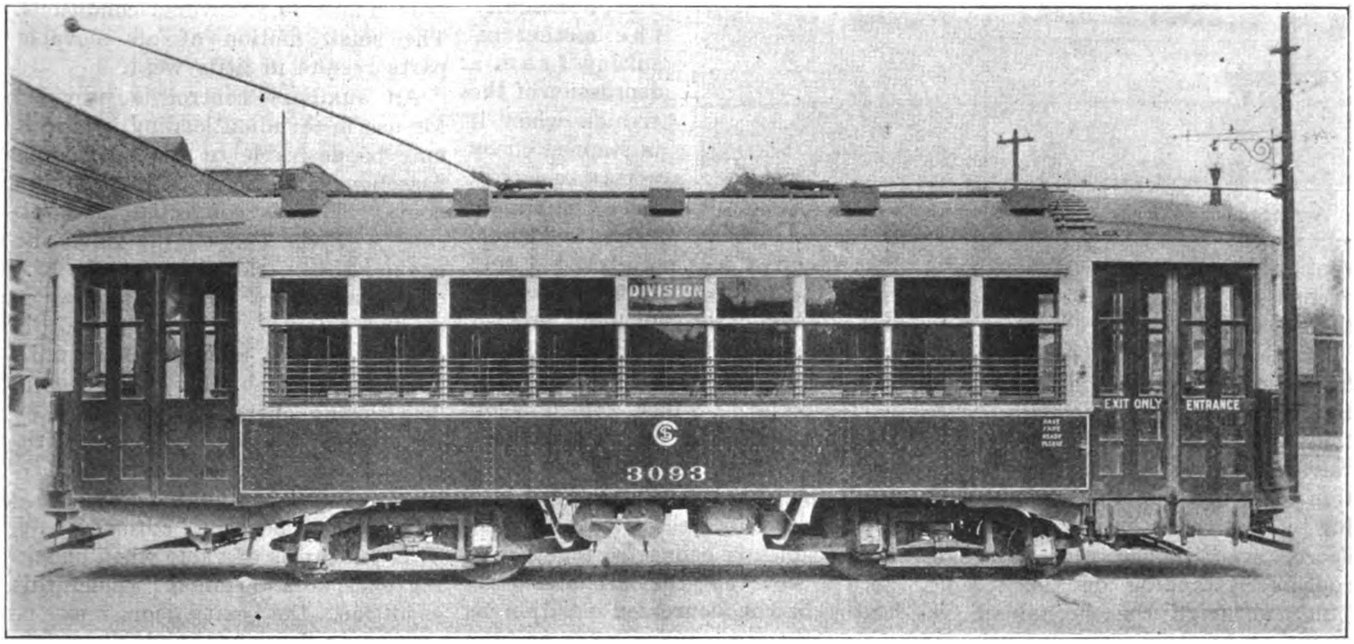
Practically all of the construction features described for the earlier sample car, No. 3092, have been retained, but the new cars have been made one window longer. In developing the car structure and in the selection of materials, constant consideration was given to the reduction in weight. At the same time however, low maintenance and depreciation are assured by a consistent provision for rigidity and ruggedness. In carrying out this policy, the side girder sheets are made of No. 12 gage steel. The body floor is of double thickness and the bumpers and platform knees are of sufficiently heavy members to assure an ample factor of safety in meeting the requirements of congested city service.

The general dimensions of the new cars are as follows:

Length over bumpers	39 ft. 7⅜ in.
Length over corner posts	26 ft. 1⅜ in.
Width over side girders	8 ft. 4⅝ in.
Seating capacity	50
Width of aisle	28⅜ in.
Entrance and exit passageway widths	25⅛ in.
Height from rail over trolley boards	11 ft. 1⅜ in.
Height from rail to top of floor	33 in.
Height from bottom of side girder over top of side post	7 ft. 1¾ in.
Side post centers	29⅜ in.
Truck centers	17 ft. 0 in.
Wheelbase of trucks	4 ft. 6 in.
Estimated weight, complete	30,000 lb.

The general plan is exactly the same as that shown in Fig. 15 of W. T. Thorn's article in this issue, page 503, except that the length is increased by one window, or 29½ in.

The cars will be equipped with two G.E. 275, 60-hp. motors with K-68 control, and Brill 39-E maximum traction trucks with 28-in. diameter driver wheels and 21-in. diameter pilot wheels. The selection of this type of equipment was the result of careful consideration of the advantages to be derived in reduced weight and maintenance from the use of two comparatively low speed, rugged motors, as compared with the smaller high-speed four-motor equipments usually applied to cars of this type and used on the sample car No. 3092. An interesting development is the use of aluminum for the controller frame and top, which results in a weight reduction of 120 lb. per car.


Latest Chicago one-man safety car seats fifty and is equipped with two 60-hp motors on maximum-traction trucks

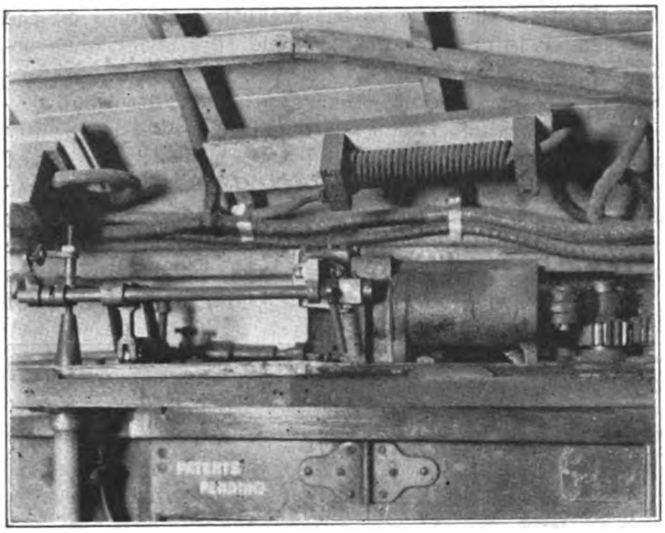
Full safety devices are being installed. The cars are also being equipped with the automatic exit door, which has been in successful passenger service on sample car 3092 since March, 1922. The primary purpose of this device is automatically to prevent boarding passengers from entering through the independent exit, which is provided for the free movement of those desiring to alight, thus expediting passenger movement and the collection of fares. The doors are selective in their operation; that is, the entrance and exit doors may be individually or simultaneously opened or closed as required, but with no additional attention on the part of the operator as compared to that required in the operation of the usual single door safety cars. Careful study under the various conditions encountered has demonstrated this door arrangement to be an entirely practical device for expediting passenger interchange without imposing additional duties on the car operator.

The entrance doors are operated by a two pipe engine connected with the brake valve in the customary manner. The exit doors are opened through the medium of a treadle which is placed in the exit passage on the platform and is of such liberal dimensions that a passenger stepping down into the exit passage from the car floor will necessarily be standing on the treadle. When the brake valve handle is placed in the "doors open" position to open the entrance doors, the exit door will also open simultaneously if a passenger is standing on the treadle, or will open when a passenger steps on the treadle, as long as the valve handle remains in "doors open" position. The brake valves used are of the latest type developed by the Safety Car Devices Company, in which "handle off" position is to the left of the "brake application" position. In addition, by a slight modification in the porting of the valve, the old lap "handle off" position is utilized as an "exit door open" position.

In this position of the handle, the entrance door does not open, but the exit door will open immediately if a passenger is standing on the treadle, or will open when a passenger steps on the treadle. The exit door quickly closes and the step folds up with no supervision from the operator, as soon as the passenger steps off to the street, unless a succeeding passenger has in the meantime stepped on the treadle. Should this latter have occurred, the door remains continuously open with no "flapping" between passengers. It will be readily appreciated that the quick closing of the exit door after the last passenger has left the car results in directing all entering passengers through the entrance passage. This expedites orderly loading and the collection of fares. Under a condition where a comparatively few people are leaving the car and a larger number are waiting to board, this arrangement is of particular advantage in facilitating fare collection. If an alighting passenger is standing on the treadle when the brake valve handle is moved to "doors open" position, the two doors open simultaneously. If he is not standing on the treadle, only the entrance door opens when the brake valve handle is moved to "doors open" position, the exit door remaining closed. The latter, however, opens quickly to allow him to alight, as soon as he has stepped on the treadle. Should a belated passenger desire to leave the car, the exit door will open instantly from the treadle, as long as the brake valve handle remains either in "doors open" or in "exit open" position.

The entrance door remains open

as long as the brake valve handle is allowed to remain in the "doors open" position. When the brake valve handle is returned to "service application doors closed," the entrance door closes and also the exit mechanism becomes inoperative, preventing the exit door from being opened by a passenger stepping on the treadle.



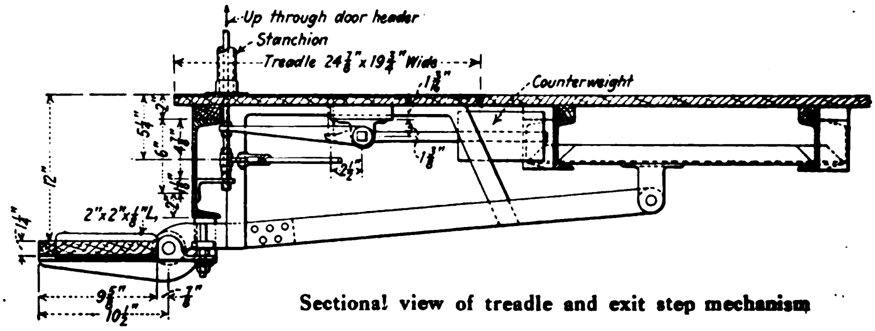
Arrangement of automatic exit door apparatus above header

If the exit door has been held open by a passenger standing on the treadle who does not desire to leave the car the movement of the brake valve handle to "doors closed" position results in the simultaneous closing of both the entrance and exit doors, even though the passenger continues standing on the treadle. Thus, although the mechanism remains in position to open instantly to enable a belated passenger to leave the car, as long as the operator's brake valve handle remains in "doors open" position, all doors are effectively locked as soon as the brake valve handle is returned to "doors closed" position.

The air for operating the exit engine is taken directly from the emergency line, so that if the brake system is thrown into "emergency" all doors on the car become balanced, enabling them to be pushed open by passengers. This includes the automatic exit doors as well as the entrance doors.

The operations described are obtained through the medium of a comparatively simple device. The engines are small, compact units, which were designed by the National Pneumatic Company, to meet the requirements imposed. They are mounted over the doors on the header. The exit door engine is of the one-pipe type, provided with an integrally mounted valve which is operated to open the door by the depression of a pin in the face of the valve, and which closes the door by the release of this pin. The valve pin is actuated from the exit treadle by means of a light rod extending up through the stanchion which separates the entrance and exit passages. The lower end of this rod is connected to a lever actuated from the floor treadle, so as to magnify the motion resulting from a depression of the treadle when it is stepped on by a passenger. The maximum treadle depression required does not exceed 3/16 to ¼ in. In order to operate successfully under a comparatively light impulse, such as would be transmitted by a small child, the treadle itself is supported on arms which extend below the platform floor and beyond the edge of the treadle opening. On the front end of these arms, the exit step brackets are located, so that the step and treadle are connected together in such a way that the mechanism remains in the depressed position as long as a passenger is on either the treadle or the exit step. The general construction of this mechanism is illustrated below.

The upper end of the rod extending through the vertical stanchion mentioned is connected through a small rocker arm to a countershaft above the door header, which upon being rotated slightly, transmits the motion of the treadle to the exit engine valve. In order to prevent the exit door from opening until after the brake valve handle has been moved to "exit open" or "doors open" position, a small air cylinder is provided which prevents the exit engine valve from functioning until after the brake valve handle has been moved to the proper position by the operator and the treadle has been depressed by a passenger. No valve mechanism is used under the treadle.



Sectional view of treadle and exit step mechanism

It is apparent that the design is essentially mechanical in its operation and that the construction used eliminates the possibility of failure due to the accumulation of ice, mud or snow. In the initial installation of the device on car No. 3092, it was operated for long periods through exceedingly bad weather, and has amply demonstrated its reliability even under very adverse conditions. The small motion of all movable parts results in little wear.

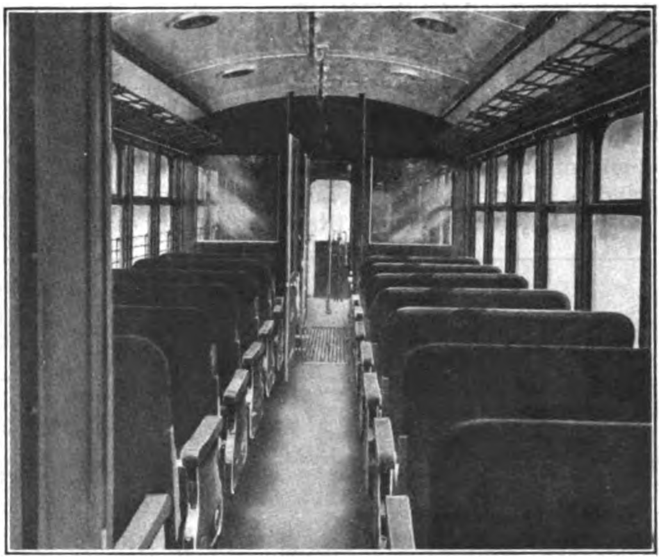
An auxiliary control is provided for use in terminal loading, where it may be desirable to allow boarding passengers to enter through both doors. This is connected mechanically with the exit engine valve and enables the operator to open the exit door whether or not a passenger is on the treadle. When the door is opened in this manner, it remains open until the brakes are released. The closing operation is effected by the simple release of the brakes without any further attention to the auxiliary control handle, which resumes its normal position automatically. This feature is of value when changing ends at a terminal. Under this condition, the exit door may be opened as described, and allowed to remain open for passengers to enter while the operator is changing handles and taking his position at the opposite end of the car. In inclement weather, this is a particularly convenient feature. Release of the brakes from either end of the car results in closing the exit door, even though it were opened from the opposite end. The auxiliary control handle is interlocked so that the door cannot be opened by this means except upon applying full brake pressure.

High-Speed Light-Weight Interurban Cars

Western Ohio Railway's New Equipment, Weighing Only 32,462 Lb., Enables This High-Speed Interurban Railway to Maintain 45 M.p.h. Schedule at Considerably Low Operating Cost

A FEW weeks ago the Western Ohio Railway placed in operation ten 45-ft. light-weight interurban cars developed by the G. C. Kuhlman Car Company, Cleveland, and mounted on Brill light-weight truck No. 77-E-1, which have most satisfactorily met the highest expectations of the operating company. This high-speed interurban line operates from Findlay through Lima to Piqua, in the western part of Ohio, a 113-mile line on which a schedule speed of 45 m.p.h. is maintained. In the short space of time these cars have been in service they have clearly demonstrated their ability as far as speed requirements are concerned. In fact, in some of the tests which have been made these cars easily made 50 m.p.h. Their weight of 32,462 lb. is less than half that of the high-speed cars displaced and the railway company's engineers report that power consumption is also reduced one-half. These are the first light-weight cars developed for the high-speed interurban service and the general acclaim which has met their introduction, both from the railway's officials and passengers, indicates more than anything else the success of this accomplishment of providing light-weight cars for high-speed lines.

As will be noted in the illustrations, this car conforms in general appearance to standard interurban equipment. It is of a combination passenger, smoking and baggage type, measures 34 ft. 2⅞ in. over the corner posts, 45 ft. 0⅞ in. over the bumpers and has a seating capacity of forty-eight passengers, six of whom are accommodated on folding seats in the baggage compartment. There is a 4-ft. sliding door on each side of the baggage compartment at the forward end. The rear platform, by way of which passenger entrance and exit is made, is inclosed on each side by a two-leaf folding door over stationary type steps.



SEATS ARE ARRANGED FOR COMFORT DURING LONG TRIPS

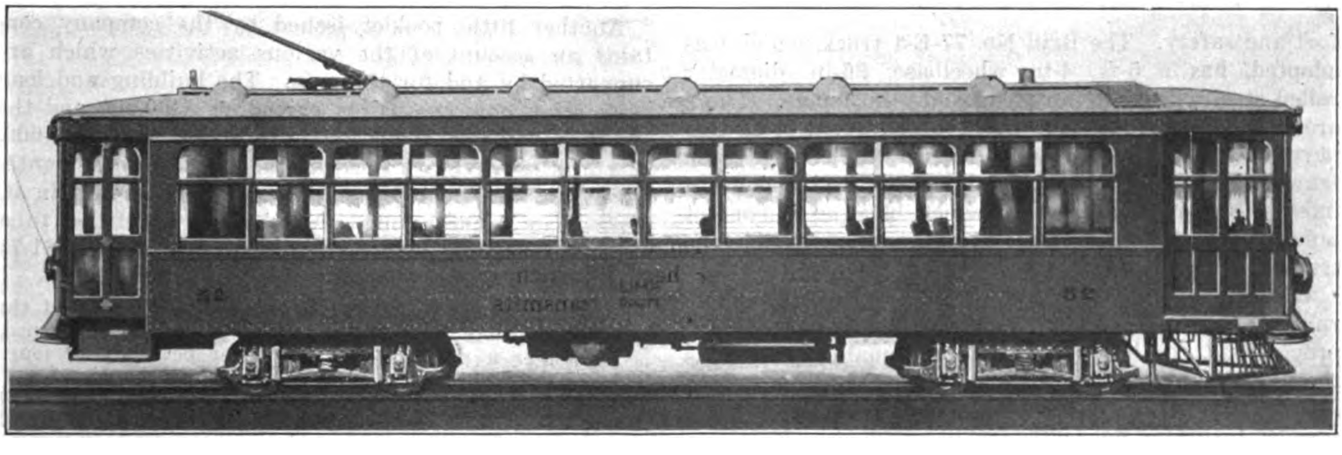
The body construction is entirely of steel commercial shapes and pressings and includes sides of built-up steel girders extending from the side sill angles to the window sills, sheathed on the outside with No. 13 gage sheet steel side girder plates. Double corner posts are used and T-section side posts divide the double windows. These are placed 5 ft. 4 in. apart and extend from the side sill angle to the No. 16 pressed steel letter board. There is a T-section sub-post dividing each window in two parts which extends from the top compression member of the side girder at the window sill to the letter board. Pressed steel carlines, riveted to the letter board flange, support a ⅜-in. Haskelite veneer roof securely clamped at all edges to the letter panel flange and carlines by the special method of the car builder.

The side window sash are of the double type, each upper sash spanning two lower sash. All lower sash, which are arranged to raise, have brass sash stiles which fit into the grooves of the Brill "Renitent" spring brass post casings. This type of post construction holds the window sash under compression, preventing sash rattle and providing a sash fit which is air, dust and water tight.

Inside the body at the forward end there is an open archway, while at the rear there is a closed bulkhead fitted with a swing type door. Between the compartments there is a partition made of cherry, having a swing

PRINCIPAL DIMENSIONS AND WEIGHTS

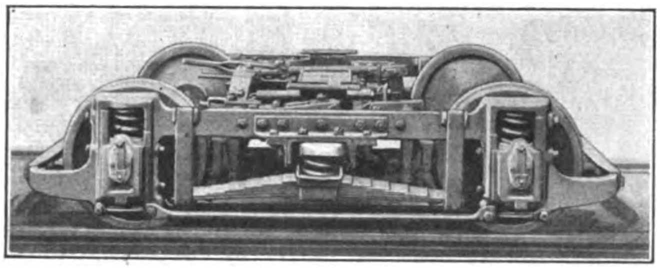
Length over corner posts	34 ft. 2⅞ in.
Length over platforms	43 ft. 9⅞ in.
Length over bumpers	45 ft. 0⅞ in.
Width over sides	8 ft. 6 in.
Extreme width	8 ft. 8⅛ in.
Height, rail to side sills	2 ft. 2⅛ in.
Height, rail over trolley boards	10 ft. 7⅞ in.
Height, rail to step	16⅛ in.
Height, step to platform	15⅛ in.
Weight of body, less electric and air equipment	14,382 lb.
Weight of electrical equipment on body	1.200 lb.
Weight of air equipment on body	1,500 lb.
Weight of motors	5,114 lb.
Weight of trucks, including gears	10,266 lb.
Total weight	32,462 lb.



EXTERIOR OF NEW INTERURBAN CAR

type door fitted with stationary sash, except that between the smoking and baggage compartments, which is paneled on each side of the door.

Below the windows on each side the construction is insulated for heat and cold by the installation of specially treated balsa wood, ¾ in. thick, covered with thin linoleum painted to conform to the interior finish. All window sill cappings and interior moldings as well as the Brill spring brass "Renitent" post casings are painted cherry. The ceiling, the underside of the three-ply veneer roof, is finished in white enamel as no interior headlinings are required.

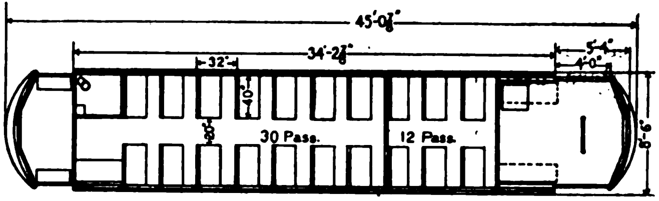


NEW DESIGN INTERURBAN TRUCK ON WESTERN OHIO CARS

As indicated on the accompanying diagram, a saloon is located in the rear right-hand corner of the passenger compartment. Provision is made in this saloon for the usual water cooler. All transverse seats are of the Brill non-reversible type for interurban service with pressed-steel aisle plates and aisle rests with wood caps. Those in the passenger compartment are upholstered in plain green plush, while those in the smoking compartment are upholstered in imitation leather. These seats provide the kind of passenger comfort so essential to long interurban service and which must necessarily be considered in any type equipment for this class service. The longitudinal seats in the baggage compartment are of the folding slat type.

The electrical equipment of these cars includes four G. E. No. 265 motors (35 hp.), with K-35 control for single-end operation, and G. E. straight airbrake equipment, with an emergency feature having a conductor's valve at the rear end, is also used.

Much attention was given to the question of trucks, taking into consideration the questions of weight, comfort and safety. The Brill No. 77-E-1 truck, which was adopted, has a 5-ft. 4-in. wheelbase, 26-in. diameter rolled steel wheels, 3½-in. tread and ⅞-in. flange. There are many features of this truck which adapt it to this particular class of service. It has solid-forged side frames, is comparatively light in weight and includes a number of patented features which have an important influence on the comfortable riding action of this type truck.



PLAN OF WESTERN OHIO RAILWAY'S NEW CARS

While the weight of 32,462 lb. for the car in complete running order is higher than other cars of the same proportions, the body is considered equally as light as the lightest car of its size yet developed, and the weight is attributed to the heavier equipment required in high-speed interurban service.

Representation Plan Highly Successful

FOR almost four years now the "representation plan" on the Kansas City (Mo.) Railways has been tested in the crucible of daily experience and has emerged as perfect in its record of accomplishment as anything of the kind could be expected to do. How well-nigh perfect the record has been is, perhaps, best attested by the statement that not one case coming up for settlement has ever got as far as the central committee and that 99 per cent of the cases are settled in the division committees. There have been very few appeals to the general mechanical and general transportation committees. In short, four years use of the plan has demonstrated conclusively that the objects sought to be accomplished have been accomplished, namely:

1. Insure to every employee exact justice in all matters of discipline or discharge.
2. Settle and adjust promptly all questions affecting wages and working conditions.
3. Provide for compulsory arbitration as a last resort.
4. Insure co-operation between employees and management in all matters affecting the operation of the company and the welfare of its employees.
5. Insure continuous, uninterrupted transportation service to the public.

The general plan as put into effect on April 1, 1919, has been revised by the employees and their committees twice since its adoption, changes being minor organization ones. The range of activities under this system comprises everything connected with the operation of the road. Committees form the machinery for considering every possible thing that is taken up. About half the time of the committees is taken up in adjusting grievances and settling disputes.

In the three years of the work of the plan, F. G. Buffe, general manager of the company, the author of the plan, has never had a single case appealed to him, despite the fact that there are more than 3,000 employees. This is all the more remarkable when it is considered all matters affecting the relations between the company and its employees, after following the various courses of appeal, rest for final settlement in the hands of the central committee, but that no employee is prevented from acting individually or taking up any matter with any official of the company or the receiver. In a pamphlet on the plan Mr. Buffe said:

> The Kansas City Representation Plan has now been in effect for four years and, with slight modifications made by the central committee, is substantially the same as the employees adopted in April, 1919. It provides for the representation of the employees of this company in its management and gives them complete committee representation to adjust any grievances that may arise affecting the individual case, working conditions or wages.
>
> One of the chief reasons for the continued success of the company has been the wonderful spirit of co-operation shown.

Another little booklet issued by the company contains an account of the various activities which are supported by and for the men. The building and loan association now has assets exceeding $300,000 and the monthly pay-roll deductions are more than $10,000. The brotherhood, as it is known, meets once a month. Of the 3,000 employees eligible for membership in it, more than 2,800 belong. Members are entitled to a most imposing list of benefits for monthly dues of $1.75 each. Mr. Buffe is quoted:

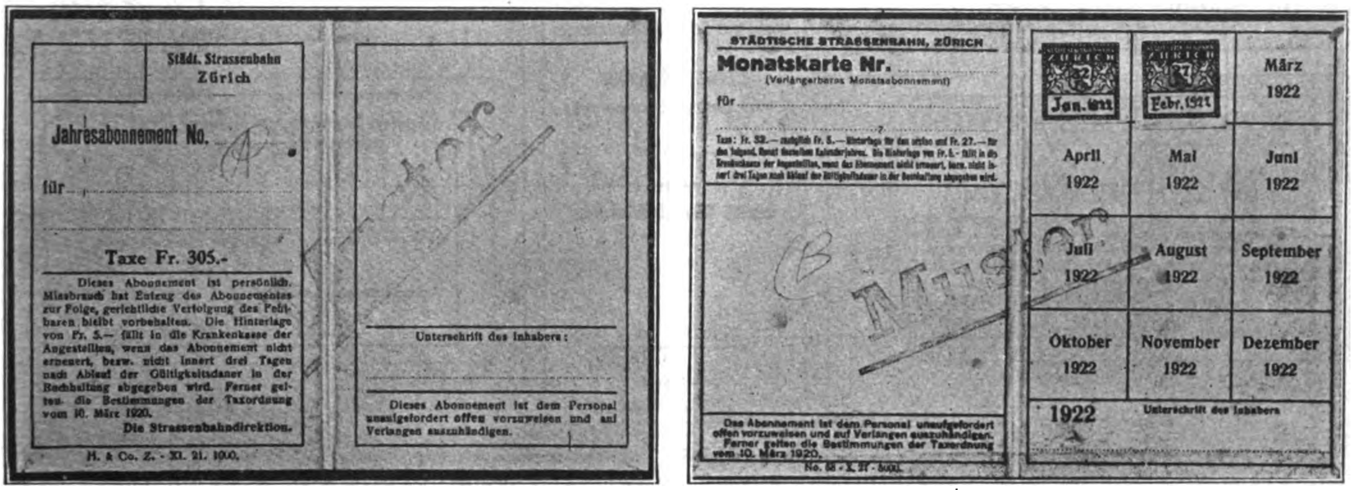
> I do not believe I am exaggerating when I say that the labor situation in Kansas City, as far as we are concerned, is no longer a problem. It has never been my pleasure to see a better satisfied or more contented bunch of employees, and you can't knock the Kansas City Railways to any one of them without having an argument then and there.

Riding on a Pass

Studies Are Given of Long-Standing European and Recently Devised American Forms of Blanket Transportation with Comments as to Their Relative Advantages

By Walter Jackson
Fares Consultant

When the writer first suggested the weekly, unlimited-ride, transferable pass inaugurated on the Racine division of the Milwaukee Electric Railway & Light Company on Aug. 18, 1919, many electric railway operators held that this or any other form of non-recorded, intangible transportation was impracticable. As a matter of fact, there was nothing new in the idea of the pass itself but only in the manner of fixing its price, its period of validity, restrictions as to use and selling effort or advertising. Its practicability under American fare conditions has now been demonstrated not only at Racine (63,000 people), but also at Kenosha (44,000 people) since Jan. 24, 1921; Youngstown (146,000) since Oct. 3, 1921; Beaver Valley Traction Company (cross-country line serving 64,000 people) since Feb. 13, 1922; Fort Wayne (86,000 people) since Feb. 27, 1922; Terre Haute, Ind., and Meadville, Pa., since May 1, 1922; Fort Smith, Ark., May 29, 1922; also Gainesville, Ga.; Tacoma, Everett and Bellingham, Wash.; Houghton, Mich.; St. John, N. B.; Paducah, Ky., etc. In all some twenty cities are using the pass. The Chicago Elevated Railways also filed a new fare scale to include a $1.25 pass as of Sept. 18, and applications for the Pomona and Riverside systems of the Pacific Electric Railway, Astoria, Ore., and the Washington-Virginia Railway are in hand.



Städt. Strassenbahn
Zürich

Jahresabonnement No. A

für

Taxe Fr. 305.-

Dieses Abonnement ist persönlich. Missbrauch hat Entzug des Abonnementes zur Folge, gerichtliche Verfolgung des Fehlbaren bleibt vorbehalten. Die Hinterlage von Fr. 5.— fällt in die Krankenkasse der Angestellten, wenn das Abonnement nicht erneuert, bezw. nicht innert drei Tagen nach Ablauf der Gültigkeitsdauer in der Buchhaltung abgegeben wird. Ferner gelten die Bestimmungen der Taxordnung vom 10. März 1920.

Die Strassenbahndirektion.

H. & Co. Z. - XI. 21. 1000.

Unterschrift des Inhabers:

Dieses Abonnement ist dem Personal unaufgefordert offen vorzuweisen und auf Verlangen auszuhändigen.

STÄDTISCHE STRASSENBAHN, ZÜRICH

Monatskarte Nr.
(Verlängerbares Monatsabonnement)

für

Das Abonnement ist dem Personal unaufgefordert offen vorzuweisen und auf Verlangen auszuhändigen. Ferner gelten die Bestimmungen der Taxordnung vom 10. März 1920.

Zürich 32 Jan. 1922	Zürich 27 Febr. 1922	März 1922
April 1922	Mai 1922	Juni 1922
Juli 1922	August 1922	September 1922
Oktober 1922	November 1922	Dezember 1922

1922 Unterschrift des Inhabers

At Left, Yearly Pass of the Zurich Municipal Railway. The Renewable Zurich Monthly Pass Is at the Right

Again in August, 1920, the Mason City (20,000 people) & Clear Lake Railroad inaugurated a personal monthly ticket originated by R. Schaddelee, president of the company. Although the holder of the ticket does have to pay a tangible fare per ride, the ticket is in effect a pass which allows a lower rate per ride and therefore comes within the scope of this study. In November, 1921, the same plan became effective on the Clinton, Davenport & Muscatine Railway (16,000 people in Muscatine) with which Mr. Schaddelee is also connected. In both these cases the pass was introduced to give a lower rate to the steady rider while the casual patron's fare was raised from 7 to 10 cents cash straight. On Jan. 1, 1922, however, the Joliet (38,000 people) Electric Railway adopted this plan at a time when the straight cash fare was 10 cents, so that an increase in gross revenue would be attainable only through a heavy increase in riding.

Since both the weekly and monthly passes have attracted much attention and are likely to be adopted by many others, it seems appropriate now to discuss the types used on foreign city and rapid transit lines. It was personal study of these examples that led to the suggestion of a weekly unlimited-ride, transferable pass based upon the cost of more than twelve full fares a week.

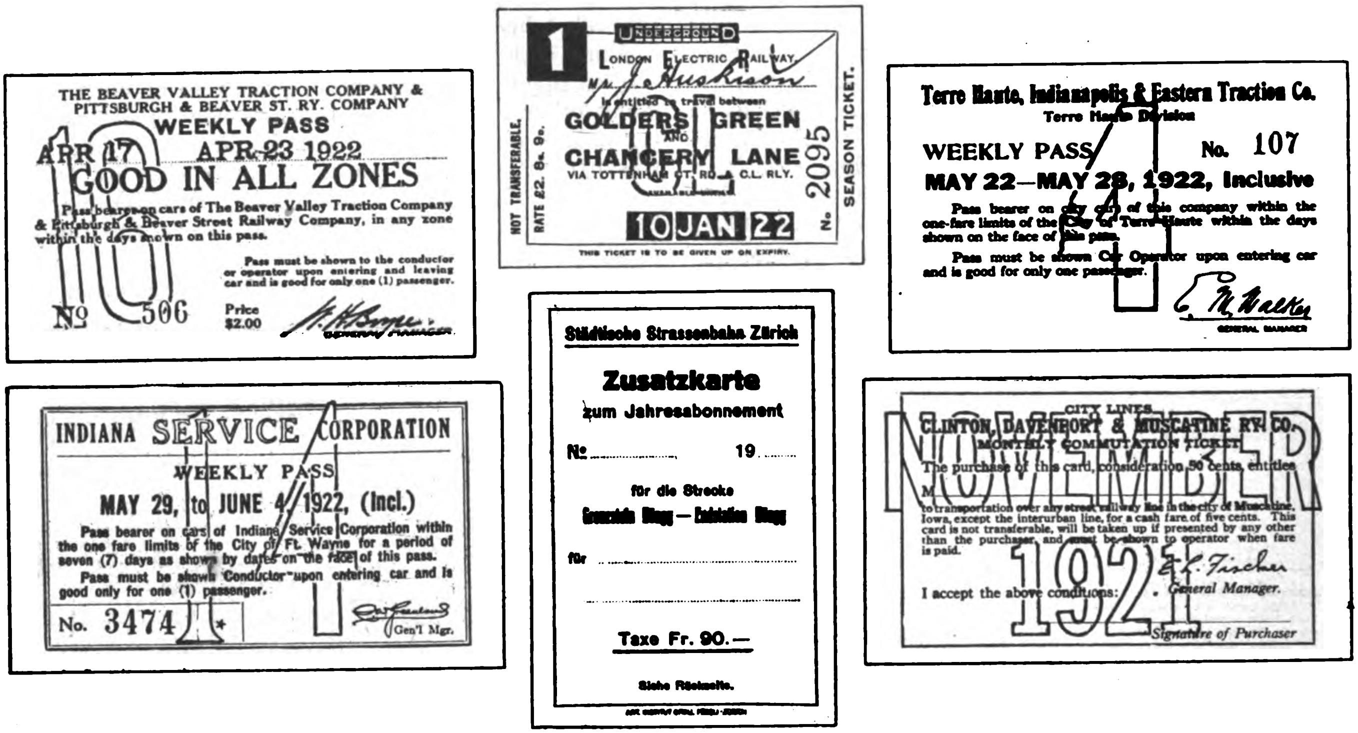
Zurich is an industrial city of 205,000 population with publicly owned street railways. Like most foreign lines the latter have a variety of fares that would stagger operators used to the charming, but not necessarily economic, simplicity of most American systems. The fare schedules inaugurated as of April 26, 1920, show:

Single-trip cash fares of 20, 30 and 40 rappen (or 4, 6 and 8 cents), according to distance.

Bound booklets containing eighteen tickets for 5 francs and good over the entire system, twenty-eight tickets for 5 francs good only for one zone or thirty-three tickets for 5 francs good only for rides before 7:45 a.m. These tickets must be detached by or in presence of the conductor, but as many people may ride simultaneously as there are tickets available.

The passes issued in Zurich cover periods from one year down to one month. Those sold to the general public are not transferable and must bear the buyer's photograph. Those purchased by the post office and the telephone and telegraph department are merely numbered and their use is limited to employees of these government bureaus. There are also special passes for children who are aided by the municipal welfare bureau and for students (school days only) in the local school of forestry. Still another variety is involved in the purchase of an extra-fare pass for those Zurich passholders who wish to ride on the Hongg suburban division. Finally, there is a package pass which is purchased by merchants for their messengers. This pass does not cover personal fare but does cover the right to transport packages that would otherwise have to be paid for by the piece.

All passes are made up in the form of a pair of stiffly-bound cloth covers. They are not transferable. Usually the regulations, name of user, cost, etc., are printed on the paper pasted inside these boards, but the passes issued to government employees also have outer identification as the covers are of a different color.



THE BEAVER VALLEY TRACTION COMPANY &
PITTSBURGH & BEAVER ST. RY. COMPANY
WEEKLY PASS
APR 17 APR 23 1922
GOOD IN ALL ZONES
Pass bearer on cars of The Beaver Valley Traction Company & Pittsburgh & Beaver Street Railway Company, in any zone within the days shown on this pass.
Pass must be shown to the conductor or operator upon entering and leaving car and is good for only one (1) passenger.
No 506
Price $2.00
General Manager

UNDERGROUND
1
LONDON ELECTRIC RAILWAY.
Mr J. Huskison
is entitled to travel between
GOLDERS GREEN
AND
CHANCERY LANE
VIA TOTTENHAM CT. RD. & C.L. RLY.
NOT TRANSFERABLE.
RATE £2. 8s. 9d.
10 JAN 22
No. 2095
SEASON TICKET.
THIS TICKET IS TO BE GIVEN UP ON EXPIRY.

Terre Haute, Indianapolis & Eastern Traction Co.
Terre Haute Division
WEEKLY PASS No. 107
MAY 22—MAY 28, 1922, Inclusive
Pass bearer on city cars of this company within the one-fare limits of the City of Terre Haute within the days shown on the face of this pass.
Pass must be shown Car Operator upon entering car and is good for only one passenger.
E. M. Walker
GENERAL MANAGER

INDIANA SERVICE CORPORATION
WEEKLY PASS
MAY 29, to JUNE 4, 1922, (Incl.)
Pass bearer on cars of Indiana Service Corporation within the one fare limits of the City of Ft. Wayne for a period of seven (7) days as shown by dates on the face of this pass.
Pass must be shown Conductor upon entering car and is good only for one (1) passenger.
No. 3474
Gen'l Mgr.

Städtische Strassenbahn Zürich
Zusatzkarte
zum Jahresabonnement
№ .... 19 ......
für die Strecke
für ....
Taxe Fr. 90.—
Siehe Rückseite.

CITY LINES
CLINTON, DAVENPORT & MUSCATINE RY. CO.
MONTHLY COMMUTATION TICKET
NOVEMBER
The purchase of this card, consideration 50 cents, entitles
M
to transportation over any street railway line in the city of Muscatine, Iowa, except the interurban line, for a cash fare of five cents. This card is not transferable, will be taken up if presented by any other than the purchaser, and must be shown to operator when fare is paid.
1921
E. C. Fischer
General Manager.
I accept the above conditions:
Signature of Purchaser

GROUP OF TYPICAL EUROPEAN AND AMERICAN PASSES

Upper row, left to right: Beaver Valley Traction Compan , London Underground Railways, Terre Haute City Lines. Lower row, left to right: Fort Wayne (Ind.) City Lines, Zurich (Switzerland) supplementary ticket for Hongg division, Muscatine (Iowa) City Lines

The passholder who rides on the Hongg division must also show a separate card. There is no registration on the car to show how often each class of passholder rides, but four rides a day and 360 days in the year are used in estimating the volume of pass traffic.

How does the Zurich management, after many years of experience, determine the cost of the passes used by the general public?

The annual pass is sold at 305 francs, which is equivalent to 83.5 rappen a day. As the maximum single-trip fare is 40 rappen, the cost of the pass is equal to 2.1 rides a day. For this, the holder probably averages four to five rides per working day, as Zurich is a compactly built city and the average business man and woman allow more time for the luncheon period than here.

The semi-annual pass is sold for 155 francs or 83.6 rappen a day, making the cost per trip almost the same as to the annual passholder. A monthly pass at 32 francs costs a bit more per day, viz., 1.03 francs or a little more than two and one-half times the price of a single-trip maximum-length ride at 40 rappen. But, of course, the passholder will average more than two rides a day. Those who start with a monthly pass may purchase (through stamps as shown) an extension at the rate of 27 francs per month within the same calendar year. If such a purchaser started in January, his total cost would be 309 francs or only 4 francs more than the one who could afford the entire year's outlay at once. Each passholder also deposits 5 francs, which is forfeited to the employee's benefit fund if the pass is not returned within three days after expiration.

During the year 1920, there were sold 491 annual, 3,244 semi-annual and 27,426 monthly adult, individual passes which were responsible for 6,342,480 out of a total of 48,618,232 passengers. About 50 per cent of all passengers paid full fare; about 20 per cent purchased the different varieties of 5-franc booklets, while the rest were on either personal or public passes.

In the fiscal year ended May 31, 1920, the Aberdeen (population 165,000) Corporation Tramways derived approximately 3.5 per cent of its passenger revenue from the sale of quarterly passes, locally termed "composition tickets." These are non-transferable cloth-covered boards similar to the type used at Zurich, but no photograph of the passholder is required. The pass is made out for any desired number of zones between specified points. The adult's rate is £1 for the first 2,100 ft. and 8d. for every additional 300 ft.; passes for children under fifteen years are half price.

To see how the adult fare shapes up against single-trip rides, the Mannofield route may be taken for comparison, as this is one on which the passes have been responsible for as much as 20 per cent of the riding. This route has an over-all fare of 2d. for its length of 2.06 miles. The average length of ride of a 2d. rider, however, may be taken at 1.75 miles. A regular rider over that distance would therefore have to pay for a stretch of 9,240 ft., which would cost him £1 for the first 2,100 ft. and 8d. more for each additional stretch of 300 ft. (300 ft. into 7,140 ft. or 23.1 × 8d.). This equals 424.8d. for say ninety days' riding, or 4.7d. a day. Two cash trips would cost 4d. anyway, so that for 0.7d. a day the passholder gets all the extra, off-peak rides he wants.

BLACKPOOL CALLS THEM "CONTRACT TICKETS"

The famous English bathing resort, Blackpool (population 58,000), sold during the fiscal year ended March 31, 1921, a total of 5,463 annual passes locally termed "contract tickets." The revenue from this source was £14,896, which was approximately 5 per cent of the total traffic receipts of £276,598. Contract tickets are so called from the fact that they are applied for on a formidable contract form which shows the prices for different stages and the reduction for juveniles under eighteen years of age. Up to July, 1919, an over-all pass cost only £3, or 720d. for anywhere up to 1,825 rides a year, assuming five rides a day—the general manager's estimate. The cost was doubled at that time, making the relation stand at 1,440d. for 1,825 rides. Even on the basis of four rides a day for 360 days in the year, there would be 1,440 rides, making the cost 1d. per ride, whereas the average distance for a penny in June, 1921, was only 0.9 mile. An over-all passholder would average a much longer trip than this; if not, he could buy a "one-section" pass at half price. So regarded from any angle, the cost of the Blackpool pass is far too low to be economic.

A feature common to both the Zurich and Blackpool contracts is that in the event of the passholder's death or other special causes, a rebate is made. At Blackpool, the matter is left to the discretion of the general manager; at Zurich the restitution amounts to 9 francs for each unused half of a calendar month following at least one month's illness or absence.

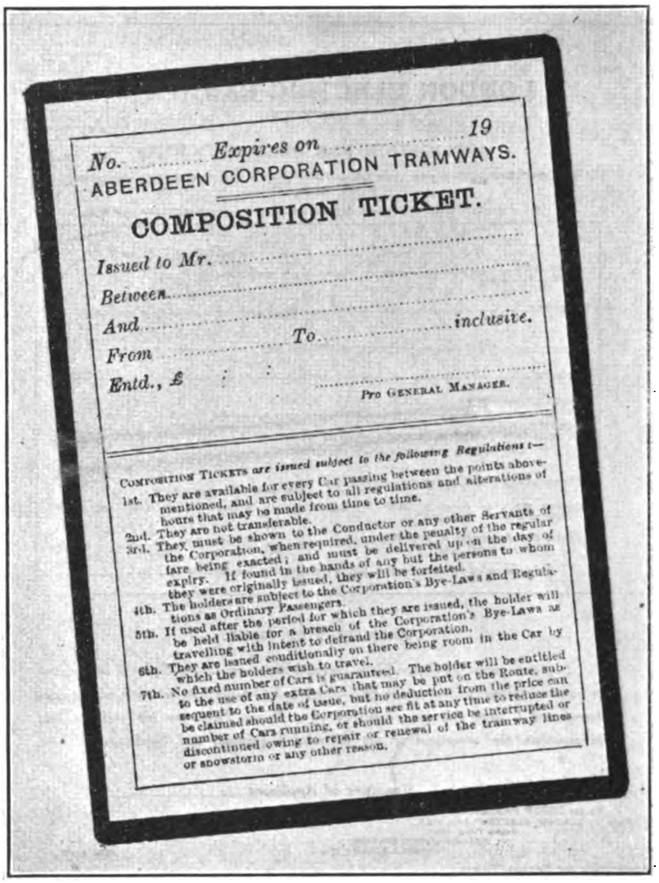
LONDON'S STATION-TO-STATION PASSES

In addition to its endless variety of graduated single-trip fares and special round-trip fares, the London Underground Electric Railways also issues passes called "season tickets" or "seasons" between any desired stations and good also for all intermediate stations. They are sold for annual, semi-annual, quarterly and monthly periods good only for the purchaser. Half-rate passes are obtainable also for children under fifteen years of age, for juveniles such as apprentices, clerks, etc., under eighteen years of age. Passes are issued at once from the season ticket office, or on twenty-four hours notice from any booking station. Season tickets must be returned within one day after expiration. There is no penalty for failure to do so, but the company may refuse to issue a new pass if the old one is not turned in. No allowance is made for the unused portion of monthly tickets. To encourage contracts for the longer period, the cost of a monthly ticket is 10 per cent higher per diem than a quarterly ticket.

The principle of fare fixing used in connection with London "seasons" is akin to that of the American steam railroad commutation book except that the "season" is good for an unlimited number of rides within the time limits. In general, a patron who lives too far out to go home for lunch averages a daily fare expense below that of two cash rides. In addition to this reduction based on his twelve compulsory rides a week, he gets all his evening and holiday riding for nothing. The natural consequence is that he is more likely to go out then than if he had to pay fare. In doing so, he will have one or more companions going the same way for whom fare must be paid unless they also are passholders.

On the other hand, a person living close enough to his work to average four rides a day may be assessed the cost of two and one-half to three cash rides. In this way, he gets his off-peak rides at a very low rate; and like his long-distance brother takes out his family or friends oftener than he would if he had no pass for himself.

The London season ticket is nothing more than a simply-worded card 3x2½ in., on which is stamped the date of expiration. Where it is not worth while to print the names of the stations, a rubber stamp serves the purpose. Thus: "Golders Green and Chancery Lane via Tottenham Court Road and Central London Ry." is printed, while "Strand and Knightsbridge via Leicester Square" is stamped. The pass bears the signature of the user.



No. .... *Expires on* 19

ABERDEEN CORPORATION TRAMWAYS.

COMPOSITION TICKET.

Issued to Mr. ....

Between ....

And ....

From .... *To* .... *inclusive.*

Entd., £ : : ....

Pro GENERAL MANAGER.

COMPOSITION TICKETS *are issued subject to the following Regulations* :—

1st. They are available for every Car passing between the points above-mentioned, and are subject to all regulations and alterations of hours that may be made from time to time.

2nd. They are not transferable.

3rd. They must be shown to the Conductor or any other Servants of the Corporation, when required, under the penalty of the regular fare being exacted; and must be delivered up on the day of expiry. If found in the hands of any but the persons to whom they were originally issued, they will be forfeited.

4th. The holders are subject to the Corporation's Bye-Laws and Regulations as Ordinary Passengers.

5th. If used after the period for which they are issued, the holder will be held liable for a breach of the Corporation's Bye-Laws as travelling with intent to defraud the Corporation.

6th. They are issued conditionally on there being room in the Car by which the holders wish to travel.

7th. No fixed number of Cars is guaranteed. The holder will be entitled to the use of any extra Cars that may be put on the Route, subsequent to the date of issue, but no deduction from the price can be claimed should the Corporation see fit at any time to reduce the number of Cars running, or should the service be interrupted or discontinued owing to repair or renewal of the tramway lines or snowstorm or any other reason.

THIS PASS (COMPOSITION TICKET) USED AT ABERDEEN FOLDS AND HAS A STIFF CLOTH BACK

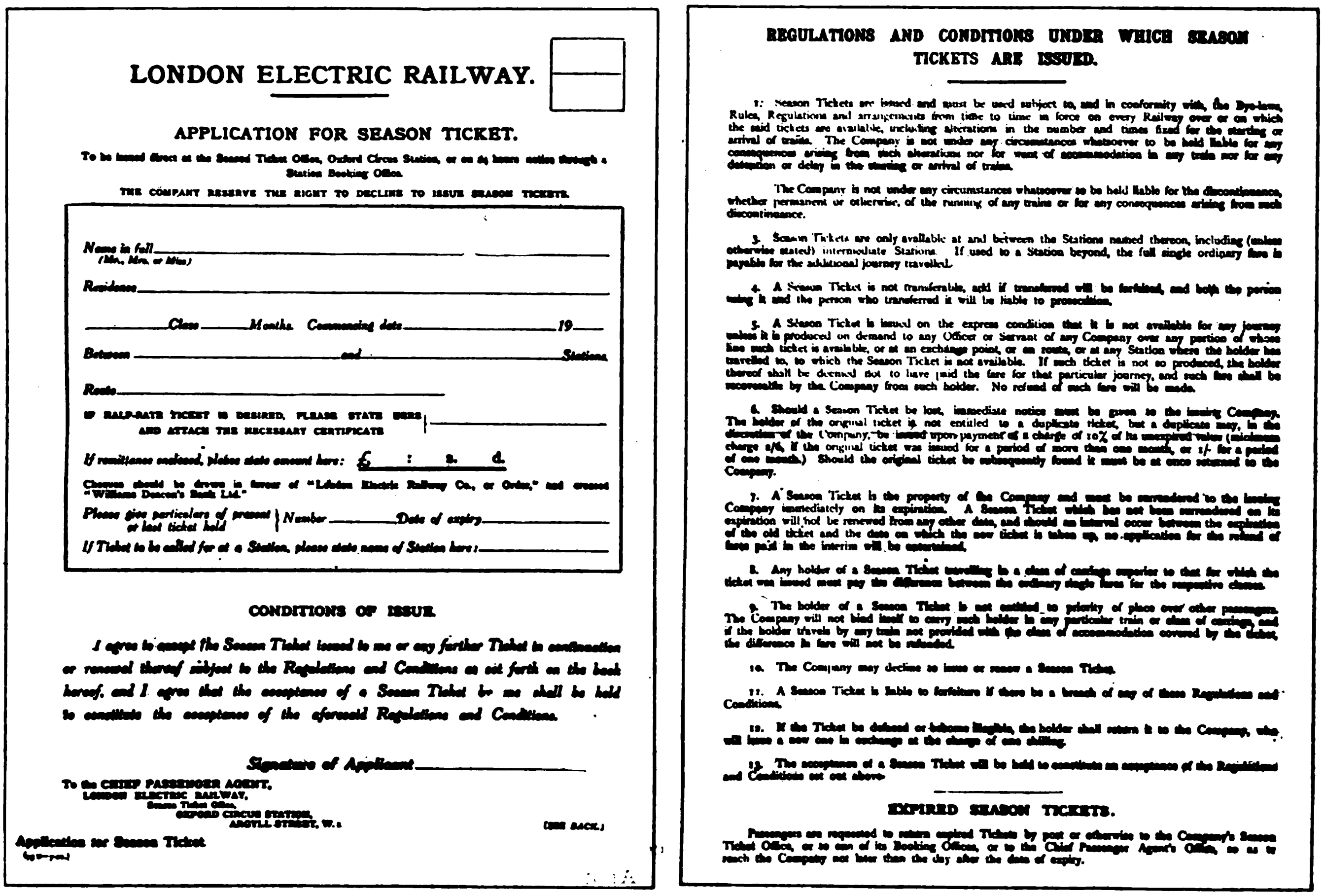
VIENNA USES PHOTO IDENTIFICATION

The Vienna Municipal Tramways probably has a greater variety of passes than any other street railway in the world—or did. The writer cannot guarantee what the present practice is for there have been numerous changes in fare since his visit in 1921. With a wildly fluctuating exchange, the management can hardly afford to make even a monthly agreement with a passenger.

One pass covering the period of Jan. 2-July 1, 1921, was sold for 2,300 kroner and was good only in fare area I, exclusive of any special-fare sections therein. A space was provided for the passholder's photograph. The opposite side carried the expression: "Netzkarte

No. ......" or "Pass No. ...... Section I" with lines for the name, address and signature of the purchaser. The wording at the bottom was to the effect that the pass is not transferable and that it would be taken up if found in the wrong hands. The pass is illustrated.

A variety that seems peculiar to Vienna is the type of pass which is not good for a ride in itself but which entitles the holder to a reduced rate—just like the Schaddelee monthly personal ticket—except that no service charge is involved. Such a pass is granted, for example, to residents along the trackless trolley extension, inasmuch as they are already penalized for higher fares through being long riders on the city system; or it may be granted to employees of certain factories; to school children, etc. In many cases of this kind, identification as to person and residence must be attested by the captain of the local police precinct! Obviously, American car riders would be unwilling to go through such procedure.



LONDON ELECTRIC RAILWAY.

APPLICATION FOR SEASON TICKET.

To be issued direct at the Season Ticket Office, Oxford Circus Station, or on 24 hours notice through a Station Booking Office.

THE COMPANY RESERVE THE RIGHT TO DECLINE TO ISSUE SEASON TICKETS.

Name in full ______________________ ______________
(Mr., Mrs. or Miss)

Residence ______________________________

______ *Class* ______ *Months.* *Commencing date* ______________ *19* ____

Between ______________ *and* ______________ *Stations.*

Route ______________________

IF HALF-RATE TICKET IS DESIRED, PLEASE STATE HERE AND ATTACH THE NECESSARY CERTIFICATE } ______________

If remittance enclosed, please state amount here: £ : s. d.

Cheques should be drawn in favour of "London Electric Railway Co., or Order," and crossed "Williams Deacon's Bank Ltd."

Please give particulars of present or last ticket held } *Number* ________ *Date of expiry* ________

If Ticket to be called for at a Station, please state name of Station here: ______________

CONDITIONS OF ISSUE.

I agree to accept the Season Ticket issued to me or any further Ticket in continuation or renewal thereof subject to the Regulations and Conditions as set forth on the back hereof, and I agree that the acceptance of a Season Ticket by me shall be held to constitute the acceptance of the aforesaid Regulations and Conditions.

Signature of Applicant ______________________

To the CHIEF PASSENGER AGENT,
LONDON ELECTRIC RAILWAY,
Season Ticket Office,
OXFORD CIRCUS STATION,
ARGYLL STREET, W. 1

(SEE BACK.)

Application for Season Ticket
(93 P—[illegible])

REGULATIONS AND CONDITIONS UNDER WHICH SEASON TICKETS ARE ISSUED.

1. Season Tickets are issued and must be used subject to, and in conformity with, the Bye-laws, Rules, Regulations and arrangements from time to time in force on every Railway over or on which the said tickets are available, including alterations in the number and times fixed for the starting or arrival of trains. The Company is not under any circumstances whatsoever to be held liable for any consequences arising from such alterations nor for want of accommodation in any train nor for any detention or delay in the starting or arrival of trains.

The Company is not under any circumstances whatsoever to be held liable for the discontinuance, whether permanent or otherwise, of the running of any trains or for any consequences arising from such discontinuance.

3. Season Tickets are only available at and between the Stations named thereon, including (unless otherwise stated) intermediate Stations. If used to a Station beyond, the full single ordinary fare is payable for the additional journey travelled.

4. A Season Ticket is not transferable, and if transferred will be forfeited, and both the person using it and the person who transferred it will be liable to prosecution.

5. A Season Ticket is issued on the express condition that it is not available for any journey unless it is produced on demand to any Officer or Servant of any Company over any portion of whose line such ticket is available, or at an exchange point, or en route, or at any Station where the holder has travelled to, to which the Season Ticket is not available. If such ticket is not so produced, the holder thereof shall be deemed not to have paid the fare for that particular journey, and such fare shall be recoverable by the Company from such holder. No refund of such fare will be made.

6. Should a Season Ticket be lost, immediate notice must be given to the issuing Company. The holder of the original ticket is not entitled to a duplicate ticket, but a duplicate may, in the discretion of the Company, be issued upon payment of a charge of 10% of its unexpired value (minimum charge 2/6, if the original ticket was issued for a period of more than one month, or 1/- for a period of one month.) Should the original ticket be subsequently found it must be at once returned to the Company.

7. A Season Ticket is the property of the Company and must be surrendered to the issuing Company immediately on its expiration. A Season Ticket which has not been surrendered on its expiration will not be renewed from any other date, and should an interval occur between the expiration of the old ticket and the date on which the new ticket is taken up, no application for the refund of fares paid in the interim will be entertained.

8. Any holder of a Season Ticket travelling in a class of carriage superior to that for which the ticket was issued must pay the difference between the ordinary single fares for the respective classes.

9. The holder of a Season Ticket is not entitled to priority of place over other passengers. The Company will not bind itself to carry such holder in any particular train or class of carriage, and if the holder travels by any train not provided with the class of accommodation covered by the ticket, the difference in fare will not be refunded.

10. The Company may decline to issue or renew a Season Ticket.

11. A Season Ticket is liable to forfeiture if there be a breach of any of these Regulations and Conditions.

12. If the Ticket be defaced or become illegible, the holder shall return it to the Company, who will issue a new one in exchange at the charge of one shilling.

13. The acceptance of a Season Ticket will be held to constitute an acceptance of the Regulations and Conditions set out above.

EXPIRED SEASON TICKETS.

Passengers are requested to return expired Tickets by post or otherwise to the Company's Season Ticket Office, or to one of its Booking Offices, or to the Chief Passenger Agent's Office, so as to reach the Company not later than the day after the date of expiry.

FRONT AND BACK OF ONE OF THE SIMPLER FORMS OF APPLICATION REQUIRED IN EUROPE FROM THE PERSON DESIRING TO PURCHASE A PASS (OR SEASON TICKET)

GENERAL EUROPEAN SURVEY

As regards pass inspection abroad: On surface lines, the pass is inspected by the conductor "on the nod," to use a British expression. It is also subject to a second visé by the inspector who makes surprise boardings to see that the passenger has either a receipt for fare paid or a pass. On the London Underground, the pass is viséd on entering the station and again on leaving the station. The single-trip rider gives up his ticket at the exit station. No registration devices are used on Continental tramways, but some German street railways have taken up locked fareboxes lately. British tramways use a portable bell punch for perforating and counting fare receipts at the same time. The only British registration devices, outside of these punches, are the London Underground Railways' cash registers, which are used at the more important stations to record excess fare upon the exit of over-riding passengers. These practices are worth keeping in mind because of the basic difference from the American schemes of collecting and recording fares.

It will be observed from the foregoing that all of the foreign passes are restricted to the purchaser. This has always struck the writer as unenforceable, unnecessary and annoying. The larger the city, the greater the difficulty of identifying the bearer as the purchaser; and supposing it were possible to get information, the conductor would have no time for such palaver during rush hours. The restriction is also unnecessary in that the pass is a thing of value that the owner parts with only in exceptional cases. The restriction is annoying in compelling the patron to visit some central office and go through a lot of red tape. It is only on the London Underground that the latter procedure is simplified through having a pass agency at every station. Such rules compel a great deal of clerical work although there is an offset in the reduction of tickets and change-making required.

Having tested these restrictions by riding freely on the passes of others, the writer concluded that it was not worth while to promulgate rules that are difficult if not impossible to enforce. Therefore, the weekly pass has been made fully transferable, and this transferability has been made a selling point. People always will want to do as they please with their own. If they resent restrictions, they will welcome an invitation to

"Go to it and give the pass to anybody, provided it is used for but one ride at one time."

The limitation of the pass to a month or more also seemed unnecessary. Such long periods prevent the working classes and clerical people from purchasing them because they cannot lay out the necessary amount in advance. Hence we have the situation that those who get the lowest fares are those who could best afford the highest rates. The natural antithesis is the uneconomic workman's limited-hours rate. It seemed better to put the pass on the shortest practicable basis—one week—and to charge more than twelve single-trip fares for the same. In this way, the ratio of passholders and riders in American cities has already grown greater in months than it became abroad after a generation; and instead of getting less per diem from these wholesale riders, the American operator gets more.

Divergent Objects of the Monthly Personal Ticket and Weekly Transferable Pass

Both the monthly personal ticket and the weekly transferable pass have seen enough service to give some idea of what each accomplishes. As might be expected, applications have already been made to conditions that were not originally held of first importance. Thus, the pass put on at Racine in lieu of a zone fare has proved exceedingly effective at Youngstown in cutting jitney competition; while the monthly ticket intended at Mason City and Muscatine to grant a low rate to regular riders while raising the fare to casuals has also been instituted at Joliet, although the maximum fare of 10 cents had already been attained there. No two of the cases are alike, yet some interesting speculations are permissible on the basis of the results attained.

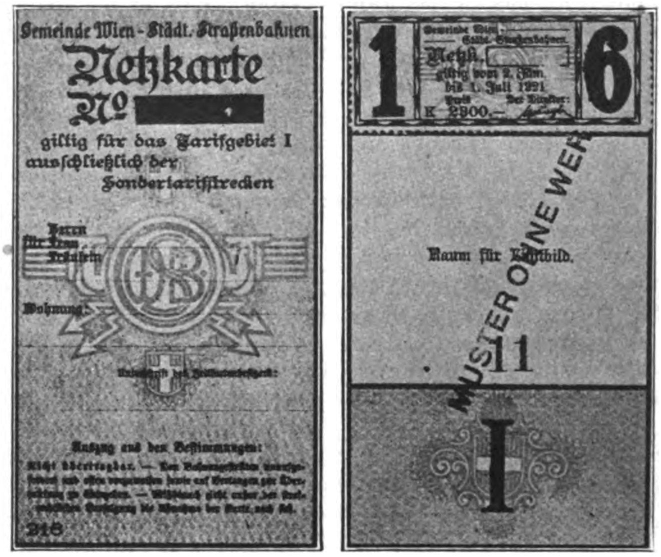
Thus in any given city, one would find more buyers for the monthly ticket than for the weekly pass, because it is easier to secure 50 cents a month than 85 cents, $1, $1.25 or more per week. Also, the monthly ticket holder averages fewer rides than a weekly passholder because he still has to pay money each time. On the other hand, the big reduction which even two rides a day means to him, makes it essential to induce a ticket user to ride at least two and five-tenths to three times a day to be a profitable customer. Contrariwise, the weekly passholder having paid for all his riding in advance uses the service at will and is sure to average a much greater use of the service, although it is obvious he cannot take more than two rush-hour rides in any case. Figures to illustrate these points may now be given.

The Monthly Ticket to Date

Mason City, Iowa, has had monthly tickets since August, 1920. These were put on when the standard 5-cent fare was raised to 10 cents. The company did not push the sale of the ticket, so as late as January, 1922, this city of 20,000 had but 524 ticket holders. On the other hand, Muscatine with 16,000 people shows the result of a good advertising campaign, for there the number of tickets sold in January, 1922 (the third month of use), was 1,261. It seems likely that the average Mason City passholder is a bit wealthier, for transportation bargains are snapped up by the well-to-do first. At any rate, the Mason City ticket holder averaged 2.267 rides a day at a net cost of 5.782 cents per ride, yielding the company 13.1 cents a day against a cash fare of 10 cents or 91.7 cents a week. Ticket riders brought 39.25 per cent of the traffic and 28 per cent of the revenue.

The Muscatine advertising campaign cut deeper into the labor ranks, for the average passholder took only 1.777 rides a day at 6.033 cents net, yielding the company 10.7 cents a day against 10 cents straight cash or 74.9 cents a week. Ticket riders brought 52.6 per cent of the traffic and 42.8 per cent of the revenue. In November, 1921, the first month of the ticket, the change from a 7-cent to a 10-cent fare coincident with this reduction plan produced an increase of 11 per cent in daily revenue but a drop of 6.6 per cent in patrons, there being 98,819 riders for thirty days of November against 108,916 riders in thirty-one days of October. By January, however, the casuals seem to have returned, in addition to a little more riding by ticket holders (from 1.732 to 1.777 rides a day), making the traffic total 116,013.

To summarize Mason City and Muscatine: The monthly ticket plan seems to have resulted so far in granting a much lower rate of fare to people who ride chiefly in the rush hours. This is bound to be the case until the average rides are raised to three a day or twenty-one a week, at which figure the ticket holder will yield 21 × 5.55 cents or $1.17 a week in 10-cent fare communities.



Gemeinde Wien - Städt. Straßenbahnen

Netzkarte

No [redacted]

giltig für das Tarifgebiet I
ausſchließlich der
Sondertarifſtrecken

Herrn
für Frau
Fräulein

Wohnung:

Auszug aus den Beſtimmungen:

218

1 6

Gemeinde Wien
Städt. Straßenbahnen
Netzk.
giltig vom 2. Jun.
bis 1. Juli 1921
Preis
K 2900.—

Raum für Lichtbild.

MUSTER OHNE WER

11

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The Vienna Pass Has Space for a Photograph of the Holder and Is Not Transferable

Another of Mr. Schaddelee's properties, the Tri-City Railway of Illinois (Moline, 30,700 and Rock Island, 35,200) installed the personal monthly card on March 1, 1922, at 50 cents against (new) 10 cents and 8⅓ cents adult and 4-cent (old) children's fares. During April, 54 per cent of the riding and 37 per cent of the revenue came from card riders. These riders paid 5.9 cents fare and averaged 1.73 rides a day.

At Joliet, on introducing the ticket plan without change Jan. 1, 1922, in the standard fare of 10 cents then in force, the management said that it expected more riders but less revenue from its use. Information at hand for January is to the effect that the average rate of fare was cut from 9.7 cents to 8.7 cents, or 9.4 per cent. The increase in riding was not sufficient to offset this, but there was some increase in net earnings owing to a wage reduction.

The Weekly Pass to Date

The conditions under which the pass was installed at Racine were not favorable for a publicity campaign. The sales, therefore, have not been as high as they might have proved with a more favorable start. However, there was an increase in revenue almost from the first week.

At the same time, it has always been difficult to say what proportion of the gain was due to the pass and what was due to rising industrial conditions and the later introduction of improved service with safety cars. It is known, however, that the average number of rides taken was about four per business day and about twenty-six per week. Count of pass riders is no longer made. The Racine pass buyer yields 14.3 cents a day or $1 a week against a 7-cent cash and 5⅝-cent ticket fare. February, 1922, sales were on the order of 2,100 a week. During the depression, the pass sales have suffered less than cash and ticket sales—actually being ahead of the preceding year until the first months of 1922. This proves that the weekly pass tends to get more revenue out of the well-to-do, but that it does not attract the poorest paid class of riders so well as the monthly ticket. The proportion of revenue from passes has ranged from 15 to 18 per cent; and it may be estimated that the proportion of traffic from passholders is 25 per cent or more. A special check in the early days of the pass showed 13.8 per cent revenue and 19.7 per cent rides as the respective ratios to total revenue and riding.

At Kenosha the traffic suffered severely because of a bridge reconstruction along the main line. When 498 passes were sold, they brought 15 per cent of the revenue and about 20 per cent of the riding. The pass here is also sold for $1 against 7 cents cash and eight for 50 cents tickets, bringing in 14.3 cents for every day in the week.

At Youngstown the pass was favored by the circumstance that there was 10-cent and 8⅓-cent jitney traffic to capture in addition to creating traffic. The pass costs $1.25, yielding 17.9 cents a day against 9 cents cash and 8⅓ cents ticket and 1-cent transfer.

In the period Sept. 19, 1921 (before advertising and using the pass), to April, 1922, it had seen an increase of more than 50 per cent in traffic and 30 per cent in revenue with but 15 per cent increase in car-miles, although thirty-two-seat safeties were going on in place of thirty-six-seat double-truckers. Excellent, unremitting publicity seems to have done much to promote pass sales from the original 4,200 to 8,100 during recent weeks. The price is also very favorable, being but 20 cents a week more than the cost of twelve ticket rides. The ratio of pass riders is as high as 43 per cent and the revenue from pass riders is more than 30 per cent of the total. Although Youngstown is much bigger than Muscatine, Mason City or Joliet, which are of ideal size for home-lunch rides, the average number of "origin-to-destination" rides by weekly passholders is in excess of 3.3 a day, which shows that people can find plenty of reason for riding once they have been induced to pay for all of it in advance.

The Indiana Service Corporation of Fort Wayne is also on a $1 basis against a 7-cent cash fare, and four for 25 cents ticket fare. Its first week (Feb. 27-March 5, 1922) showed a sale of 3,100 passes; and later cool-weather weeks showed sales up to 3,872. As the Fort Wayne case is not complicated by jitney competition, it is worth noting that a comparison of eight weeks before the pass inaugural in 1922 and 1921 showed the 1922 period to be dropping behind at the rate of $324 a week. The comparison of the following fifteen weeks of each year shows that the 1922 period ran ahead $575 a week, making a total gain of $899 a week, which is between 4.5 and 5 per cent improvement in gross. The car-miles in the first eight 1922 weeks or non-pass period were 4.3 per cent ahead of 1921 but in the pass weeks only 2.8 per cent ahead of 1921.

CONCLUSION

Lack of space forbids more extended general discussion of pass experiences to date. However, it is proper to say that no user of the weekly pass believes it has cut his revenue. All agree that it has speeded operation and improved good will; and some have been kind enough to say that it has either protected or enhanced their revenue.

Iowa Midyear Meeting in Sioux City

THE midyear meeting of the operating heads of the Iowa Electric Railway Association will be held in Sioux City, Iowa, on Nov. 2 and 3. The program, which is still under preparation, will be published in an early issue.

American Association News

Conference of Interurban Companies

A CONFERENCE of all interurban companies interested in the construction of section 15A of the transportation act with respect to whether these companies come under the provision in regard to earning a 6 per cent return will be held on the pier some time during the convention.

The meeting of interurban men has been called at the request of Charles L. Henry, chairman of the committee on national relations, and at the request of several interurban companies which fear that the claim may be made by the Interstate Commerce Commission that "they are engaged in the general transportation of freight." A notice to interurban member companies in regard to the conference issued by Mr. Henry suggests that in the meantime, if the Interstate Commerce Commission has asked for reports from them, on the ground that they are included in the transportation act, they should write the director of the Bureau of Finance, Interstate Commerce Commission, requesting that no decision be made in the matter until after the convention, when the matter will be taken up for consideration.

The meeting will be held in a room provided in Section G at the center of the Municipal Pier, and suitable notices will be placarded on the pier indicating the time and location. Unless otherwise announced the meeting will be held at 3 p.m., Thursday, Oct. 5.

Meeting of Committee on Nominations

THERE will be a meeting of the committee on nominations of the American Electric Railway Association in front of Convention Hall, immediately at the close of the Tuesday morning session.

Chairman Henry of the committee has called this meeting in order to consider the nomination of a substitute for C. K. Knickerbocker, who was nominated as a member of the executive committee but has indicated that he will not be able to accept the nomination.

California Boosters Will Be on the Job at Chicago

BY AUTHORITY of the executive committee of the California Electric Railway Association the Californians attending the Chicago convention will urge upon the executive committee of the American Association the selection of California as the place for holding the midwinter meeting in the spring of 1923.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Taxation Argument Up

Court of Appeals Hears Question on Supporting Seattle Municipal Railway by Inroads on General Tax Fund

Three judges of the United States Court of Appeals, sitting in Seattle on Sept. 19, took under advisement the question of whether Seattle property owners can be taxed for the support of the Municipal Railway, if the gross revenues of the system should ever become insufficient to meet all its obligations. This issue was laid before the high federal tribunal in the appeal of the city of Seattle from a decision of District Judge E. E. Cushman, who last spring decreed that if the revenues ever should become insufficient to pay for operating the street cars, after the installments of interest and principal on the $15,000,000 purchase bonds had been taken out, the general tax fund should be invaded to make up the deficit.

The city, represented by its attorneys, Charles T. Donworth and T. J. L. Kennedy, appeared before the court to have this decree stricken, and the Puget Sound Power & Light Company, represented by James R. Howe; appeared to have the decree affirmed. The city was assisted in its appeal by counsel for the fourteen taxpayers who in the interests of all Seattle taxpayers have been fighting in the courts of this state to preserve the general tax fund from invasion for the municipal railway.

In the decree which the city is seeking to have reversed in this appeal, Judge Cushman assumed jurisdiction over the Municipal Railway and the parties in the litigation to compel specific performance of the city's contract with the Stone & Webster bondholders. He interpreted that contract as necessitating an invasion of the tax fund, if the street car revenues should prove insufficient.

Delivering the chief argument for the city, Assistant Corporation Counsel Donworth asked that the municipal government be permitted to perform its obligations to the bondholders voluntarily, as it has done in the past. He said that the company asked the court to give it something which it never bargained for, namely, the sovereign power of taxation to guarantee its bonds.

That the statutes of the state of Washington provide no authority to municipalities to incur general indebtedness for the purchase of utility properties was pointed out to the federal judges by Robert H. Evans, who appeared as special counsel for the city in this suit. He declared that this decision was fundamentally unsound, for the Legislature of the state had not conferred upon cities the power to levy taxes for the operation and maintenance of its public utilities.

Harold Preston, counsel for the fourteen taxpayers during their litigation in defense of the general fund in the state courts, represented them before the federal tribunal. He pointed out that the Supreme Court, in its decision in the fourteen taxpayers' case, enjoined the city from using the general fund in any way for the operation and maintenance of the street railway, and that the District Court, in the Cushman decree, compelled the city to do exactly that thing. He reviewed the decisions in the so-called Twichell case and the fourteen taxpayers' case in the state courts. He said:

> The Twichell case was instituted before the street railway purchase was consummated. to determine the validity of the bonds. The question of the general fund came before the court then only as a hypothetical one. It was presented in this way: If there is a deficit in the operation of the railway, will a general obligation be created? The Supreme Court held that from the record in the case, there was no possibility of a deficit, and therefore no general obligation was involved. When in the fourteen taxpayers' suit the Supreme Court learned for the first time there was a deficit, the court held that the general fund could not be encroached upon for the operation and maintenance of the railway.

Arguing in behalf of the Puget Sound Power & Light Company, James B. Howe declared that the Stone & Webster interests accepted the $15,000,000 of bonds as valid on the basis of the Twichell decision, and that neither the fourteen taxpayers' decision nor any other subsequent decision can affect them.

Assistant Corporation Counsel Kennedy, in rebuttal for the city, declared that stripped of all disguise, the company's suit was nothing more nor less than an attempt to enhance the value of the $15,000,000 bonds by a decree of the court that would stamp them as a general-fund obligation, rather than a debenture or utility bond.

Attorney Howe's argument centered largely on proof of breach of contract in the city's failure to have money on hand Feb. 10. 1921, to meet the payment due the company March 1, 1921.

San Francisco to Vote on Municipal Railway Extension Bond Issue

The public utilities committee of the San Francisco Board of Supervisors on Sept. 13 instructed the city attorney to prepare an ordinance outlining a $1,500,000 Municipal Railway extension bond issue for submission to the voters of the city at a special election. Other bond issues are to be voted upon Nov. 21, and it is thought probable that this railway extension question can also be settled at that time.

Long Island Planning Ahead

$2,000,000 Elevated Extension Under Way—Further Electrification Proposed for the Future

The Long Island Railroad has confirmed for the *Electric Railway Journal* the statement that the ultimate electrification of the 40-mile commutation zone of the Long Island Railroad is anticipated by the installation of additional power equipment in the Long Island City plant of that system.

It was said that the road's plans to replace steam with electric propulsion will be carried out first probably on the Montauk Division to Babylon. Eventually the company hopes to electrify the entire Oyster Bay branch, and the Wading River branch to Huntington or Northport, eliminating the necessity for changing trains at Jamaica.

Another improvement would involve the connection of the old and unused Central Railroad line with the Main Line, so that the express service may be diverted from the entire Montauk Division east of Babylon, through Hicksville and Mineola to Jamaica.

According to the president, the company has concentrated its efforts during the present year upon the extension of its conduit lines to a point just west of Forest Hills. This is intended to furnish additional feeders. The construction is progressing rapidly, and before many months will be completed at a cost of approximately $240,000.

The cost of extending a third rail to Babylon will be about $3,500,000, which must be added to a cost of $1,000,000 already met by the company in the additions made to the power plant. The extension of the conduits to Winfield in the last two years has cost $300,000.

In the next few weeks the railroad will begin work on the extension of its elevated structure eastward through Hollis and Queens to the boundary line of Nassau County. That is to be a four-track extension, and it is to be completed at the end of a year and a half at a cost of approximately $2,000,000.

Increased facilities are being added to the system, according to the officials, because of growing traffic demands. It was pointed out that the necessity for additional trackage was becoming more and more urgent because of the increasing population along the Main Line and the Montauk Division in the suburban zone. On those lines it was said that additional service had about reached the limit. With reference to the short-haul city traffic on the Long Island, President Peters said:

"I have tried to impress upon the

Transit Commissioners of this city that they ought to build a four-track rapid transit line from Jamaica over the Queens Boulevard route to Long Island City, thence under the river and across the city to Tenth Avenue, intersecting all the north and south lines on Manhattan Island and giving the Borough of Queens real rapid transit.

"The city should not depend on the Long Island Railroad to furnish rapid transit, as this transportation line is needed to serve all other parts of Long Island for passenger and freight transportation."

City Joins Railway in Seeking Review

The city of Seattle has joined with the Puget Sound Power & Light Company in application for a writ of review before the United States Supreme Court in the $400,000 railway tax suit. This is the case in which King County sued the city and company for taxes on the railway for the year 1919, when the railway was purchased by Seattle. The State Supreme Court held that the taxes were a lien on the railway property, and that the city and company were required to pay approximately $400,000 to the county. The city was held liable for about $300,000 of this. Application for a writ of review constitutes an appeal to the United States Supreme Court from the decision of the State Court.

Unification Suggested

Chief Engineer Osborne of the Board of Public Utilities at Los Angeles, Cal., recently laid before the board at a special meeting a report summarizing the recent decision by the State Railroad Commission in the Pacific Electric case. He recommended a comprehensive engineering survey of the local railway transportation situation in Los Angeles looking toward a unification of the existing lines under one ownership and one operating management.

The report was adopted by the board and was forwarded to the City Council for action. Mr. Osborne said:

> With the end in view of securing a comprehensive engineering report, I respectfully recommend to your honorable body, subject to the further approval of the City Council, that a joint report be made by the Engineering Department of the California Railroad Commission and the Board of Public Utilities. This report should discuss adequately and in a comprehensive manner the three ways outlined by the California Railroad Commission to secure a unification of the two local systems into one single system under one ownership and one operating management, as follows:
>
> The Pacific Electric to take over the Los Angeles Railway.
>
> The Los Angeles Railway to take over the local lines of the Pacific Electric Railway.
>
> The city of Los Angeles to take over the Los Angeles Railway lines as well as the local lines of the Pacific Electric Railway.
>
> I therefore respectfully recommend, upon approval by the City Council, that the California Railroad Commission be requested to authorize its engineering department to participate in such comprehensive joint report, and that after conference with Chief Engineer Richard Sachse, I present to your honorable body an estimate of the time which such survey and report will require, together with an estimate of the expense involved in making such report.

Commission Rules Out Complaint of Syracuse Against One-Man Cars

The objection to one-man operated street cars in New York State seems to have reached a culmination in the decision and finding of the Public Service Commission in the matter of the complaint of the City of Syracuse against the New York State Railways as to operation of one-man cars in that city. An abstract of the opinion follows:

One-man operated street cars in New York State are of comparatively recent introduction. In "Electric Railway Transportation" by Blake and Jackson, published in 1917, a statement is made that the one-man car was then in use on more than 125 roads. In August, 1921, there were in operation 4,300 one-man standard safety cars and 1,200 converted two-man cars according to general railway statistics.

The one-man car was adopted primarily as a matter of economy on the part of the street railway corporation in the matter of dollars paid for wages. According to the decision of the Public Service Commission of Sept. 21, 1922, in the Syracuse case permitting the continuance of the one-man car, when properly equipped with safety devices, it has proved not only economical in wage saving but also in the matter of accident cost.

Statistics submitted by the New York State Railways show in the city of Syracuse from April 1 to Dec. 31, 1921, inclusive on cars operated by two men there were carried 18,219,006 passengers at an accident expense per 10,000 passengers of $18.04. During the same period 9,604,854 passengers were carried on one-man cars at an accident expense per 10,000 passengers of $14.62, a difference of $3.42 per 10,000 passengers carried in favor of one-man operation.

In the Syracuse decision one-man cars are not advocated on congested lines, but in many cities, notably Albany, where at rush hours the United Traction Company places several men at strategic boarding points to sell tickets and make change for passengers, this type of car has proved its superiority both in loading and the discharge of passengers.

One-man cars are equipped with such safety devices that immediately the hand leaves the control the car automatically stops. The most of the accidents in connection therewith are of a minor nature.

From the standpoint of service on the average line the one-man car should not run more than two minutes behind the average two-man car schedule.

Single and double truck cars are operated within this state by one man in the cities of Poughkeepsie, Hudson, Albany, Troy, Schenectady, Amsterdam, Utica, Oswego, Binghamton, Elmira, Buffalo, Niagara Falls, part of Greater New York and many suburban lines. Public utility commissions of the states of Massachusetts, Connecticut, Missouri, Wisconsin, Rhode Island, Idaho, New York, Tennessee, California, New Hampshire and Illinois have approved their use.

In conclusion the commission said:

> It appears undisputed that in one-man car operation there is a saving in expenses of over $100,000 per year. This will have a material effect on determining the rate of fare. This commission feels that the public should have the service it is willing to pay for, and if Syracuse car riders are willing to pay the additional cost of two-men car operation they should have such operation. But it is apparent that they are not because of their complaint against the existing fare, at present service furnished to a considerable extent by one-man car operation.
>
> Upon the evidence in this case, the commission has reached the conclusion that the operation of one-man cars is not a serious inconvenience to the extent that it fails to give adequate service to the traveling public. The complaint should therefore be dismissed upon the condition that the company complete at once the installation of the safety devices on all cars operated by one man and comply with the suggestions of the commission in reference to safety of operation at grade crossings.

New Richmond-Cincinnati Company to Operate

A new interurban company has been formed to take over the old New Richmond & Cincinnati Interurban, now several months abandoned, lay new tracks and operate an electric line of passenger and freight service between Cincinnati and New Richmond, Ohio. This announcement was made by Lawrence Langdon, general counsel of the Union Gas & Electric Company and attorney for the new Cincinnati-New Richmond Railway Company.

Associated with Mr. Langdon are William Harton, general manager of the South Covington & Cincinnati Street Railway; Frank Woods, superintendent of the former New Richmond & Cincinnati Traction Company, and Walter Beaty, Cincinnati electrical engineer. According to Mr. Langdon the company will be incorporated with officers as follows: Mr. Harton, president; Mr. Langdon, vice-president; Mr. Beaty, secretary and treasurer, and Mr. Woods, manager.

The new company will take over the present franchise of the old company to operate its cars through Cincinnati streets to Stanley Avenue, where the Cincinnati terminus of the line will be located. A new franchise, however, will be sought in the Cincinnati Council.

The Council of New Richmond has already voted to give the company a franchise to operate its cars and to supply the town with electricity. The new company will lay standard gage tracks and communicate with the Pennsylvania Railroad along its route. A freight business will be carried on.

New Richmond at present is without interurban transportation. The New Richmond & Cincinnati Traction Company abandoned its service about four months ago. The line which was built in 1901 was known as the Eastern Division of the Interurban Railway & Terminal Company, which has also abandoned its only other division operating from Cincinnati to Lebanon.

Power to operate the interurban line will be furnished by the Union Gas & Electric Company.

Accepts Previous Proposals

With a View to a Five-Cent Fare the City and International Railway Representatives Will Meet

Herbert G. Tulley, president of the International Railway, Buffalo, sent a letter to Mayor Frank X. Schwab Sept. 27 accepting the proposals previously made by the Mayor calling for a conference between representatives of the city and the railway company with the view to the adoption of a plan whereby the 5-cent fare may be re-established in Buffalo. The International is now charging a 7-cent fare or four tokens for 25 cents.

In his letter to Mayor Schwab, President Tulley said:

> Acknowledging receipt of your letter asking the company to enter into negotiations with a view to the adoption of a system under which the 5-cent fare may be restored in some form and relations established similar to those existing in the city of Cleveland with such modifications as are practicable and applicable to Buffalo, I beg to say that the representatives of this company will be glad to negotiate with representatives of the city to determine what, if anything, can be done toward meeting your views.

The favorable reply from Mr. Tulley came as a big surprise to members of the City Council especially in view of the fact that responsibility for the strike which has crippled the company's lines since July 1 has been placed by officials of the International squarely upon Mayor Schwab and other members of the city goverment. Several members of the City Council already have expressed themselves as willing to become members of the commision to negotiate with the International. Frank C. Perkins, the Socialist member of the Council, said the negotiations may result in municipal ownership for the local traction lines.

In an interview, President Tulley is quoted as saying:

> If it is possible to give Buffalo a 5-cent fare, Mitten Management wants to do so, but I can say that much ground will have to be gone over in our discussions and many obstacles overcome before any fare reduction is possible.

The City Council already has voted to use a fund of approximately $50,000 to bring a rate case before the Public Service Commission as the first step in its fight for lower street car fares on the local lines of the International.

STRIKE EMERGENCY PASSED

Strike pay amounting to $7.50 a day for emergency trainmen who have been operating the local and interurban cars on the lines of the International Railway, Buffalo, since July 1, will be discontinued on Oct. 1, according to announcement made by President Herbert G. Tulley. It is explained that the strike emergency has now passed and that all trainmen will hereafter be paid 55 cents an hour, the regular maximum rate on a straight time basis.

The higher rate of pay which has been in effect since the strike was called on July 1 by the Amalgamated was offered by the International because of the hazard involved in the operation of cars.

The International Railway now has recruited a permanent operating staff and many employees are now on the extra list. Many strikers have deserted the ranks of the union and are now operating cars on local and interurban lines. Only such other strikers will be taken back as indicate their willingness to comply with the Mitten plan and then they will be given places on the extra list at the end of the seniority list.

Beginning September 25, the International resumed local service in the city of Niagara Falls. Local service has not yet been started in the city of Lockport, but normal service is being given over all Buffalo local and western New York interurban lines.

Penitentiary sentences are being imposed by Justice Pooley in Supreme Court to jitney drivers and striking employees of the International who have been found guilty of contempt of court for violations of injunctions.

THIRD INJUNCTION AGAINST JITNEY OPERATORS

A third injunction restraining jitney operators from running cars in the streets of Buffalo has been issued by Justice Pooley in the Supreme Court upon application of Henry W. Killeen of Penney, Killeen & Nye, attorneys for the International. About 150 individuals are named in the third injunction.

Samuel Gompers, president of the American Federation of Labor, spoke in Buffalo last week at a meeting designed to stimulate the morale of the strikers. In his speech, Mr. Gompers assailed the use of injunctions to curb the activities of strikers.

Railway Men Choose Books

The McAlpin Hotel in New York decided recently to put in its library a number of technical books, and in order to determine what books they should be, sent letters to a number of the leading members in the different industries. Returns are now being received, and it is understood that the books will be added. Among those who have given their selections of electric railway books, from which the final choice will be made, are:

T. L. Cross, Baltimore; James W. Welsh, New York; Lucius S. Storrs, New Haven; Van Horn Ely, Philadelphia; Franklin T. Griffith, Portland, Ore.; E. M. Herr, East Pittsburgh; W. F. Ham, Washington; J. H. Pardee, New York, and Percy Ingalls, Newark, N. J.

Want More Utilities in Association

Intensive study of common problems and the enlisting of more of the public utilities eligible for membership were two things determined as a policy to be followed by directors of the Southwestern Electric & Gas Association at a meeting in the office of E. N. Willis, secretary, Dallas, Tex. There are 175 public utility concerns in Texas and Louisiana, the territory of the association, now members and there are eighty associate members. About 100 more utilities are on the eligible list.

Chicago "L" Sells About 18,000 Passes First Week

The riders on the Chicago Elevated have not yet awakened to the possibilities of the weekly pass, which became effective on Sept. 18. The first week's sales were around 18,000 for the $1.25 ticket and rough checks have shown that each pass was used for an average of three rides daily. Complete figures have not yet been compiled due to the extra accounting work involved with the complete revision of the fare schedule, which provides cash and ticket rates and a complex reduced children's and school fare.

So large a percentage of the elevated riders use the lines only twice daily that they have taken the fare reduction in the form of the lower three-for-a-quarter ticket rate. The tickets were four for 35 cents. It is understood that the ticket ratio has increased from 67 per cent to around 80 per cent. Assuming the same traffic as last year this decrease of 0.42 cent per ride will mean a loss of nearly $600,000 in revenue, while a further loss will occur from the much lower children and school rates.

Early reports indicate that the type of pass user is one to whom the flat rate meant an immediate saving. Companies whose business required much local traveling by employees purchased the passes in 90 and 100 lots. The Elevated has been handicapped by the short time available to popularize the pass so it is doubtful whether or not any additional traffic has been gained. As a percentage of the 500,000 daily riders, the pass rides constitute about 10 per cent. Undoubtedly this ratio will gradually build up as the advantages of the pass are realized.

Recommends Broad Street Subway

In a report to the City Council of Philadelphia, City Transit Director Twining has urged the construction of a North Broad Street subway from the City Hall to Olney Avenue. It was in response to a resolution introduced in the Council asking the transit department for estimates on the cost of the subway, and a Broad Street elevated line that the report was prepared.

The cost of the tube is estimated by Director Twining at $50,400,000 for 6 miles of roadway with equipment. Mr. Twining said that a four-track elevated structure on Broad Street would cost $20,000,000 less than the four-track underground line but said that the extra $20,000,000 would prevent Broad Street being disfigured.

Wages Cut Ten per Cent

Wages of employees of the Gary & Southern Traction Company at Gary, Ind., have been reduced 10 per cent, effective on Oct. 1, it has been announced. Officers of the company said it was necessary to make the cut if the line were to continue in operation. The employees have been receiving 60 cents an hour.

Financial and Corporate

Net Income of Detroit Municipal Continues to Increase

The August report of the Department of Street Railways, Detroit, Mich., shows that mileage and revenue increased and expenses were less for the month. After all charges were met, including operating expenses, interest on notes, sinking fund on the original municipal ownership bonds, purchase contract, bonds authorized at the time of the purchase of the Detroit United Railways, interest on the original municipal ownership bonds and interest on the Detroit United Railways purchase contract, a net income of $114,801 remained. This is $13,909 more than the July figure.

Operating cost, which represented 74 per cent of the income in July, was reduced to 72.8 per cent in August with operation of 112,509 car miles more than in July. This fact Mayor Couzens pointed out as indication that service is being improved.

Operating expenses for August were given as $1,097,270, a decrease of $6,171 under July. Out of this sum interest on notes to the amount of $10,421 has been paid and also a sum has been set aside amounting to $333,178 for sinking funds, etc. The August statement of operation follows:

CITY OF DETROIT

Department of Street Railways

INCOME STATEMENT AND OPERATING STATISTICS, AUGUST, 1922, COMPARED WITH JULY, 1922

Operating Revenue	August, 1922 31 Days	Cents per Car-Mile	July, 1922 31 Days	Cents per Car-Mile
Revenue from transportation				
Passenger revenue	$1,507,158		$1,489,136	
Parlor, chair and spec. car revenue	62		109	
Total	$1,507,220	.3680	$1,489,245	.375
Revenue from other railway operations				
Station and car privileges (adv.)	$8,551		$7,390	
Rent of track and facilities	86,487		85,678	
Miscellaneous	4,575		2,482	
Total	$99,613	.0243	$95,550	.024
Total operating revenue	$1,606,833	.3923	$1,584,795	.399
Operating expenses				
Way and structures	$133,703		$181,977	
Equipment	110,705		98,930	
Power	155,577		140,091	
Conducting transportation	569,336		564,210	
Traffic	183		119	
General and miscellaneous	127,766		118,114	
Total operating expenses	$1,097,270	.2679	$1,103,441	.278
Net revenue railway operations	$509,563	.1244	$481,354	.121
Deduct taxes assignable to ry. oper. and miscellaneous rents	$54,574	.0133	$54,574	.014
Net operating income	$454,989	.1111	$426,780	.107
Non-operating income				
Net income from miscellaneous property	$2,743		$569	
Income from unfunded sec. and accounts	670			
Total non-operating income	$3,412	.0008	$569	
Gross income	$458,401	.1119	$427,349	.107
Deductions				
Pro rata sinking fund provision on $15,000,000 original bond issue	$37,748		$37,748	
Pro rata reserve on D.U.R. purchase contract	142,015		142,015	
Pro rata sinking fund provision on $4,000,000 bond issue	11,111		51,260	
Pro rata interest fund provision on $15,000,000 bond issue	58,583		10,245	
Pro rata interest fund provision on $4,000,000 bond issue	10,422		85,189	
Pro rata interest fund provision on deferred payments on D.U.R. purchase contract	83,721			
Total deductions from gross income	$343,600	.0839	$326,457	.082
Net income	$114,801	.0280	$100,892	.025
Ratio operating expenses to revenue from transfers		72.8 per cent		74 per cent
Ratio operating expenses to operating revenue		68.3 per cent		70 per cent
Ratio net income to operating revenue		07.1 per cent		6 per cent
Revenue car-miles operated	4,087,962		3,975,552	
Non-revenue car-miles operated	7,668		7,569	
Total car-miles operated	4,095,630		3,983,121	
Earnings per car-mile		.3680		.375
Earnings per car-hour		1.9336		1.946
Expenses per car-mile		.2679		.278
Expenses per car-hour		1.4078		1.440
Revenue passengers carried	28,183,105		27,838,688	
Transfer passengers carried	9,189,043		9,065,737	
Total passengers carried	37,372,148		36,904,425	
Ratio of transfer passengers to revenue passengers		32.6 per cent		32 per cent
Revenue passengers per car-mile operated		7		7
Transfer passengers per car-mile operated		2		2
Total passengers per car-mile operated		9		9

New Orleans Company Incorporated

The New Orleans Public Service Corporation has been incorporated with the reorganization completed on Sept. 27. R. S. Hecht was made the permanent chairman of the Board of Directors; A. L. Kempster, vice-president and general manager; H. A. Ferrandou, treasurer; J. H. DeGrange, secretary, and O. B. McCoard, auditor.

The 7-cent fare became effective midnight on Sept. 27. In accordance with the ordinance settlement, Commissioner Maloney announced that he would now give attention to the survey by the Beeler organization including rerouting and other important matters for more efficient car service.

Joseph Bourdette, Jr., and Freda Bourdette, owners of $63,000 of the company's 4½ per cent bonds, have withdrawn the suit brought by them attacking the legality of the foreclosure sale of the properties of the New Orleans Railway & Light Company Judge Rufus Foster returned hurriedly to New Orleans from New York specially to try the new issue presented by the suit, which would have blocked the reorganization of the company and prevented the reductions in street car fares and in gas rates from being put into effect.

The action brought by Augusta Du Buisson against the company for failure to satisfy a judgment for $10,000, which she had obtained against the company for personal damages, was also withdrawn. Mrs. DuBuisson alleged the foreclosure proceedings of the company and the contemplated reorganization endangered her interests. It is understood that both complaining parties have been assured that their rights would be fully protected.

R. S. Hecht, chairman of the bondholders' protective committee, and C. C. Chappelle, representing the junior security holders, were in court at the conclusion of the proceedings, and announced later that the withdrawal of these suits removed the last obstacle toward the reorganization of the company.

The papers confirming the sale of the company's property were signed on Sept. 19 before Judge Foster by all the officials and the representatives of the shareholders interested in the case.

Extension of Bond Maturity Announced

All holders of the first mortgage 5 per cent gold bonds of the Rockford & Interurban Railway, Rockford, Ill., due Oct. 1, 1922, are requested to deposit their bonds for extension with the Continental & Commercial Trust & Savings Bank, Chicago. An official statement says that payment cannot be made at maturity "as it is impossible to sell or secure underwriting of a new refunding issue under existing conditions." The terms of extension provide a maturity date on Oct. 1, 1930, at the same rate of interest.

Glasgow Celebrates

Elaborate Ceremonies Attend Observation of Fiftieth Anniversary—Balance Reported for Year

Glasgow has figured prominently in the public eye during the last month in the matter of tramways. The jubilee of the city's tramway system, a renewal of the agitation for the reduction of fares, and a warm discussion over the acceptance of an American contract for the supply of special trackwork in turn occupied the city's attention.

The jubilee celebration bulked large. Each employee received a gratuity of £1. The appointed day was Aug. 18, the fiftieth anniversary of the first car route in the city. In the presence of great crowds of people a procession of three cars carrying members of the Town Council and other notabilities passed over the 2½ miles of the original route. The first was a horse car drawn by three horses as in the original days of the Glasgow Tramway & Omnibus Company, a postilion being a prominent figure. Then came an electric car of the type first used by the municipality, and finally one of the modern electric cars with the upper deck covered.

The driver and conductor of the horse car were old servants of the tramway company, which was superseded when the Town Council took over operation in the early '90s. The municipal band headed the procession. A luncheon was afterward given by the Corporation in the City Chambers. It was attended by over 400 guests, among whom was the veteran J. Barber Glenn, who was the first secretary of the Glasgow Tramway in 1872, and who is still at work as a tramway company director in London. In the evening a reception was held which was attended by about 1,500 guests, who were welcomed by Lord Provost Paxton and Mrs. Paxton.

NO FARE REDUCTION

In regard to fares on Glasgow Tramways, the question of reducing them was again debated by the tramways committee on Aug. 16, and in particular a proposal by the Labor party to reintroduce halfpenny fares for short stages was discussed. The latter proposal was defeated by fifteen votes to eleven and one committee decided that there should be no reductions. This was confirmed by the Town Council on Aug. 24, the proposal for reduction being dropped.

The wisdom of the decision not to reduce fares is confirmed by the figures contained in a long report by Mr. Dalrymple, the general manager, on the subject of fares. He showed how the last increase of fares, decided on to meet growing working expenses, had changed a deficit into a surplus. Owing to the slump in trade, however, the weekly revenue was now less than a year ago, and for the current financial year he estimated a deficit after meeting all expenses of £50,000. If the fares were reduced, he estimated the deficiency at £434,000. He also pointed to the heavy liabilities which were being incurred for extensions and the purchase of other undertakings.

According to the twenty-eighth annual report of the tramways committee of the Corporation of Glasgow the result of operation from June 1, 1921, to May 31, 1922, shows that the ordinary income amounted to £2,350,752 and the working expense to £1,804,652, thus leaving a net revenue of £546,100. For the previous year the ordinary income was £2,392,853 and working expenses £1,937,664. The net balance for the year ended May 31, 1922, to be paid over to the common good was £149,988.

GROSS REVENUE FALLS OFF

From the revenue and net revenue accounts the gross revenue for the year shows a decrease of £53,800 compared with that of the previous year and the average traffic revenue per car-mile has decreased from 21,307d. to 20,845d. The working expenses show a decrease of £133,012. The passengers carried from June 1, 1921, to May 31, 1922, were 431,372,473 against 447,601,811 for the year previous.

The sum of £3,500 has been placed to the credit of the Employees' Liability Fund for the year to May 31, 1922. To the company's own fidelity risk the sum of £225 has been placed to the credit of the fund for the year to May 31, 1922. During the year £186,743 was expended on the upkeep of the track.

Wisconsin Companies Consolidate

The Wisconsin Securities Company, Milwaukee, plans to combine seven public utility companies, supplying gas, electricity and electric railway services to more than 200,000 persons, according to Clement C. Smith, president of the company. The united companies will operate under the name of the Wisconsin Public Service Corporation, with a capital stock of $5,000,000, half common and half preferred.

The new company will control the following public utility properties now owned or controlled by the Wisconsin Securities Company. The Wisconsin Public Service Company, supplying Green Bay and its suburbs with electric light, power, gas and transportation services; Sheboygan Gas Light Company, Menominee & Marinette Light & Traction Company, Calumet Service Company, operating at Chilton and Brillion; Manitowoc and Northern Traction Company, operating an interurban electric line between Manitowoc and Two Rivers, and the Peninsula Service Company, furnishing electric power to Kewaunee, Algoma and Sturgeon Bay.

The principal officers of the company are Clement C. Smith, president; J. P. Pulliam, vice-president; Howard Greene, secretary; H. C. Mackay, treasurer; W. M. Chester, assistant secretary and assistant treasurer.

Financial News Notes

Permission Given for Bond Issuance.—The Georgia Railroad Commission has granted permission to the Valdosta Street Railway to issue $100,000 in bonds. The railway's application was referred to in the *Electric Railway Journal* issue of July 15.

Interests Sold.—The controlling interest in the Salina (Kan.) Street Railway has been purchased by J. J. Wiesendanger, who has been elected president. W. E. Smither will retain his position as secretary, treasurer and general manager.

Receiver's Sale Announced.—Receiver Gunsul will sell the Chicago, Aurora & De Kalb Railroad property on Oct. 17 at Geneva, Ill. The company was formerly the Aurora, De Kalb & Rockford Electric Traction Company, which was sold under foreclosure in December, 1908, to Jay Morton of Chicago for about $195,000. The road extends about 28 miles.

Gold Bonds Offered.—The National City Company, New York, N. Y., is offering $2,500,000 of the first lien and refunding mortgage gold bonds of the Portland Railway, Light & Power Company, Portland, Ore., known as Series B. The bonds, dated May 1, 1922, and due May 1, 1947, are offered at 96 and accrued interest, yielding more than 6.30 per cent.

$200,000 Issue Authorized. — San Francisco-Sacramento Railroad, Sacramento, Calif., has been authorized by the Railroad Commission to issue and sell at not less than 85 per cent of their face value and accrued interest $200,000 of its first mortgage 6 per cent bonds due on Jan. 1, 1940, and to use the proceeds to finance in part estimated capital expenditures. The company reported that it will need $228,609 to pay for additions and betterments to properties consisting in general of sidings, stations, warehouses and the concreting of its tunnel. The bonds will be callable upon any interest payment date at par, accrued interest and a premium of 2 per cent of the principal.

Successor Organized to Brockton & Plymouth Road.—The Brockton & Plymouth Street Railway, which recently was sold at foreclosure to John H. Dawson, has been reorganized and the service will be resumed. Mr. Dawson has received authority from the Massachusetts Department of Public Utilities to issue $280,000 in capital stock and $260,000 in bonds in a new company, in the process of organization, to be known as the Plymouth & Brockton Street Railway. The old company had $405,000 of stock and $260,000 of bonds. Mr. Dawson and his associates will contribute $88,000 to the new company, which will operate the lines formerly maintained by the old company.

Traffic and Transportation

Seeks Increased Fares

Houston Electric Applies to Council—Jitney Competition Blamed—Improvement Program Halted

The Houston (Tex.) Electric Company, a Stone & Webster property which operates the street car system in Houston, has made formal application to the City Council for authority to increase fares from 7 cents to 9 cents to do away with the metal tokens now sold at the rate of four for 25 cents, and to increase children's fares from 3½ cents to 4½ cents. The traction company, through Luke C. Bradley, district representative of Stone & Webster, who filed the application, requested immediate action.

JITNEY ISSUE SET FOR NOV. 7

In filing the application for increased rates, Mr. Bradley informed the Council that the company is not earning a sufficient return under the 7-cent fare, due to the jitney competition, and that the outlook is exceedingly gloomy unless the city takes immediate action and stops the operation of jitneys in competition with the street cars. The traction company two weeks ago asked the city to take action to stop the operation of the jitneys on all lines except two that are not in competition with the street cars. This question was passed on to the voters to be decided at the general election on Nov. 7, and the traction company then filed application for increased fares.

In presenting this application, Mr. Bradley informed the City Council that all improvements, betterments and extensions already begun under the traction company's program to spend $1,200,000 on improvements within a year had been stopped, and that the company is now without funds or credit and that it is impossible for it to continue the improvements promised. Last January the Houston Electric Company was granted a fifteen-year extension of its franchise after extended negotiations with the city, at the end of which a compromise agreement was effected under which the traction company agreed to spend $1,200,000 in extensions and improvements. This program had already been started and it is estimated that approximately $700,000 of the $1,200,000 had been spent.

IMPROVEMENT PROMISE MADE IN GOOD FAITH

Mr. Bradley said that the traction company made its agreement with the city in good faith, believing that it could re-establish its credit, but that it had found this impossible in the face of the jitney competition. The jitneys, he said, had so reduced the earnings of the traction company that it not only cannot re-establish its credit, but that the company is now faced with bankruptcy.

The City Council acted on the traction company's application by asking the management for a more detailed statement of its operation under the 7-cent fare, by which it was shown that its net earnings during the six months of such operation had been only $20,000.

Commissioner T. L. Waugh first made a motion that the city take over the street car properties, unless work was resumed at once on the program involved in the expenditure of the $1,200,000 promised, and that the city continue to operate the system until some person competent to operate it properly could be found. This motion was lost, however, for want of a second.

Mr. Bradley informed the City Council, that the information asked would be submitted within a few days. Information asked by the Council covers the following points: Amount spent on extensions and improvements since the franchise was extended last January; the kind of service furnished before and since the extension; schedules followed by cars on all lines; number of passengers carried in August and January, 1921, and the number carried during the corresponding months in 1922; what number of fares was full fares, what number half fares and what number transfers.

Selma Plans Weekly Pass

The Selma (Ala.) Electric Railway plans soon to put into effect the weekly pass plan whereby for $1 one can enjoy an unlimited number of rides for one week. The pass on sale at Ward's drug store and with all the motormen is made to bearer but may be used by anyone holding it.

Managing Director Mallory in a statement about the installation of the pass says that more traffic is needed to keep the cars running and that Selma's prosperity and progress depend a good deal upon the electric railway.

The pass is to be a thirty-day experiment. If it meets with success the sale of weekly tickets will continue, according to Mr. Mallory.

Gain in Traffic Reported Since Lowering of Fare

The Louisville (Ky.) Railway, since reducing ticket fares to 6 cents, is using a plain envelope for packing, instead of the former receipt envelopes used while the suit was pending. The same form of metal token is used, these selling at six for 30 cents, whereas they were formerly six for 35 cents, the cash and ticket fare having been the same.

Since reduction of fare to 6 cents it is reported that a substantial gain has been shown in the number of persons riding.

Rehearing on Injunction Denied

Motion for rehearing in the suit for injunction to restrain the Dallas (Tex.) Railway from collecting a 6-cent fare in Dallas was denied by Special Judge John W. Pope, who heard the original petition and denied the injunction sought by W. S. Bramlett et al. Judge Pope sustained the general demurrer of the traction company, which set forth that the action properly should be brought against the city and not against the traction company, that the 6-cent fare ordinance was legally passed by the city, and that the city had full authority to enact such an ordinance carrying the emergency clause and not refer the fare increase to a referendum of the voters of the city.

The railway set forth in this demurrer, filed by Joe A. Worsham, attorney for the company, three points on which it sought to controvert the petition for injunction. These are: First, whether the franchise granted by the city of Dallas to J. F. Strickland and C. W. Hobson in 1917 constitutes a binding contract between the traction company and the city; second, if this franchise is not a binding contract, then the City Commission has the right under its authority to prescribe a set of rates of fares to be charged differing from that set forth in the franchise, and third, whether the fare increase ordinance, adopted by the City Commission on June 24 of this year, is subject to referendum under the city charter of Dallas.

In sustaining the demurrer and explaining his attitude on the questions raised, Judge Pope said that precedent set in other cases involving the question of whether a franchise granted by a city to a utility is a binding contract had established the fact that utilities holding such franchises may go into Federal court or state court and obtain an increase in rates or fares, if the returns show that such fares or rates as already fixed afford an inadequate return on the invested capital and for the service rendered. With such precedent Judge Pope held that the City Commission was acting within its authority when it originally granted an increase in fares, and was still within its authority when on June 24 it passed an ordinance extending such fare increase for a period of one year. Such ordinance, Judge Pope held, is not subject to referendum provision of the charter.

Mr. Bramlett gave formal notice of appeal for the Fifth Court of Civil Appeals when his motion for rehearing was denied.

Opposes One-Man Cars

The Salt Lake Federation of Labor is opposing the plan of the Utah Light & Traction Company to place one-man cars on its light traffic lines in Salt Lake City. The organization has passed resolutions demanding if the company use such cars it return to a 5-cent fare instead of the 7-cent fare now in effect.

Commission Fixes Fares

New York State Railways Must Lower Syracuse Rate—Utica Fare Goes Up One Cent

The Public Service Commission has ordered a reduction in fare on the New York State Railway lines in Syracuse from 8 cents to 7 cents. This fare will be effective for a period of six months commencing Oct. 1 next and until the further order of the commission.

The 8-cent fare with four tickets for 29 cents was established by order of the former Public Service Commission of the Second District on April 19, 1921, and became effective shortly after that date. Against this rate, asserting that it was unjust and unreasonable, the city of Syracuse through its Mayor, Harry H. Farmer, on Dec. 15, 1921, filed a complaint with the commission. Hearings have been held at which a large amount of testimony and numerous exhibits have been presented by the parties. The case was submitted on briefs, the reply brief of the city being filed on Sept. 3, 1922.

In its finding the commission concluded that the company was entitled to an 8 per cent return, which in the opinion was a reasonable average return to the company upon the value of its Syracuse lines. On the other hand, the commission found that the $774,152 which represented the income available for return gave a return to the company of 8.54 per cent on $9,038,050, which the commission allowed on this property. According to the commission's finding this exceeds a fair return and the 8-cent fare complained of was, therefore, considered unreasonable and unjust.

In concluding its order the commission reviewed some facts about passenger traffic since November, 1918, when the 6-cent fare went into effect. The commission said:

> When the 6-cent fare went into effect in November, 1918, there was a falling off in passengers during the following year of a trifle less than 10 per cent. In the year ending March 31, 1920, there was a material increase and in the year ending March 31, 1921 (the 6-cent fare continuing), the largest number of passengers in the history of the company was carried. In April, 1921, the 8-cent fare went into effect and the traffic fell off in the year ending March 31, 1922, about 20 per cent. For the year ending July 31, 1922, there was a general decrease of passengers of nearly 200,000.
>
> The general industrial depression commenced in Syracuse in September, 1920, and continued to March, 1922, before relief therefrom was apparent. This undoubtedly had a considerable effect upon passenger traffic. As a further cause of reduction in traffic the company assigns the increased use of automobiles. It showed an increase in the count of Onondaga of 2,500 automobiles in the past year. The increase of fare and these other causes undoubtedly combined to decrease passenger traffic. The automobile will continue without question to affect it to a considerable extent, particularly during summer months. With a restoration of business, with a reduction in rate, we have estimated that the number of full fare passengers for the coming year will be at least 33,199,000. Dividing the cost of service, $2,309,842, by this number of passengers gives an average rate of fare of 6.96 cents, or substantially 7 cents.

At the same time as it ordered fares reduced in Syracuse the commission authorized the New York State Railways to increase its rate of fare in Utica from 6 cents to 7 cents. The increase in Utica is temporary pending determination on the application of the company for a 10-cent fare. The application for the 10-cent fare was made two years ago and was denied by the commission. The company took the matter to the courts and the Appellate Division of the Supreme Court remanded the case to the commission for further consideration.

Paducah Added to Weekly Pass Users

And now the unlimited-ride transferable weekly pass has penetrated Old Kentucky. On Aug. 28, the Paducah Railway put on the pass at $1 a week without disturbing the 10-cent cash and two for 15 cents ticket fares. A vigorous and varied publicity campaign, including car cards, advertising car, painted signs, speeches and newspaper copy was carried out by Alfred S. Nichols, manager, with such success that within the first four weeks about 25 per cent of the revenue was coming from purchasers of the pass.

Transportation News Notes

One-Man Cars in Operation.—The Public Service Railway, Newark, N. J., is running one-man cars on its Moorestown branch.

To Know the Routes by Night.—Colored lights will indicate the routes of cars operating at night on city lines of the Wisconsin Public Service Company. This innovation was the result of the printed signs not being read easily.

More Trains in Service.—The Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company, both of New York, have increased their service by 214 trains in accordance with the Transit Commission order which became effective on Sept. 25. Reports of inspectors of the commission showed that seats were provided for nearly all local passengers during the non-rush hours on both the Interborough and Brooklyn Rapid Transit cars.

Freight Rates Reduced.—New class and commodity rates on freight over the lines of the Boise Valley Traction Company, Boise, Idaho, went into effect on Aug. 28. Reductions are made in practically all classes of freight. This action is voluntary on the part of the company. An idea of the reduction is afforded by a comparison of the new and old charges in class No. 1. The new rate for class No. 1 is 25 cents for 100 lb. from Boise to Nampa. The old rate was 31½ cents.

Popularizing the Pass.—The Puget Sound Power & Light Company, Everett, Wash., is employing daily newspaper advertising in an effort to popularize the use of the $1 weekly pass recently instituted on the Everett railway lines. A recent "ad" suggested the use of the pass in the taking of self-improvement courses at the Y. M. C. A., Y. W. C. A., Commercial or night schools. It also called attention to the various public entertainments in the city, urging the free use of the pass.

Petition for Lower Fares.—Mayors and City Councils of Shawnee and Tecumseh, both in Oklahoma, have petitioned the Corporation Commission of Oklahoma to order reductions in fares charged in the two towns and also to order reduction of the fare between Shawnee and Tecumseh on the Interurban line. The Shawnee Traction Company operates the lines. Fare in the towns has been raised to 7 cents and the interurban fare between the two towns to 15 cents with the understanding at the time that the traction company would make certain improvements. The petition to the Corporation Commission sets forth that the promised improvements have not been made and the commission is asked to order reductions in the fares. Date for hearing has not been fixed.

Suspends Freight Abandonment.—Schedules which the International Railway, Buffalo, N. Y., filed with the Public Service Commission, effective on Sept. 25, providing for abandoning its freight and express service, have been ordered suspended by the commission until Dec. 30. A hearing will be held before the commission and a continuation of the present service will follow until there is a determination of the case by the board. The commission in its order holds that the rights and interests of the public may be injuriously affected by cancellation of this service. The International Railway operated a joint express or freight service with the Rochester, Lockport & Buffalo Railway, the Empire State Railroad, the Auburn & Syracuse Electric Railroad and the Rochester & Syracuse Railroad. A large express and freight station is operated by the company in its Main-Virginia Street carhouse.

Will Make Local Stops in Lockport.—J. D. Nailor, general manager of the Rochester, Lockport & Buffalo Railway, Rochester, N. Y., has advised Mayor Ernest B. Crosby of Lockport that he has issued orders for the crews of its interurban cars to make all local stops in the city of Lockport to receive and discharge city passengers. The Lockport municipal authorities recently notified the company that its franchise would be revoked if it failed to carry local passengers. Since July 1, when the strike on the local and interurban lines of the International Railway, Buffalo, N. Y., went into effect, employees of the Rochester, Lockport & Buffalo Railway have refused to make local stops in Lockport to carry local passengers. The Rochester line operates over the local tracks of the International in Lockport. The Rochester crews refused to stop in sympathy with the strikers on the International lines.

Personal Mention

John I. Beggs

Friends of the Nestor of the Industry Pay Him Tribute on Seventy-fifth Birthday Anniversary

There is always work for willing hands to do. John I. Beggs discovered this truism when he was seven years old. He is still willing and he is still working. He has been working for sixty-eight years. Just now he is doing his business bit as president of the Milwaukee Electric Railway & Light Company. This is not Mr. Beggs' only business interest, but it is his business hobby. Every day he is on the job actively administering the affairs of this company, one of the most successful public utilities in the United States.

Just a few days ago about 100 friends and associates of Mr. Beggs from all over the United States gathered at his home on Beggs Isle, Oconomowoc, to celebrate the seventy-fifth anniversary of his birthday. It was, indeed, a gala occasion. Among those who attended was a delegation from Mr. Beggs' own company. They presented Mr. Beggs with a sterling silver water pitcher. This he prizes very highly as coming from the men and women among whom he has worked so long, but he prizes no less highly the silver loving cup engraved with the names of the directors of the North American Company and the sterling silver tea set and tray from the officers of the Wisconsin Securities Company, of which Mr. Beggs is a director. Mr. Beggs is also preserving carefully a sheaf of letters and a bundle of telegrams from associates and friends congratulating him.

J. I. BEGGS

The little party to Mr. Beggs was an extraordinary tribute to an extraordinary man. The question that was asked was how Mr. Beggs felt about it. Surely he must, according to the newspapers, have a message for the public. What was it? Well, just this: "Don't worry—work—and stick." The newspaper men who talked with Mr. Beggs went back with this bit of philosophy: "Never fret. Work hard, persevere and have endurance. Hard work, if the work be congenial, has never killed or harmed any person." There is summarized the personal philosophy of the former president of the American Electric Railway Association.

Even among Mr. Beggs' associates and in the industry of which he has so long been a part, it is a mighty long stretch from the kindly banker, railroad man and car builder—for Mr. Beggs is each of these—of the present day to the fatherless lad of seven years working in a brick yard. Yet the man is only the boy grown up. A volume, indeed, several volumes, might be written about the business activities of Mr. Beggs. It is impossible here to do more than note some of the outstanding events in that career. He was born in Philadelphia, Sept. 17, 1847. He organized a company and built the first electric light and street railway system in Harrisburg, Pa., almost forty years ago. He built two great electric power plants for the New York Edison Company in 1887. He built and reorganized electric service plants in other cities. He appeared in Milwaukee in the early '90s as an expert in a famous 3-cent fare controversy between the electric company and the city and later returned to reorganize the properties.

Mr. Beggs was 50 years old when he tackled his big job in Milwaukee. At sixty he was a director of the largest bank in Wisconsin and at sixty-four owner and president of the St. Louis Car Company. At seventy he helped organize and accepted the presidency of the huge new rolling mills located just outside of Milwaukee.

In 1911 Mr. Beggs went to St. Louis, where he had acquired control of the St. Louis Car Company. While still president of this company he returned to Milwaukee in 1919 again to assume the presidency of the Milwaukee Electric Railway & Light Company.

That is the tabloid record. It isn't intended to be complete. The man of active affairs, however, will be quick to appreciate the romance concealed between these lines and also will be quick to realize the burdens which were imposed in managing all these different undertakings. It would seem that there is no one anywhere in the electric railway industry in the United States to whom the title Nestor might more fittingly be applied than to Mr. Beggs.

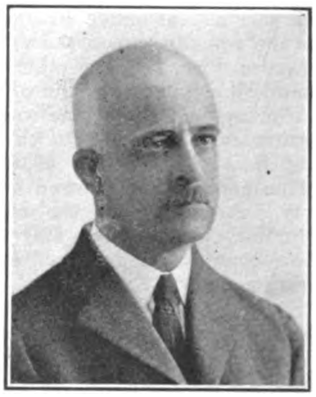
Thomas Lees Resigns

Thomas Lees, manager of the Lowell district of the Eastern Massachusetts Street Railway, has resigned, effective Sept. 30. Maurice E. McCormick, manager for the past year of the Salem district, will succeed Mr. Lees, who will remain in an advisory capacity until Nov. 1. Mr. Lees was president of the New England Street Railway Club.

"Making the Grade"

Remarkable Record of Achievement Made by W. B. Yereance in Rehabilitating New York Lines

"Making the Grade." This is the title of a department in the New York *Globe* that has attracted great attention. It is devoted to recording extraordinary personal achievement. Fortunate, indeed, is the individual whose attainments are recited therein. Although the term "Making the Grade" has been appropriated from railroad work, few if any railroad men have made the grade—in the sense that the *Globe* uses the expression. The reason is that spectacular success is not very often possible to the railroad man. The two do not go together. The railroad man must remain content with the knowledge of work well done. He may make the grade, but no Boswell is at his elbow to tell the public about it. If any railroad man ever made the grade, that man is W. B. Yereance, whose resignation from the Eighth and Ninth Avenue Railroads was recorded in the *Electric Railway Journal* for Aug. 16.



W. B. YEREANCE

Mr. Yereance as chief engineer and general manager did some extraordinary things with these lines, cast adrift from the rest of the New York Railways system. It was more than a case of bringing order out of chaos. Bringing order out of chaos implies that you have chaos with you as a starting point. It was worse than chaos that Mr. Yereance encountered on taking over these lines. He did have a railroad and a few cars as a foundation, but beyond this there were none of the other ordinary railroad attributes. There was no source of power within the lines themselves and there were no shops and no carhouse facilities. Moreover, there was the 5-cent fare and no hope of escape from that rate. Worse yet, there was no organization with which to work. All this bothered Mr. Yereance, but it didn't dishearten him.

The work upon which Mr. Yereance entered in July, 1919, has been an almost truly creative task. It involved developing an organization, planning the work of each department, co-ordinating the functioning of all and establishing a valuable morale. All this was preliminary to acquiring the necessary facilities, improving the public relations, etc. Of all this work Mr. Yereance was both designer and executive—wisely so, as thereby authority and responsibility were centralized. There have already been published in the *Electric Railway Journal* several articles on the improvements effected in these properties and there will shortly be printed another, on what is probably the largest and most important physical extension and improvement, the new operating terminal at 155th Street, now well along toward completion under present plans.

Mr. Yereance brought to this work a consistent training and wide experience gained in work which ranged in geographical location from Massachusetts to Nebraska and from Illinois to Texas. He was graduated in 1888 as a mechanical engineer from Stevens Institute of Technology and he went directly to the Dickson Locomotive Works as machinist, first in the tool room and later on the erecting floor. His next work was with the New York Central & Hudson River Railroad as inspector of coal and locomotives—Transportation Department. Then for two years he was instructor and acting dean and registrar School of Civil Engineering, New York University, coincidently in private practice with the late Charles B. Brush on municipal utilities. For the next two years he was assistant to the general manager and chief engineer Brooklyn Elevated Railroad.

For the next four years Mr. Yereance was on the staff of the general superintendent of the West Shore Railroad with special way, traffic and transportation duties, principally engineering, loss and damage claims and freight handling and movement from receipt to delivery. He was next promoted to be executive secretary to the vice-president and general manager of the West Shore Railroad, vice-president C., C. C. & St. Louis and other railroads, where his work was mainly transportation, financial and accounting. He continued in these capacities until the New York Central assumed the direct operation of the West Shore. For the next three years he was assistant to the general superintendent of the Brooklyn Heights Railroad (operating organization of the B. R. T. System, both elevated and surface divisions), coincidently secretary of the New York Railroad Club.

Then for seventeen years he was a consulting engineer and operator of public utilities properties, for seven years of which he was employed exclusively in work of this character for two large firms of general practitioners. During this extended period he examined and made reports on steam and electric roads' construction projects, proposed consolidations, extensions and purchases and betterment and extension requirements of existing properties. In addition he was retained to study valuation problems and to pass upon questions of operating efficiency, management, etc. He also gave expert testimony in many important cases.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Extensive Improvements in Union Traction Power Facilities

Extensive changes in the power and transmission equipment of the Union Traction Company of Indiana, Anderson, Ind., are in progress and may be completed within two months. High tension lines are being installed between Muncie and Selma, on the Muncie-Union City division, and between Muncie and Eaton, on the Muncie-Bluffton division. The power plants at Winchester and Eaton are to be shut down and much of the equipment sold. Power to supply the lighting plants situated on these lines will in future be brought from the central power plant at Anderson.

At the Anderson plant two 400 hp. Edgemoor boilers, with Foster superheaters, Diamond soot blowers, Green chain grates and B. & W. water boxes are to be removed and sold, to be replaced with boilers of the same make, but of 600 hp. capacity. The equipment to be sold from the Eaton and Winchester plants consists of two 500-kw. cross compound condensing Buckeye engines, direct connected to Westinghouse a.c. 380 volt 25 cycle generators; two 500 kw. Cooper Corliss cross compound condensing engines, direct connected to Westinghouse 380 volt 25 cycle a.c. generators. The engines are equipped with surface condensers and circulating and vacuum pumps, also generator and exciter switchboard panels. Other miscellaneous equipment to be sold includes four 30 kw., 110 volt d.c. exciters, driven by Buckeye and Ridgeway simple engines, four 250 and three 300 hp. Stirling boilers and appurtenances.

After the changes have been made the generating equipment in the Anderson power plant will consist of five 1000-kw. Rice & Sargent cross compound, condensing engines, direct connected to Westinghouse 380 volt, 3 phase, 25 cycle a.c. generators, two 1500 kw. G. E. high pressure turbines, with 380 volt, 3 phase, 25 cycle generators and one 2500 kw. Westinghouse low pressure turbine and Westinghouse 380 volt, 3 phase, 25 cycle generator.

In the boiler room will be six 600 hp. B. & W. boilers and ten 400 hp. B. & W. boilers; the 600 hp. boilers will be equipped with Taylor underfeed stokers, while the 400 hp. boilers will be equipped as heretofore with chain grate stokers. There are in use two feed water heaters, one a 7,000 hp. Cochrane metering heater, the other a 7,000 hp. open heater.

The water for boiler purposes is treated with an International intermittent system, consisting of two 90,000 gallon tanks and filters with the necessary pumps. There is also a 15,000 gallon elevated water tank for house supply. The boiler feed pumps consist of one 1,500 gal. per min. Mid-West Engine Company's centrifugal pump and turbine, one 500 gal. per min. pump, same make, one cross compound duplex Worthington pump and two 8-in. duplex, single, Blake pumps. These are for fire protection, one 500-gal. and one 750-gal. Worthington fire pumps.

This plant will supply power for the entire Union Traction System after the changes have been made, through twenty-nine converting substations and the transformers in forty towns to which power for industrial and domestic use is supplied.

To supply power to the lines heretofore supplied from Eaton and Winchester will require stepping down the voltage at the Muncie substation from 33,000 volts to 16,000 volts and for this purpose four 400-kva. transformers will be used. Two 25,000-volt oil circuit breakers have also been ordered for installation in these lines for protection, also a full complement of lighting arresters and disconnect switches. The additional load will be taken care of at the Anderson power plant by the installation of four 1,000-kva. water-cooled Westinghouse transformers.

W. S. Rugg Appointed General Sales Manager

W. S. Rugg, assistant to the vice-president, has been appointed general manager of sales of the Westinghouse Electric & Manufacturing Company. The position of general sales manager is a new one in the Westinghouse Electric Company.

Mr. Rugg was born in Broadhead, Wis., and was graduated from Cornell University. He became identified with the Westinghouse company in 1892 and three years later was transferred from Pittsburgh to the Chicago office as district office engineer.

While engaged in this position, Mr. Rugg attracted the attention of the manager of that office, who decided that Mr. Rugg would make an excellent salesman. Quite contrary to the latter's own ideas on the subject, the manager forced Mr. Rugg into selling with results that pleased the manager and very much surprised Mr. Rugg.

In 1901, Mr. Rugg was transferred to the New York Office as special sales engineer and in 1909 was made manager of that office. In 1917, he was transferred to the East Pittsburgh works and made manager of the railway department. Shortly after, he became manager of the Marine Department also. During his administration of the railway department, started when the industry, due to the war, was at its lowest ebb, the most constructive work of the department of any previous period was accomplished.

His success in the railway department resulted in his promotion in 1920 to assistant to Vice-President Shute, in charge of sales. His duties in this position gave him special jurisdiction over negotiations and district office personnel and especially fitted him for the general sales managership.

Car Works Injured by Fire

The wood mill and the cabinet and erecting shop of the Perley A. Thomas Car Works at High Point, N. C., were destroyed by fire on Sept. 19 with a loss of cars and equipment amounting to about $225,000. The company expects to have a new building erected at once and be ready for operation in about sixty days.

Car Building Active

The United States Department of Labor, through the Bureau of Labor Statistics, compiles monthly figures of employment in representative industries. Among these is that of car building and repairing, in which the conditions in seventy-two establishments are canvassed monthly. The figures follow:

Expenditure on payroll in July, 1922, $2,134,427; in August, $2,685,339. This is an increase of $550,912, or 25.8 per cent.

Foreign Trade Handbook Issued

An exceptionally usable foreign commerce handbook has just been issued by the Foreign Commerce Department of the Chamber of Commerce of the United States. Within the space of thirty-one pages this publication condenses a mine of information as to sources of service in foreign trade. Its alphabetical arrangement makes it a handy reference work for the busy exporter or importer. The book contains also a list of the topics of national importance that are engaging the attention of the National Chamber's Foreign Commerce Department Committee under the chairmanship of Willis H. Booth of New York. As the first publication of its kind the handbook meets a distinct need in foreign trade and industrial circles.

Metal, Coal and Material Prices

Metals—New York	**Sept. 26, 1922**
Copper, electrolytic, cents per lb	14.00
Copper wire base, cents per lb	15.625
Lead, cents per lb	6.375
Zinc, cents per lb	7.225
Tin, Straits, cents per lb	32.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.075
Somerset mine run, Boston, net tons	4.75
Pittsburgh mine run, Pittsburgh, net tons	4.50
Franklin, Ill., screenings, Chicago, net tons	4.125
Central, Ill., screenings, Chicago, net tons	3.375
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	6.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	91.50
White lead, (100-lb. keg), N.Y., cents per lb.	12.75
Turpentine, (bbl. lots), N.Y., per gal.	$1.34

Rolling Stock

Jacksonville (Fla.) Traction Company through Manager Ingles has declared that the aim of the company is to equip every line in the city with the new one-man cars.

Louisville (Ky.) Railway has placed a contract with the National Safety Car Equipment Company, St. Louis, for fifty-five one-man type safety cars, which will be built in the plant of the Cincinnati Car Company, deliveries to start shortly. These cars will be of the single-truck type, equipped with General Electric motors of 25 hp., one on each axle, or two to the truck. The control will be General Electric. Westinghouse traction airbrakes are specified. Double doors will be provided at the front, for exit and entrance, along with the pay-as-you-enter fare feature. The company will also rebuild thirty cars in its own shops. These, added to the sixteen now in operation on the Brook Street lines, and fifty-five to be purchased, will give the company 101 safety cars of the one-man type. Five lines are to be equipped with this type of car.

Track and Roadway

Washington Railway & Electric Company, Washington, D. C. has received permission to install single overhead trolley wires in place of double wires on several of its suburban lines.

Jacksonville (Fla.) Traction Company has completed the double tracking from Orange to Eighth Street. The company has spent $75,000 as its share in the straightening of Main Street.

New Orleans Railway & Light Company, New Orleans, La., promises a most radical physical change to the properties in connection with the New Orleans reorganization. The change is that of altering the gage on the St. Charles, Tulane and North Claiborne lines to conform with that on other city routes. For many years local car service has lacked elasticity for the reason that there could not be an exchange of cars between those two track systems, and, of course, no rerouting that involved any such community of trackage. The cost of making the change will run into the hundreds of thousands of dollars but calculations made indicate that the outlay would be returned in due time with a good profit by making the system uniform.

Power Houses, Shops and Buildings

Louisville (Ky.) Railway, through President Barnes, has stated that it was not in a position as yet to give out any information concerning just what would be done in connection with plans for improving the riverside power plant. The company is planning eventually to pass up its old plant on Finzer Street. This will result in a great saving in the item of water alone, as the newer plant is right on the riverfront. The company is erecting an additional smoke stack at the riverside plant now.

Trade Notes

Power Specialty Company, New York, N. Y., announces the appointment of Pell W. Foster, Jr., as New England district manager with offices at 50 Congress St., Boston. Mr. Foster was formerly in the New York sales office of the company.

National Railway Appliance Company, New York, N. Y., has no intention of moving its offices from its present quarters at 452 Lexington Avenue, New York City. The statement appearing in the *Electric Railway Journal*, issue of Sept. 23, to the effect that the company contemplated making a change was due to an error on the part of the editors in which names were confused.

Economy Electric Devices Company, Chicago, Ill., recently received an order through the Westinghouse Electric & Manufacturing Company to supply 120 1,500-volt, 300-amp. Economy meters for locomotives that are being built for the Paris-Orleans-Mediterranean Railway of France. This is thought to be the largest single order for heavy locomotive type watt-hour meters ever placed. The Westinghouse company is to supply the complete control equipment for these locomotives, which are under construction in France. The company has also received an order for 1,442 Economy inspection dial meters completely to equip the United Railways, St. Louis, Mo. This order followed a general investigation of power-saving devices on several Eastern properties, and two tests on its own lines involving seventy-two meters, one to show probable savings and the other to show the effect on maximum demand. In the latter test the reduction in maximum demand in the rush hour was within 1 per cent of the average all-day per cent reduction in energy consumption. The United Railways will equip all cars, not only for energy measurement but also for car inspection.

New Advertising Literature

Wagner Electric Corporation, St. Louis, Mo., has issued a bulletin emphasizing Wagner "Ability."

Climax Engineering Company, Clinton, Ia., has issued an eight-page bulletin No. 1001 with illustrations of some typical installations of climax engines in contractors' machinery.

The Electric Railway Equipment Company, Cincinnati, Ohio, has issued a catalog entitled "Overhead Trolley Materials." It contains a complete listing with illustrations of standard trolley suspension material, trolley wheels, line section switches, etc.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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The Symposium versus Formal Papers in Convention Programs

A FEATURE of the programs at the Chicago convention this year was the use of symposiums to a certain extent in place of formal papers. The result was highly satisfactory and should be continued. The principal virtue of this kind of a program is that busy men will consent to prepare short papers, when each realizes that he shares the responsibility for the success of the discussion with a number of others as well informed as himself. An invitation to prepare a five-minute paper does not seem formidable, whereas a half-hour address is, to many, a formidable proposition. Each contributor of a short paper is likely to put into it the meat of what he would say in a much more extended discourse.

There are, perhaps, some objections to the symposium plan in that it usually does not encourage discussion from the floor and sometimes symposiums become extended in length, due to too many invitations being sent out. Unless well planned, there is also some likelihood of overlap and repetition.

However, during the present convention the good features of symposiums were more evident than the bad ones. A particularly valuable symposium this year was that dealing with public relations. More like it should be encouraged in the future. Another innovation, symposium-like but not so formal, was the "Interurban Hour" of the Transportation & Traffic Association on Thursday afternoon, which was productive of many valuable suggestions.

Chicago as a Meeting Place

THE two principal criteria by which the desirability of a city for a convention is judged are attendance and size of exhibits. The former indicates the relative ease of access, quality of hotels and reasonableness of hotel rates, etc., while the latter registers the viewpoint taken by the manufacturers. Judged by these two standards the Chicago convention was successful, and the convention reached a larger number of people with a better program, both as regards sessions and the exhibits, than ever before. The association is now fortunate in having at least two cities shown by experience to be capable of entertaining an annual convention. Of course, much of the success of the Chicago convention was due to the notable work in preparing for the convention by the local committees. This work was especially praiseworthy because so much of it had to be of a pioneer character, but a foundation has been laid upon which future committees can build in any subsequent Chicago convention.

The arrangement of the exhibits in a comparatively narrow hall in place of a wider one on the whole proved superior, in that the exhibits had more frontage and less depth, and hence could more easily be inspected, although the plan necessarily made a longer distance between the pier entrance and the meeting halls. The arrangements for the latter, which necessarily were of a temporary character, were not quite what might be desired, as the partitions separating some of the rooms were far from sound-proof, and it was difficult at times to hear all that was said from the platform. This and the ventilation of meeting rooms and the commissary arrangements are matters which should be improved for any future convention on the Municipal Pier.

The fear that the delegates would "scatter" because of the many outside attractions in a large city like Chicago, as compared with Atlantic City, proved groundless. One reason perhaps was that the pier is somewhat removed from the center of the city, and another was that there was so much to interest and attract on the pier. This is the first annual convention to be held in the Middle West in ten years, and for this reason, if for none other, the selection of Chicago for this year's convention was justified.

The Engineering Association's Relation to Heavy Electric Traction

IN ITS REPORT to the Engineering Association this week, the committee on heavy electric traction reported lack of success in its efforts to bring about some kind of a joint committee on electrification. At last year's convention a resolution to make such an attempt was passed in the hope that a clearing house could be provided to prevent duplication of research work in this field. The committee did not secure the favorable reaction from other organizations which was hoped for and recommended in effect that the attempt be abandoned. There was a ray of hope, however, in the statement that the steam railroad men would probably form some kind of a joint committee among themselves. This would be a step in the right direction and would be welcomed by the Engineering Association even if it were not invited to co-operate.

However, no matter what is done in the steam railroad field there will always be plenty of work for a heavy electric traction committee in the Engineering Association. The most constructive work which this committee can do was well emphasized by some of the speakers at Monday afternoon's meeting. Originally this committee considered that heavy electric traction was interurban electric railway work and freight handling, and there was a sentiment expressed that the committee should return to this field for the major part of its work. This may be wise, but there is also work for this committee to do which is not being done elsewhere in the line of railroad electrification, the direction in which the committee's efforts have been expended recently.

This association, containing many electrical engineers, men not directly interested in or influenced by steam railroads themselves, is in a position to collect and formulate data and thus record facts upon which future developments may take place, rather than upon opinion. Furthermore, the electric railway man cannot but be interested in steam railroad electrification though he cannot hope to keep in touch personally with all developments. This committee can well interpret these developments to him annually.

In the interurban field, Chairman H. A. Johnson of the subjects committee did well to recommend that the committee turn its attention somewhat to a study of freight haulage on interurbans, the self-propelled vehicle on interurban rails and some of the problems of high-speed interurban work, all from an engineering standpoint.

The committee is available for that which the Engineering Association desires and will no doubt respond to instructions as to its activities.

How Many Assignments Should a Committee Have?

IN THE report of the committee on reorganization, presented to the Engineering Association on Monday, concentration of effort on fewer subjects each year was urged. This raises the question as to the proper number of assignments to be made to a committee, a question which annually arises to trouble the subjects and executive committees. Obviously the answer is not to be found in a fixed and arbitrary number, for subjects vary in importance and in difficulty. But there must be an answer, which evidently was not found if the reorganization committee's criticism was well founded. What are the characteristics of the answer?

A standing committee of the association is in one sense the watchdog which serves to apprise the members of what they ought to know in its field. Possibly its first function, as a group of experts, is to determine the relative importance of topics assigned and to direct attention to others which may have been overlooked. Two or three of those which are of most immediate urgency should be tackled. There should be at least one topic of live general interest which will serve to keep the committee stimulated and furnish educational material for the membership generally. Then provision should be made for the completion of unfinished work left by previous committees so that the results of this work may be made available. Finally, contacts should be maintained with other organizations covering the same field as that of the standing committee or allied ones. No line of investigation should be assigned to a committee unless there is prospect that its work, if properly done, will be fruitful.

Last year as this, the subjects committee followed the commendable practice of submitting to the convention, after the presentation of a report by a committee, its recommendations as to the subjects for that committee for the ensuing year. This should have insured an equitable distribution of subjects for last year.

A suggestion has been made that the subjects committee of the Engineering Association prepare a standing list of live subjects, keeping it continually revised as suggestions are received. From this list a few outstanding items could be selected and assigned, with due allowance for the miscellaneous items outlined above. This would insure an interesting and practical program for each year's work and minimize criticism like that made this year. While this plan is suggested for the Engineering Association, it is applicable to all of the associations.

Statement on Substitute Ties Ignores Experience

IT IS not surprising that a part of the report of the subdivision of the way committee which dealt with the subject of "Design of Substitute Ties" was withdrawn at the convention. This report was widely distributed over the country. To the convention, therefore, even though withdrawn, the statement to which exception was taken has created the general impression that the engineering committee assigned to the study of this subject is decidedly skeptical of the merit of present substitute ties. While the withdrawal indicates that this may not be true, yet it is felt that this statement, which has thus gained circulation in printed form, should not be permitted to go by without bringing the question of its worth to the attention of those not in attendance at the meeting.

Thoughts were set forth in the statement withdrawn which seem to disregard much of the general knowledge and experience on the subject. The basis for the report was the replies from forty companies to a questionnaire sent to sixty-four companies, only twenty-four of those replying having had experience with substitute ties. Even the tabulation of these replies does not seem really to support the position taken in the withdrawn statement.

The sentence withdrawn from the report contained these five thoughts: (1) Because "Electric railways generally incase their ties in concrete and protect them from weather by paving, it is believed that (2) the additional investment required in forms of substitute ties and (3) the lack of a thoroughly suitable design for street railway purposes (4) tend to make them an uneconomical proposition and (5) account for the lack of interest by electric street railways."

1. Just how the encasement of ties in concrete and protection by paving is a consideration, it is difficult to see, since this applies as well to wood ties.

2. The matter of additional investment required in substitute ties is not pertinent, for this is more than offset by the saving in concrete possible thereby on account of the greater bearing area, wider permissible spacing and shallower depth of the steel ties. In fact, the saving in first cost of track has been one of the main selling features.

3. As to the lack of a thoroughly suitable design, the worth of this premise hinges on the word "thoroughly." The statement is probably correct on this point, for the present ties no doubt have not yet reached perfection.

4. If the use of substitute ties does reduce the first cost and makes at least as durable a foundation as concrete and wood ties, then it would not appear to be an uneconomical proposition.

5. The lack of interest pointed out in the statement is not apparent when it is known that of the two principal manufacturers now supplying substitute ties, one has sold more than 34,000 ties so far this year and a total of more than 115,000. The other has sold in 1922 more than 60,000 ties for approximately 360,000 ft. of track, and a total in the past twelve years of 295,000 ties to 140 electric railways. One of the interesting things about this use of steel ties has been the repeat orders placed year after year and the very large number in use by some companies. One street railway now has 60,700 in use; another has 66,400.

It would seem that the unfortunate reflection cast on present available designs of substitute ties by the circulation of this report is not well founded.

Why Optimism Is Justified at This Time

In His Presidential Address at the Chicago Convention of the American Electric Railway Association Robert I. Todd Proved by Statistics that the Electric Railway Industry Is on the Up Grade—At the Same Time Continuous Publicity Is a Necessity

THE keynote of Robert I. Todd's address was struck in the opening sentences, in which he said that prosperity is increasing on most of the city electric lines of the country, and their managements are keeping pace with riders by buying liberally of equipment and supplies. Improved financial conditions are being translated into better service almost everywhere. Probably no industry is doing more to bring the business of the country back to a pre-war basis than this one.

This generalization was justified by Mr. Todd by reference to the following data: Reports from companies taking in one-third of the total electric railway revenue of the country indicate that during the current year 21.6 per cent of the operating expenses of the industry will be devoted to the purchase of materials and supplies, or about $136,000,000. In no year between 1902 and 1917 was the expenditure more than $104,000,000, and the average was about one-half of what is being spent this year.

During the first half of 1922 a total of 1,016 passenger cars of all types were ordered, which is 122 more than were bought in the twelve months of 1921. It appears likely that purchases this year will double those of 1921. Allowing for companies which are not prosperous, and there are some, and adding capital expenditures, the industry will spend for equipment and supplies this year about $200,000,000.

As to operating statistics, Mr. Todd said that reports from about three-eighths of the industry, as measured by mileage, for the first seven months of 1922 show that riding is on the increase, and at the present rate of increase approximately 75,000,000 more rides will be taken this year than last. This is attributable to general improved business conditions.

Despite the increased number of riders, however, gross revenues are off more than $5,500,000, or 2.6 per cent, in this three-eighths of the industry, due to the lighter traffic early in the year and to slight fare decreases. Fares generally are remaining practically stationary because the industry is understood to be using its increased fare returns to improve service.

Increased efficiency of operation, said Mr. Todd, is reflected clearly in operating expenses, which have been cut down 7.2 per cent, while car mileage has been reduced only 0.8 per cent. The operating ratio has dropped from 75.2 to 72 per cent or 4.75 per cent; while net revenues have increased 11.8 per cent. The use of one-man cars, automatic substations and other labor-saving devices, and the abandonment of unprofitable and unused trackage are responsible for these figures. Material and labor costs also have been reduced somewhat during the year, materials now being about 50 per cent higher than they were prior to the war, and labor slightly more than 100 per cent higher.

R. I. TODD

Mr. Todd's analysis of the interurban situation was not so encouraging, as the interurbans show a tendency to lag behind the urban systems in recovering from the effect of the war and the industrial depression. When general business lags, the interurban loses both passenger and freight revenue. Motor-bus competition also affects both of these sources of interurban revenue. The interurban has not a monopoly of its business, as the urban lines have, as there is always the competition of the steam railroads, while fare increases are limited by this competition. However, the interurbans are holding their own and discharging well their obligations to the public; better times for them are anticipated. As to piratical bus and jitney competition, this, Mr. Todd said, is still making inroads on receipts, but is gradually being put under proper restraint. All that the railways ask is that buses be made to pay their fair share of burdens in the way of taxes and be subjected to control like the electric railways. Once this is accomplished, there will no longer be a bus problem, for they cannot survive. Twenty-three states now classify buses as common carriers and more cities are regulating them daily. Soon all buses will be rated as common carriers.

In Mr. Todd's opinion the industry's public relations are better than ever before, traceable to frank dealing with the car rider. The railway story has been told through executives, employees, advertisements and other channels, while honest newspapers everywhere are helping the electric railways to get back upon their feet. No greater mistake could be made than to neglect to keep the public informed regarding the railways' activities.

As to the financial problems ahead, Mr. Todd said that these are still serious. New money must be raised through the sale of securities in the next few years, and this can only be had on the basis of the prosperity of the industry. A start for new financing is already being made, and more financing will be done if the progress of the last seven months is sustained. It behooves transportation men to keep in close touch with every new development that enters into the transportation business and to adapt to their purposes the best of the new developments. In addition, the public must be informed of the evil consequences of any move that would weaken the electric railways and hamper them in providing the service the people demand.

Mr. Todd then went on to explain the part which the association can play in the development of the industry, particularly through the information bureau, making a plea for prompt response to requests from headquarters for information. He also showed how excellent results can be secured through co-operation in the publising of the association magazine and in the work of the advertising section.

Mr. Todd's outstanding suggestion was that every one in the industry should do his utmost to inform his patrons of the basic facts relating to the electric railway business. The public must be brought to realize that it is impossible for competing forms of public transportation to prosper in a given community. It is as foolish to permit unprofitable and destructive competition in public transportation as it would be to have several postal systems competing for business. The people should be made to realize the gross inequality that exists with reference to taxation and other public charges as between motor vehicles operating in the streets and the railways.

As to fares, also, he said that while it is true that the lower that fares can be kept while maintaining a proper return on investment, the better satisfied the public will be, yet fares cannot be made lower than will provide all the costs of giving adequate service and providing a fair return. When unfair competition impairs the earning power of a railway, either service must be diminished or fares increased. Fares will be lower in proportion to the reduction of charges for paving and other public obligations, and to the lessening of the cost of fuel and labor, and they will be lower due to increase in patronage. As costs are increased, fares must increase.

In conclusion, Mr. Todd thanked the executive committee for efficient work and faithful attendance at the monthly meetings, and the officers, executive committee and members generally for their hearty co-operation and splendid support.

Suggestions on Merchandising Transportation*

Make the Car and the Service Attractive and Show the Public You Wish Its Patronage—Instances to Illustrate This Maxim Are Cited

By Edward Hungerford
Publicist, Rochester, N. Y.

EDWARD HUNGERFORD

THERE are two ways in which the merchandising of transportation may be accomplished. In one the passenger buys his transportation—just as he goes in to the nearest post office and buys a postage stamp. He needs the convenience of the stamp—or the trolley car—and he pays for it. It is a cold-blooded commercial transaction. He can take the postage stamp or he can leave it. There is no selling force placed back of that transaction. The patron can easily—and generally does—gain the impression that his presence, or his 2 cents, are not particularly needed around those parts. Really, he is not a patron. The favor is generally being done by the large concern that is selling him the small stamp. At least this is the impression that is given.

I have known in my day a number of railways—both steam and electric—who sold their transportation in precisely this way and then sometimes wondered quite blandly why they did not enjoy a fuller meed of public confidence and public friendship.

The other way of selling transportation is to sell it.

Here it is that the patron at once is placed in his true light. The railway is the one that is anxious to complete the transaction. It seeks the patron's favor. It catches his attention. It heralds its wares. It endeavors to create a desire upon his part to partake of them. This is real salesmanship. The other is a mere ordinary garden-fed sort of a buying and selling transaction and is unworthy of any special study or consideration.

The real selling of transportation is a highly specialized art. A study into its great possibilities is forever filled with fascination—and generally highly profitable.

The one method—if indeed you can dignify it by such a name—wins no friends for a railway; putting the thing more positively, it very frequently creates many enemies for it. The other method — the far-seeing, broad-visioned one—may be the salvation of some critical situation.

It is of this last method that I am going to speak this morning.

BROOKLYN TWENTY-FIVE YEARS AGO

It is about a quarter of a century now since the trolley road here in the United States first began to try and popularize itself by some crude beginning steps in the merchandising of its transportation.

That was about the time when I first came to live in Greater New York—as the metropolis of this country was then quite popularly known. I boarded in Brooklyn. The B. R. T., in those days, seemingly had little time for fussing with such seemingly fine details as a consideration of merchandising its product. It was too busily engaged in trying to reconstruct out of a hodgepodge of steam and electric railways, of every size, condition and vintage, a real metropolitan transport system for a community which was just upon the threshold of coming into its own. Yet somewhere in that early organization there must have been some one in whose fertile mind there had been sewn a tiny seed of transportation merchandising ability.

For upon quiet summer nights one saw passing through those pleasant shaded streets of Brooklyn town open trolley cars gaily illuminated with a hundred or more incandescent bulbs of a variety of colors and filled with parties of Brooklynites young or old bound to the beaches or off to the open country. These cars were held for the use of chartered parties. They were continued in use for several seasons. Then some efficiency man came into the offices, figured out just how much juice those pretty lamps burned, how once or twice upon a rainy night the whole lightly constructed fandangle had short-circuited and burned itself out—and the cars were abandoned.

Yet the cars themselves represented a very early effort toward accomplishing the end to which an important committee of your association is today bending every effort to accomplish. They were, in their crude fashion, merchandisers of transportation.

The old-fashioned cross-bench open-car, itself, is a merchandiser of transportation. In my day in Brooklyn we continued the use of hundreds of these somewhat antiquated bodies, even though it involved twice a year an interchange upon the trucks of them of a standard closed body. They still are in use in both Brooklyn and Manhattan—by the hundreds.

I know, myself, the arguments that are raised against this old-time form of trolley car. They are valid arguments—the safety factor, probably the most forceful of them all. Yet the fact remains that not one of our American car builders today is giving us a vehicle that for passenger-catching ability can hold a candle to the old open-bench trolley car. Right here is a something for you gentlemen who are so earnestly striving to market the transportation of the American electric railway to consider—and consider both long and well.

Granted that the open-bench car is in many ways inefficient and that because of the very ease that it offers in ingress and egress it has a high accident factor, the fact remains that it gives a method of riding more closely approximating that of the open automobile—the most lusty and popular competitor of the street railway—than any other form of trolley car. There is an old-fashioned comfort about this vehicle which cannot be gainsaid. From its comfortable seats one sees the town or the country—and sees them well. While if he be a smoker—upon a pleasant day or a warm summer's night—the old-time open-bench trolley car seems to be a little corner of an earthly paradise.

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*Abstract of discussion on report on Merchandising Transportation at convention of American Electric Railway Transportation & Traffic Association, Chicago, Oct. 2, 1922.

SOME MODERN METHODS ARE CRITICISED

To the man who once loved this type of car, what is offered in its place? A highly efficient, highly scientific contraption upon wheels in which the passenger feels that he is being put through a sort of a machine—like a sheet of paper going through a printing press. You have not as yet come to placing turnstiles in our trolley cars. I shudder even at putting the suggestion into your minds, and shall threaten yet to become the leader in a vigorous and radical nationwide anti-turnstile campaign—but in the multiplicity of little machines that place burden or annoyance upon the patron rather than upon the street railway or its agent is a force that is constantly tending to counteract all the sincere efforts that you gentlemen are taking toward popularizing all of your great properties.

I am a trolley passenger.

I enter the precise door that is designated for me to enter the conveyance that is to bear me to my destination. In the fine town in which I live one is never quite sure whether the entrance is to be by the front door or the middle one. However, this is a mere detail. We shall let it pass. Somewhere in the car the conductor takes my money. When he sits in the middle of the car I think that right there is a single modern American trolley-car device that is of real benefit to the passenger's convenience.

In our nice town the trolley-car fare is 7 cents—no more, no less. I believe that our trolley company is honestly entitled to that 7 cents—perhaps it should have more. It has accomplished marvels in the past few years in the betterment of a service that a half a dozen years ago was a reproach to one of the most forward looking cities in America. It has not done all that it might do, and I doubt if the company itself would claim that it had. But it has bettered its cars, vastly bettered its tracks and above all things it has succeeded of late in manning its cars with a fine group of motormen and conductors.

I understand that it pays these men very well. Yet no matter how well they are paid, I do not believe that they are overpaid. And if it were necessary to have them really adequately paid—as clean-cut, decent American citizens—to add a penny or 2 cents or even 3, to my car fare, I should accept the increased cost, myself, with great pleasure in my heart. In fact, I only regret that in Rochester we have not as yet acquired a full service like unto that of the Fifth Avenue Coach Company in New York, where one pays 10 cents and has the absolute assurance of a seat throughout his journey, to say nothing of clean, well-lighted vehicles free from absurd mechanical contraptions and seats arranged apparently with a real desire to meet the comfort of the patron. Of this seating question, more in a moment.

The fare upon our cars is 7 cents.

I stand before the conductor and fumble in my vest pockets for the two odd pennies. If I give him a dime I am loaded down with the three odd pennies. Either way, it is bad. There are no tickets. I wish that there were. The trolley company might sell fifteen tickets for a dollar without a heavy fare sacrifice and have its money in advance. Personally I should be glad to pay 50 cents for seven tickets and tell the company to keep the change. It probably needs it. But in the few weeks that have elapsed since I have come to Rochester I have become more than ever a red-hot enthusiast over Walter Jackson's plan of the weekly trolley pass. I think it the most definite step forward in selling transportation that I have yet seen.

But the passing petty annoyance of fumbling for pennies is not to be compared with the continued one of finding a modern trolley car without a cross-bench seat within it. There are reasons for the longitudinal seats and I think that I know what they are. But there are awfully good reasons for the cross-bench seat and every one of them is a real seller of transportation. The longitudinal seat at the best is a rather uncomfortable one. The cross-bench fellow, on the other hand, almost invariably is a very comfortable one. In it one is assured that no fellow being is likely to walk upon his toes or otherwise injure the comfort for which he has paid—and paid fairly.

Petty annoyances, all of these to be quite sure.

But any business that makes a real success of its salesmanship is not apt to be causing its patrons constant petty annoyances. This may be set down as almost fundamental fact.

I think that I am only setting down the fact fairly when I say that sometimes in the past in the planning of a new car or some other similar facility of street railway transportation too much attention has been paid to the engineer or other efficiency experts and far too little to the passenger traffic manager or whoever it is whose business is to keep in touch with the patrons of the property.

AS A PUBLICITY MAN IN BROOKLYN

Sometimes this last is the publicity man. And I could stand here and talk until dark upon the possibilities of the publicity man in the street railway business—and his heart-rending problems. I have been one, myself, and trust that I may not be accused of undue conceit when I say that I think I was one of the very earliest pioneers in the field. In 1906 the publicity job in a street railway organization was almost an unknown quantity. When E. W. Winter called me to create such a job on the big Brooklyn Rapid Transit system there were few precedents anywhere by which one might be guided. It was indeed creative work.

B. R. T. was at that time perhaps the most hated utility corporation in all America. Frankly, it had fairly earned a good part of this ill-feeling. Several years of incapable and indifferent management had but served to create an additional burden for Mr. Winter to bear when he first came down from the Twin Cities. That he finally succeeded in making such a hopeless derelict into a substantial 6 per cent property is, to my mind, one of the real miracles of modern business romance.

Soon after I took my job, one of the minor officers of the company came to my desk. He was interested in knowing how I proposed to handle it—and said so, quite frankly.

"I suppose," said he, "that you will have to spend quite a lot of your time in educating these newspaper men. They don't understand the officers of Brooklyn Rapid Transit."

I answered with equal frankness:

"Not one minute more than I shall have to spend educating the officers of Brooklyn Rapid Transit. They don't understand the newspaper men."

Here, then, was the basis for the upbuilding of our policy. We abolished a rather silly policy of courtesies to the press that had been in existence for a number of years past, and set up in its stead a policy of frankness and accuracy in our relations with the reporters. In the old days there had been two methods by which the newspaper men had been met by the officers of the company; one was to be good-natured and lie to them, and the other was to be ill-natured and to tell them to go to hell. Both were equally bad. And both were equally prolific in building up ill-will for the company. We tried to be good-natured always and to answer the questions that they asked us, but also to advance information whenever and wherever it was possible. This went so far as actually to calling them up on the telephone and informing them of accidents upon the system. Sometimes we beat their own men to a story.

FUNCTIONS OF PUBLICITY MAN

I shall go no further into these personal experiences. They are now all history, anyway. But before I am done with the important relationship of the publicity man to the selling of transportation I want to make an especial appeal for him. Since 1906 the idea of a public relations man in a street railway organization has made a pretty rapid spread. In most companies he now is regarded as a fairly essential unit in it. In very few, however, is he regarded, even yet, in anything like his proper relationship. In far too many cases he has been hired and is retained as a stop-gap; he is a sop engaged by some general manager in a futile hope that by such a step alone the pounding of the newspapers in some way or other is to be stopped.

Such a hope is indeed futile. A mere slip of an untrained boy, hired at a salary less than one would give a first-class stenographer or a chief clerk, is well to be classed as a futile hope. He may have been some reporter upon a local paper or he may have been drafted from within the organization—that makes but little difference. Neither does it make any very great difference if he be either a man who has had some training in a new but highly specialized profession or one who has some inborn innate talent for the thing, if—

Here comes the if—

None of this will amount to the proverbial tinker's dam unless the publicity man—I like the phrase "public relations" much better—is given the salary, the position and the respect to which it is really entitled.

Let me make myself clearer:

The attorney of a street railway is its arm of defense. That we shall concede at the very beginning. As such an arm he is not only entitled to a large salary—and respect and position—but he generally receives them.

Now will you agree with me that if the attorney or the general counsel of a street railway is its arm of defense is not its public relations man its great arm of offense?

And is it not forever better business and better strategy to have a strong line of offense than merely a capable one of defense?

Is it not better to spend a dollar on good offensive work at the beginning than ten dollars at the end in a defensive fight which has been forced upon you?

These are the questions, gentlemen, which impel me to say to you that it is not alone important, but absolutely necessary, that your publicity man be well trained and otherwise fitted for his job, but well paid and well treated in it. You cannot have a $25,000-a-year attorney and a $2,500-a-year publicity man and expect to accomplish many real, definite, permanent results. You cannot make bricks without straw. And in the long run you must—it is infinitely better that you have him in the short run—engage a man whose training, whose temperament, whose general abilities make him as fit at every point for his important job as your general counsel, by training, by temperament, by general abilities, is rendered fit to direct his.

More than this it is not necessary to say at this point.

FIFTH AVENUE COACH COMPANY

A moment ago and I was speaking of the Fifth Avenue Coach Company in the city of New York. Before I am done talking to you, gentlemen, I want to hark back to it once again.

Although not an electric street railway, it is, in my opinion, today the most outstanding city transportation company in the United States. The conditions that have brought it to this high point are not those that have come to it because of its use of the gasoline motor bus, instead of the electric trolley car, as its unit of operation.

It is successful as a transportation company running in a city street because long ago it seemingly began to solve the real problem of the merchandising of its product.

Which, being translated, means that it has provided clean vehicles, well lighted, well heated, well operated, has succeeded even in the guarantee of a seat to every passenger—has placed upon these vehicles men as its agents who for all-around efficiency and courtesy I have never seen equaled in any other transport company and, finally, has told its story to its public in a frank, direct, modest way. It charges a fare double that of its competitors, and not only fills all the motor buses that it can provide and earns a generous rate of return to its shareholders, but is today perhaps the only transport company in the city of New York whose patrons almost invariably are its friends.

Does the real merchandising of transportation pay?

I think that the Fifth Avenue Coach Company is the full answer to that question.

It pays—and it pays big.

I suppose that it is quite too much to hope in this day and hour that an electric railway company—particularly a city electric railway company—could ever so reorganize its operation and its public relations to provide a-seat-for-every-passenger service—at any price. So we shall have to dismiss at the outset that phase of the Fifth Avenue Coach Company's remarkable success. But there are other phases of it that might well be worth the consideration of the American street railway man.

The question of the attitude of the men upon the platform toward the patron is also difficult—yet it is not unsolvable. Offhand it would look as if the geographical position of the motor bus company, in the most exclusive thoroughfare in the city of New York, would be a great aid toward promoting courtesy among its employees, because of the rather superior and cultured class of patrons that come to it. To an extent, only, is this true. It is not entirely. Upon pleasant days the East Side and the West Side of New York fairly pour themselves out upon the bus tops. They are schooled in the bad manner of the other traction systems of the town. Yet the busmen separately have little difficulty in handling even these fairly difficult passengers—and in retaining their good tempers and their good manners into the bargain.

There is another side of the question that is worth a passing moment of attention. It is almost axiomatic to say that good manners promote a good company morale. Yet the fact that the Fifth Avenue Coach Company, even in the days of the greatest labor shortage, is never without a waiting list of applicants to go into its service is well worth noting. Labor, itself, responds to good manners. I firmly believe this. I also firmly believe that the average workman prefers a job with a clean-cut going concern, with good manners and good cars, to one which is trying to slide along with but a minimum of these things.

But one thing that has interested me very much in particular about the Fifth Avenue company is the design of its vehicles. That they are cross-seated goes without question. Have not I just told you that it is engaged in selling its transportation, not in compelling its patrons to buy it? But the seats upon the roof! There is the rub.

Throughout Great Britain I have seen the double-decked trolley cars, as well as the double-decked motor buses. I have ridden upon dozens of them. And my good friend Walter Jackson has told me much of their remarkable economy and efficiency of operation—of the astounding low weight of the car for each passenger that it carries. Invariably I have returned from England asking my street railway friends here why we could not use the same type of car in this country. Not one of them has ever given me a good and sufficient answer. Our climate certainly—in the larger part of the United States at least—is not more severe than that of Glasgow or of Edinburgh. And for that matter, in the course of a year there are comparatively few days in New York when the upper decks of the Fifth Avenue buses are not well patronized. And the city of New York is not especially distinguished for its mild winters.

The upper decks of the Fifth Avenue buses induce riding. The coach company officers have told me so. If you do not believe it, try to get on one, on even a fairly pleasant day. But we have no Fifth Avenues, a lot of you are going to chorus back at me. To this, I take exception. There are many Fifth Avenues in America these days. The city-beautiful idea has gained thousands of disciples within the past twenty years or so. Moreover, it is the ride that is the thing—and not so much the avenue. The bus conductors have told me too many times of the repeaters who ride back and forth upon their vehicles for the fresh air, the vantage views of an elevated position, the warmth of the sunshine by day and the romantic caress of the moonlight by evening. Some day some traction manager is going to have the courage, the traffic sense and the sense of transportation salesmanship to make a genuine forward-looking experiment with a car of this type. I should like to see Mr. Palmer try it. He knows the immediate popularity that has come to his double-decked buses in Baltimore, as compared with the older and more ordinary type.

All of these things—many more, too—are, or should be, sellers of your transportation, gentlemen. The ramifications of this form of merchandising are so vast, so complex, but so altogether fascinating that I have been tempted to write a book upon them. In a nation where salesmanship in other commodities long since came almost to the status of a fine art, the selling of transportation has too long been a sadly neglected affair. Therefore, I am more than delighted to see the efforts of this association toward promoting it. That these efforts will bring a definite reward I have no doubt.

Strength to your elbows! And in the long run—that inevitable reward.

The Business Situation and Public Relations*

In This Address a Former President of the United States Chamber of Commerce Explains How Normalcy Is Being Resumed, but Warns Electric Railway Men that They Cannot Solve Their Problems Alone

By H. A. Wheeler
Vice-President
Union Trust Company, Chicago, Ill.

BUSINESS is coming around all right. We cannot expect to go through such a chaos as the war period without an effect on every man, woman and child in the world at some point or in some fashion. We must all go through whatever comes to us in getting back to normal. We need not fear much for the result. Economy must be introduced. While wealth must be produced, economy has not been reinstated in the economic life of the world, neither in government, in corporate life nor in individual life. The largest spenders are those who should be the largest savers today. Conditions are gradually being restored, but they are not yet restored to a normal basis.

In so far as business is concerned, a steady, definite trend back toward a more stable condition is on.

You have been through a period of very high costs of the money you need in the operation of your business and for its extension, and for the development of efficiency. The cost of your money will be obviously less in the refinancing of the next year or two. There is more money for investment available now than ever before in the United States. There is not only money available for investing in our own facilities and services, but there is money available for investment abroad as well.

There is nothing unfavorable in the business situation. Buying has begun to flow again in channels more stable and natural than have existed since we began to move from our period of high inflation. The electric railway business has bridged a period of great distress and has come into easier conditions of operation. But there is no assurance of freedom from political interference.

H. A. WHEELER

We are breaking out of a period of war into a period when there is a demand for a new democracy which is socialistic. One of the chief byproducts of the war is the fact that every man and woman once willing to be guided by the political wisdom and economic sense of those to whom they have looked for advice now assume to be dictators in both political and economic fields. During the war men and women took public positions to meet the country's need, but after they got a taste of public authority there was a residual effect. People enjoy power when they have the right to exercise it.

THE VITAL SUBJECT IS PUBLIC RELATIONS

The subject of public relations which is to be discussed at this convention is of paramount interest today. A better establishment of these public relations is absolutely necessary to your life and to the welfare of the whole people with respect to its public services.

When people desire a luxury they buy it, no matter how costly or of how little worth. Human beings love to pamper themselves, but the moment a service or a commodity becomes a necessity they take a niggardly attitude toward those who furnish the necessity. All thought is lost of equity and justice in respect to the return to the purveyors of the necessity. They do not object to a return of 20, 30 or 40 per cent profit in the purchase price of something they do not need, but the thing that enters into their daily life, that moves them from place to place, or feeds the body, or shelters them, that service or that commodity is relegated to the point of earning power as near as possible to zero. Advantage is taken of the fact that a concern having a franchise which requires it to operate must operate, even at a loss.

The electric railways are performing an essential function in the economic life of the country. This not only reacts favorably to large business because the service makes it possible to draw labor supply from a wide area, but it is just as much an advantage to the workman. The latter, by virtue of the flexibility of transportation, can secure work in various plants and is a larger factor in industrial activity than would be possible under any other circumstances. He may choose the most lucrative and pleasant employments that are within the range of his reach.

But does the workman ever thank the transportation company for making available a broader market in which to sell his labor? He does not. Does the manufacturer, who consistently and constantly avails himself of these agencies of transportation, do anything to show his appreciation for the extended territory that you have permitted him to tap for his labor supply? I have not found it so. The attitude taken is apt to be passive and negative, whereas it is only affirmative action that will be able to uphold and strengthen transportation work in this country.

Men and women want to invest money, and there is a world of money to invest, but they look with doubt upon the securities whose earning power is in the hands of a body that may at any time become a dictator of the conditions under which operation shall be carried on. This is right because people are not going to put their funds into businesses that are not surrounded by proper safeguards.

There is not a satisfactory understanding on the part of the public as to the economics of transportation, nor a proper responsibility lodged with the public service commission for fair and just treatment of that service. In so far as public relations to any line of business are concerned, the public must understand that its dividends for proper treatment of the public utilities will come out of its effort to have that business operated on a high plane of fairness and equity. The public must be convinced that any plan that is being evolved or any plan made for which support is asked has in it some concrete, definite return to it which it can see, feel and know.

THE FOUNDATION FOR GOOD PUBLIC RELATIONS

That is the way human nature is built, and unless the foundation of public relations work is laid with that in mind, there will be failure and unreasonable demands for service will be made.

Most associations came into existence for the purpose of making more money for their members. They were organized because helter-skelter competition of a cut-throat character was found to be destructive of business. This association was developed to stimulate the art of transportation and to determine how best to provide for transportation service at the lowest cost.

If this association could influence the public mind in a definite manner toward a better understanding of electric railway requirements, as it has done along mechanical lines, it could say "We are saved."

There is a public relationship. How can you get the public into your confidence? How can you educate the people to the requirements of urban and rural transportation? How can you cause them to be just and fair in their consideration of this subject? By newspaper publicity of the right kind you can do a part of it, by advertising of the right kind you can do another part of it. But after what you have built up in this great association what you believe to be the best presentation of that service that will tie the public more closely and more sympathetically to you, you want to remember that you are under a disadvantage. You cannot do the task alone, because as an organization having a proper selfish interest in everything that you propose, there will be a certain amount of suspicion of these efforts.

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*Abstract of address delivered at forty-first annual convention American Electric Railway Association, Chicago, Ill., Oct. 2 to 5, 1922.

THREE VITAL ORGANIZED FORCES

We live, today, in a world of organized forces, that have grown out of the last two or three decades. There are three definite forces which have no point of co-ordination, and yet which will exercise a tremendously potent influence upon the powers that control our goings and our comings. These are the forces of organized agriculture, organized labor and organized business. They control the knowledge by which the economic life of our country and of the world is made sound and whole.

In the organized force of agriculture today is one of the most intelligent efforts that have ever been made in the organized life of any industry, through the organization of farm bureaus. These show the farmers how to prepare their soil, what to plant and how to reap. Now they are going to show them how to market, under cooperative leadership.

Agriculturalists are today gathering their plans together for the means of protecting themselves as to price and profits. The day will come when they have accomplished their first purpose, and then they will look over the field and see the relation of their great force to the general welfare.

The force of organized labor is not of sudden growth, and it is a growth that is not going to stop. There is a militancy about it that is dangerous. There ought to be some medium through which labor organizations would teach their membership that the production of wealth is a thing that will give them large returns, and not to expect these large returns from strikes and fights, which result in a loss to labor by reason of the loss of production.

Organized labor learned much from organized business. It is a force that looks for nothing except its selfish advantage, and is less progressive than the force of agriculture. There is a militant selfishness on the part of organized labor that can be summed up in three items: Better wages, better hours and better working conditions.

THE SOLUTION LIES IN CO-OPERATION WITH ORGANIZED BUSINESS

The force of organized business, of which you are a part, and to which you should be linked with hooks of steel, is the most constructive, and the only constructive, force that is operating in this nation in this time of real economic difficulty. Organized business is old enough, has gone through enough, has wisdom enough and has selfishness enough to have begun to see its relation to the common welfare. It has learned that it must stand constantly for this better public relationship to life's industries and life's service. That relationship may not exist fully at the present time, and there may still be a decade or two of further experimentation, to the loss of the public, to the loss of industry and to the general harm to our own constitutional safeguards.

Technically, the machinery of the electric railways is safe in your hands. You will develop it for the common good and your own good, jointly. Practically the relationships which you ought to develop and would like to see developed are capable of development out of your own knowledge and daily contact with the forces which you serve. Then it remains for you to pass these conclusions reached, out of your expert knowledge, to that great body of organized business ready to understand and to give constant thought and attention to your problems as well as the other problems of industry and service. This can be done through the medium of a nation-wide movement, that has no selfishness in its purpose other than the selfish service to the people as a whole. You can go into the campaign with the propaganda which is necessary for this development in order to assure public opinion and political opinion that the conclusions reached as to the necessity for public co-operation are not the conclusions of the craft selfishly interested in the particular proposition which is presented. Rather the proposition has been examined and checked and approved as sound justice and sound economics. In consequence the great body of organized business, intelligent and thoughtful as it is, will stand behind any intelligent and thoughtful and worth-while program of yours and will develop with you and for you these public relations and that public support and that public contribution to your capital that is absolutely necessary to the welfare of the craft.

The Interest of the Street Car Rider*

The Commissioner Shows How Paving Burdens, Excessive Taxes, Unregulated Competition and Other Unnecessary Obstacles to the Giving of Good Service Are to the Detriment of the Rider—Stress Is Laid on the Importance of Co-operation Between Regulatory and Taxing Bodies

By Carl D. Jackson

Chairman Wisconsin Railway Commission, Madison, Wis.

THE interest of the street car rider is, of course, service. I am concerned in this paper with trying to point out how that service can be obtained and assured on the most reasonable terms and why unreasonable burdens upon the street car rider should be done away with; what course of regulation and what policy in the end are in his interest to assure him the best practicable service at the most reasonable terms.

The street car rider does not always realize that service can be rendered and continued only where that service is paid for, whether furnished by private corporations or by government agencies. The cost will necessarily include the cost of money invested in the instrumentalities of service. It is of prime interest to the rider that unnecessary and unreasonable burdens of cost shall not be placed upon that service because all such additional and unnecessary or unreasonable burdens are in the end a burden upon the street car rider himself.

One of the burdens on private urban railway operation directly affecting the rider, which bulks increasingly large in recent years, is the municipal or state requirement that street railways shall be responsible for paving within the track zone and its maintenance, and in some instances for the paving on the entire street. There may possibly be slight damage to the pavement in the immediate vicinity of the rails caused by the vibration incident to the passage of heavy equipment, but this is negligible and in no way commensurate with the requirements placed upon the street railways to maintain paving within the track zone and often without the area of the track zone.

While individual companies have succeeded in being relieved in part, at least, of some of these paving burdens, in general they still remain. In all instances the railways, through general taxes, are required to pay a substantial portion of all other pavement costs.

ELECTRIC RAILWAYS INCREASE REAL ESTATE VALUES

The requirements that electric railways pay for paving construction represents in the last analysis an unfair discrimination against the car rider in the favor of the abutting property owner.

The car rider ultimately pays for the

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*Abstract of address delivered at annual convention of American Electric Railway Association, Chicago, Ill., Oct. 2 to 5, 1922.

cost of this new paving, although the abutting property owners profit greatly from the very fact that the street railway lines are on those streets. We have had a concrete case of this recently in Milwaukee. In the fall of 1921, the Milwaukee Electric Railway & Light Company laid a double track on Oneida Street from Jackson Street to East Water Street, costing with special trackwork probably $100,000. This investment permitted the operation of certain cars on Wells Street not previously carrying the cars of this company. The landlords owning the business property abutting on this section of Wells Street promptly raised the rents materially, in some cases to almost double the previous figure, but of all the tenants affected by the increase in rent, only two intended to move. The result clearly indicated that the profit to the abutting property owners was expected to be permanent. Land values on this section of Wells Street have been greatly enhanced by the laying of tracks of the street railway without any cost whatsoever to the abutting property owners.

It should be brought home to every street car rider in the country that every dollar from earnings which the street railway company is required to pay for paving means that there is just so much less which the regulatory commissions can order expended for service or improvements, or so much increased cost per ride for every ride taken.

WHY PENALIZE THE CAR RIDER ESPECIALLY?

The street car company is now treated as though it owned a private right-of-way in the streets. As a matter of fact, vehicular traffic is in many of the cities heaviest in the street railway zone, and in this respect there has been a greatly increased use of the street railway zone for general vehicular traffic in the last few years, owing to the great increase in the number of motor vehicles parking on the sides of the streets. Studies made in New York State show that the vehicular traffic in the railway area amounts to from 40 per cent to more than 90 per cent of the total vehicular traffic in the street.. The street car company is not only paying for the pavement worn out by vehicular traffic, but is often paying a larger proportion of the damage done by vehicles in the remainder of the street than is borne by the municipalities with respect thereto. Furthermore, the passengers who ride on street cars are merely using the streets as passengers, as are riders in other vehicles using the streets, and there is no more reason for penalizing the street car rider than there would be for penalizing the rider in any other vehicle.

As real estate values can be made or unmade by routing or rerouting of car lines, there is every obligation upon the owners of real estate not only not to cast unjust and unreasonable burdens on street car riders, but in my opinion to go further and in case of extensions give positive recognition of the benefits accruing to them. The demand for extensions into thinly populated or into unpopulated territory is insistent. The demand often comes from those interested in real estate development, the owners of the real estate anticipating for themselves the profit which will come from increased values through the extension of the street railway system into their territory. Extensions of this nature will not in themselves pay perhaps for years to come. They offer an additional facility but cast upon the general rider an additional burden of cost. They increase the average length of haul which in itself, of course, increases the cost to the average rider.

The problems of extensions is a difficult one. It must be considered in connection with the general benefit of all. There are already many instances where the owners of real estate or industries to be specially benefited by extensions have furnished in whole or in part the money necessary to build them, thus relieving the general rider, so far as fixed charges are concerned, of this additional burden. There appears to be a strong element of equity in the principle that extensions of this nature which cannot pay and must be a burden upon the general rider, and which will be beneficial to specially situated real estate owners or industries, should be financed by those benefited. Assessments for this purpose would be in line with municipal policy in many states, where, for instance, water mains are extended at the cost of the property owner to be served.

Many street railway systems operate under franchises which require the sprinkling of the entire street and the removal of snow and ice either from a zone or the entire street. Both of these requirements are burdens properly to be borne by the municipality as such. They have no more relation to a street car system than they have to any other vehicular traffic on the street, yet these additional burdens are in the end cast upon the street car rider. Undue tax burdens directly affect the cost of service and are reflected in the fares paid by the car riders.

Most of the taxes levied against public utilities have in the past been based on the idea that the utility selling service at rates fixed in its franchise could in no way pass the burden of taxation to the consumer. Legislatures are still making laws which appear to overlook the fact that with rates based on the cost of service, taxation of a public utility is merely an indirect taxation of the users of its service. All laws placing special tax burdens not in line with the fair and equitable distribution of taxes upon utilities are in fact penalizing the users of the service.

TAXING BODIES COMPLICATE THE WORK OF REGULATING BODIES

In few states is there any co-ordination between the regulating and taxing bodies. The old statutes relating to taxation are retained and new ones casting additional burdens of taxation are enacted, while the power to regulate service and rates is placed in the hands of a body having no authority over the burdens imposed under such statutes or ordinances. On the one hand we have the regulating body with the duty of prescribing and enforcing service, and on the other hand we often have a taxing body treating utilities as tax collectors. Efforts on the part of the regulating body to bring about a stable financial condition of the utilities and the fair return necessary for that stability has in some instances immediately met with increased taxes from a body in no way co-ordinated with the regulating body.

The duty of a regulating body to bring about a fair return cannot and should not be shirked, but it is fair to say that increased tax burdens can only add to the difficulty of the regulating agency, in performing its proper functions. Of course, in some states the fixed franchise rates of fare still exist. If it be claimed that in such instances the additional tax burden cannot be passed on to the car rider, it is also equally clear that the increased tax burdens are making it more difficult to render proper service for that car rider. The experience of the last few years, however, has demonstrated to everybody the impossibility of a fixed and inelastic franchise rate of fare, regardless of cost, and it can be only a question of time when franchises of that nature will be superseded in all parts of the country as they already are in most parts of the country. In some states we still have service regulation with no regulation over fares or the financial means of giving service. Such situations are illogical and anomalous and so clearly contrary to public interest that they cannot continue to prevail.

DON'T SADDLE FUTURE COSTS ON PRESENT RIDERS

Some franchises contain very burdensome amortization provisions. Provisions of this sort merely mean that the rider, besides paying what is the reasonable charge for the service rendered including a fair return for the capital furnished in rendering that service, shall pay an additional amount with the idea in view that at the end of a definite term of years or at some indefinite future period the entire investment will be wiped out by this excess payment and the property become governmentally owned, of course, at the expense of the car riders. Excess charges for this purpose would appear to be justified neither economically nor socially. Riders of this generation should not be penalized for the benefit of the riders of the coming generation.

The advent of the jitneys and buses was at first hailed by the average car rider with considerable enthusiasm. It took time and experience to show that the car rider could not have both jitneys and street cars, and it was soon very evident that jitneys and buses could not give the service rendered by the street car systems. They neither offered the magnitude of service, the certainty of service, nor the reasonableness of service offered by the street car systems. In general they confined their efforts to taking the cream of the traffic, the short-haul passenger, with the result that the best paying part of the street railway business was taken from the railways and the average cost per street car passenger was greatly increased.

The remedy for peak-hour traffic problems would appear to be effective co-operation by all parties interested in improving the condition of that service and by effective regulation to insure the best street car service possible without resorting to competition of independent jitney and motor-bus operation, which in the long run simply serve to increase the general costs of transportation to the riding public.

THE PLACE OF THE BUS

That the public has come to take the correct view of the jitney and bus situation seems to be clearly demonstrated where the matter has been brought directly to a vote of the people after the effects of jitney and bus competition have been demonstrated. Wherever any large city has been forced to rely on motor bus or jitney service as its only means of transportation, a chaotic condition has resulted. This was illustrated in the losses of Des Moines, Toledo and Bridgeport. Every city which has been without street car service for any period of time has recognized that this service is not merely a matter of concern to the operating companies, but is vital to the social and economic welfare of the city. The situation demands general power in regulatory bodies to prevent competition of jitneys and buses with essential street car service. In the meantime, regulatory bodies and the public realize that transportation by electric railways will always be necessary; that no substitute has been found for it and that nowhere in the United States in any city of considerable size is transportation being exclusively furnished successfully by other agencies such as jitneys or buses.

This is not saying that there may not be and is not a proper field for motor buses. Recent developments indicate that they may have a very proper place in the scheme of urban street railway transportation as feeders to existing lines and as a means of serving thinly settled territory where the traffic does not warrant the extension of the railway system, but where the general welfare of the city requires that the residents of this section be furnished with some satisfactory means of transportation. Feeder service of this nature should be furnished by the railways themselves in connection with their transportation system and co-ordinated with it.

Any analysis of the street railway situation develops at once the fact that the relationship of the street-car rider and the street-car company is in fact one of mutual interest. Service at reasonable rates depends upon reasonable costs, and it is no longer possible in this country for the car rider to look upon conditions surrounding railway operation with indifference.

All of this goes to show how essential it is that relations of mutual confidence and understanding should take the place of the old way of looking at street railway enterprises. And another factor for good service will be the establishment of good relations with the employees rendering it.

There are those who consider that urban street railway transportation is primarily a municipal function. It may be timely, therefore, to give some thought to the relative advantages and disadvantages of public operation of our urban railways as contrasted with private operation.

PUBLIC OPERATION NOT A PANACEA

Society, as constituted at present, has as yet evolved no successful substitute motive to replace the spur of individual initiative and reward for merit, and this is primarily the reason why private ownership and operation is generally more economical than public ownership and operation. In any business which is a large employer of labor, such as the street railway business, the advantage enjoyed by private capital is especially marked. Discipline in private employment is generally better maintained, and waste of effort more generally eliminated. At the same time the spur for economy in purchases and in all work is generally greater under the private incentive than under government control and operation. The three-year results of operation of the municipal plant at Seattle show a deficit before depreciation of $101,803, and on the basis of depreciation set up on the municipal books, the three years' operation resulted in a deficiency of nearly $2,000,000. When it is considered that this deficiency is before any charges for the taxes which would have been contributed by a private utility to the city, it can hardly be said that the experience of Seattle is encouraging to those who are weighing today the relative advantages of municipal and private operation.

In many cases the results of municipal operation are made to appear more favorable than they actually are because of the failure to make proper separation between the affairs of the municipal utility and the financial transactions of the municipality.

While the unprejudiced students of the relative merits of government ownership and operation will be nearly unanimous in favor of the private ownership and operation of such utilities as electric, gas and telephone utilities, the final judgment may not be as unanimous in regard to ownership of street railway systems in some of our cities. This service is of vital interest to the welfare of the community and the demands for capital investment to meet the growing requirements of some of the larger municipalities of the Union is very great. Meantime, the street car companies, in general, are just emerging from a period of extreme depression which has very greatly affected their credit. In some of the larger cities the demands for capital are such that the requirements can only be financed reasonably through municipal aid. Experience in the past has been such that in some instances it may be impossible to attract private capital into this field upon reasonable terms, except upon some mutually arranged plan for municipal participation, and perhaps, in some instances, municipal ownership may be necessary. However, it would seem that even under such circumstances actual operation ought to be left to private enterprise. In some instances, the advantage of financing by the municipality will result in a lower cost of money than could be obtained through private enterprise. This is largely the result of the credit conditions affecting street railway enterprises in such places during the last few years, the results of old fixed franchise requirements and the impairment of credit due to increased costs of service growing out of general increased costs. As said by the Federal Electric Railways Commission: "Unless the confidence of the investor in the securities of the companies furnishing this essential public service be restored, the public itself must in some way assume the burden of supplying the funds necessary for their continuance."

COST-OF-SERVICE PLANS PROMISING

In many instances it has been found practicable to establish cost of service contracts with the municipalities upon a fair and equitable basis assuring fair protection to the capital invested in the enterprises and reasonable fares to the riding public. The service rendered is so intimately connected with the daily welfare of the rider and the social and economic conditions of the municipality that such contracts are to be encouraged wherever they can be obtained upon a reasonable basis.

The transportation problem is constantly becoming more difficult and more important. As the congestion of traffic increases in our large cities, the difficulty of rendering adequate railway service becomes more acute. The result of this situation is that the public relations problem for the street railways is in general probably more difficult than the same problem as it confronts other utilities.

More and more the well-being of the people and the growth and prosperity of the communities served by the street railways is becoming dependent on good transportation. It is to be hoped that a way may be found through better public relations, through relief from unjust burdens and unfair competition, and through decreasing the cost of capital, for the stabilization of the street railway industry and for the fair treatment of both the rider and the investor. Certainly no reasonable street car rider would desire to deprive the privately owned and operated street railway from a fair return upon the investment or the necessary credit to adequately perform the important functions cast upon it.

National Financing and the Electric Railways*

Experience in Federal Financing Carries a Lesson to Electric Railways — Electric Railways Are Essential and Suggestions Are Made for Cultivating the Small Investor

By Hon. Walter W. Warwick
Former Comptroller of the Treasury of the United States

IN COMING before this association, in response to your invitation, I have thought it best to speak of the relation between government financing and the financing of public utilities. There may seem to be no relation between the two, but I am confident there is. It is often said that a government can secure all the money it wants because it has the unlimited taxing power. It is true a government can take by taxes all the property of its citizens, but a successful national life requires that the people be prosperous and contented. One mistake that leads to discontent and ultimate destruction of any nation is to pursue a course of unnecessary taxation, gross extravagance and failure on the part of rulers or of public officials in a republic to consider the best interests of the people as a whole.

In the years before the war it was comparatively easy to finance the operations of the government. The people hardly knew there was such a thing as federal taxes. The receipts from tariff duties and internal revenue taxes were sufficient to meet all the requirements of the Federal government. The total expenditures were about one billion dollars a year, and the balancing of the budget, or the consideration of receipts and expenditures at one time, was not thought to be an important subject. About ten years ago the debt of the government was less than $1,000,000,000, but as a result of the war the debt rose to about $23,000,000,000. This situation, when expenditures could not be brought below $4,000,000,000 a year, forced the adoption of some method of controlling expenditures and considering them in relation to receipts from taxation. Then was passed the budget and accounting act in June, 1921.

In the present budget law the president has control of the expenditures of the executive branch, which spends 99 per cent of the public money. The legislative and judicial branches spend together less than 1 per cent. The first large item is our obligation to the soldiers of the late war and to those of former wars, over $750,000,000. The second is the interest on the public debt and a reasonable sinking fund. These require $1,225,000,000 annually. Excluding the postal service, the receipts of the government are but a little over $3,000,000,000. These fixed charges take more than $2,000,000,000 of this sum. Upon the other $1,000,000,000 of expenditures the executive discretion is exercised through a Director of the Budget, an officer created by law to carry out the President's program of scrutinizing proposed expenditures and recommending to the President where expenditures can be reduced without injury to the service or with the least injury when the necessity for keeping expenditures within the receipts makes drastic cuts imperative. I think it safe to say that within a few years the annual budget message of the President, reporting to Congress and to the people the results of the previous year and the proposed program of government activity for the coming year, will be the most widely read of all government publications.

W. W. WARWICK

In Congress rapid progress has been made in centering in one committee of the House of Representatives and one committee in the Senate all control of appropriations. The budget law takes from Congress none of its constitutional responsibility to the people for the appropriation of the public money. Congress may reduce or increase any item of the budget submitted by the President. Congress also still retains the power to initiate appropriations that it may believe to be desirable in the public interest.

During the present fiscal year, ending June 30, 1923, there is an apparent failure of receipts and expenditures to balance by more than $600,000,000, it being calculated that expenditures total $3,700,000,000, while receipts of all kinds are estimated at about $3,100,000,000. To increase receipts by sales of surplus property and by other means, and to reduce expenditures so that the budget will balance for this fiscal year, is a task which will test the budget system. The problem must be solved if the credit of our people is to be maintained at the high level which we all demand.

ELECTRIC RAILWAY FINANCING

Your need to obtain necessary funds at a reasonable rate of interest is closely related to the problem of government financing. I come thus to a discussion of the subject of financing the needs of the electric street railways of the country.

I remember well the work of the commission appointed by President Wilson to investigate and report upon the needs of the electric street railway companies, and some time ago when I read its interesting and instructive report I was impressed with the seriousness of the troubles brought on the industry as a result of war conditions. I doubt if the public ever fully realized, during the war, the burden put upon the electric street railways. When the war came on and costs of operation increased, it is not surprising that many patrons of the street railways felt that the companies should carry out the bargain contained in their franchises, even at a great loss. It was not uncommon to hear it said that the companies could pay the deficit out of the enormous profits they had made in earlier years. This state of mind and the antagonism accumulated over a long period of years made it difficult for the street railways to secure a fair hearing when they wished to present their real troubles. Where public utility commissions were in existence it prevented action in granting increased fares as promptly as the situation and the public interest required. But the public has finally recognized that it has a real interest in first-class street car service; that such a service cannot be rendered without paying what it costs, and that cost includes adequate compensation to employees and a fair return on the value of the property. Under public regulation the old protest against paying a dividend on watered stock is dying out. The problem is the problem of the street car patrons. They are the ones to whom we must look for the help to which the industry is justly entitled.

Electric railways have been, and they will remain, our chief means of local transportation. I do not expect to see your industry supplanted by buses. The latter are efficient for light traffic, but they cannot serve mass transportation. I believe the experience in England has proved this. Buses give way to tramways wherever traffic increases to a point to warrant it. I doubt if any large American city could handle its traffic with buses exclusively; certainly not at a reasonable fare.

Electric railways must have new money to make extensions and betterments. How to get this money, amounting to about $250,000,000 a year, is not a question easily answered. I suggest to you the experience of the plain citizen, the man of small means, who bought Liberty bonds and financed our part in the Great War. This citizen, in large numbers, went into the investment business during the war, and now is ready to invest money got out of government securities, or additional savings, in something else. This man is the man for the electric railways or any other vital industry that needs new money and friends. He first learned to save when he bought a government bond on the installment plan.

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*Abstract of address presented at the annual convention of the American Electric Railway Association, Chicago, Ill., Oct. 2-5, 1922.

THE SMALL INVESTOR SHOULD BE SOUGHT

But this plain citizen wants something more than a promise to pay if all goes well. He has taken a course in government finance and is through buying stocks of no value. He wants the best. He wants first of all to know all about your business, just as he did about the Liberty bond when he invested in it. He wants you to render service with his money and to show some personal interest in customers of your lines, just as he would be interested in his customers if he were running a store. He wants to know from you how the other hired men—public officials, editors and others who share in his earnings—are treating his investment, because he wants a sure return on his money just as he received interest on his bonds. He will stand with you and fight with you so long as he is convinced that your methods are honest.

If you want to sell this plain citizen, it is best to be prepared to talk his language. The average financial statement goes over his head and some one who talks plainly will get his support and his money. This plain citizen does not demand that business men be undignified, but he wants them to be understandable and regular. Too many of them, in an effort to make their financial statements dignified, succeed only in making them complex. Your plain citizen needs a plain statement, even if it be one not approved by the best accounting practices, provided it is honest. He understood what the government was saying to him when it sold him bonds, because it talked his language plainly. Furthermore, he liked the treatment he received from the government. Thus has the government broken ground with the plain citizen and his wife for investment in great industries like yours. They are waiting to buy if you can meet the requirements I have set forth.

Of course, the money that all of these plain citizens of the country have available at once will not meet all of your financial requirements, but if you get them behind you, you will not have so much trouble interesting the big investors. Wealthy persons and institutions know that the safest investment today is the one in which the largest number of plain, everyday men and women are interested. The destiny of your business and of the public utility business generally lies with the average citizen, and the closer you get to him in a financial way the better off you will be.

It has been the experience of many lines of business that real prosperity came when it was found possible to make partners or real friends of customers. When it can be said that a large number of the common people, those who regularly patronize street cars, are interested to some extent in the management of the company, it will be certain that the good will of these citizens will be reflected in the better treatment the utility will receive from its community.

Your industry in these days has nothing to conceal. A frank statement of condition, coupled with judicious publicity, will reach the small investor who likes the bond of a local corporation furnishing an essential and growing service. But the management must not be of the absentee landlord class. Local men of reputation and high standing are essential. They must participate in all movements for the good of the community and thus be known as men of broad vision and not as men who prey upon the people.

Character in men counts more than it ever did. When the economical and efficient management of your property is known to the citizens of your city and the substantial business men believe that your bonds are a reliable security, I think it safe to say you will find your money locally. That is your field and it must be cultivated.

Your industry has its best days before it. To its credit is a large part in the building of the American home. It made it possible for men of moderate means to go outside the business sections of cities and there bring up their families in the fresh air and sunshine. Its contribution to the welfare of the nation has been a substantial one. Its future contributions will be even greater than those of the past. As it serves its country more than it serves the King of Profits, it will go on to higher and better days. In the near future it will share with all the people in the abundant prosperity that will be visited upon our land. We must deserve the blessings of prosperity.

Public Relations and Advertising Men Meet in Chicago

THERE were no dissenting opinions expressed as to the wisdom of organizing a public utility advertising association at the round-table discussion of the public relations and advertising men, held on the Municipal Pier, Chicago, during the American Association convention. W. P. Strandborg, Portland Railway, Light & Power Company, chairman of the committee on organization, appointed at a meeting of representatives of the electric railway, light and power, gas and telephone utilities at Milwaukee on June 13, 1922, presented a prospectus for the organization of a public utility advertising association in which it was recommended that a time and place be selected for further consideration of the plans. At this meeting a permanent name for the association should be adopted. A form of constitution and standards of practice, which are necessary before such an organization can apply for membership in the National Advertising Commission and the Associated Advertising Clubs of the World, were presented in the prospectus and are to be taken up at the recommended meeting. Election of officers is recommended at the same meeting and the appointment of an aggressive membership committee is also recommended.

Membership in addition to being confined to those engaged in public utility work will require assent to the standards of practice for general advertisers adopted at the 1914 convention of the Associated Advertising Clubs of the World. The organization committee was formally authorized to proceed with the organization work, and those present at the round-table discussion pledged themselves to assist the committee as called on individually for specific work. In presenting the report of the committee, Mr. Strandborg characterized the utility advertising men as double barreled orphans, in that they had not heretofore been recognized as an essential part of utility organizations and, as advertising men, have been floating around like camp followers. It has been felt that they have a place and the object of the proposed organization is to fit them into that place.

John F. Gilchrist, Commonwealth Edison Company, Chicago, in expressing hearty support of the proposed organization, declared that he had believed in advertising for many years and said that the companies he represents spend $400,000 annually in advertising, which is about 15 cents per capita. Charles Persons, director of the American Gas Association, and B. J. Mullaney spoke for the gas industry, pledging support of the movement and calling attention to the activities of the gas industry in advertising, saying that it is fully alive to the possibilities in such work. John Spellman, speaking for the Bell Telephone Companies, said that the movement has the hearty sympathy of this group of utilities. George F. Oxley, director of publicity for the National Electric Light Association, said that so far as that association can find out among its members the entire body is in favor of the movement. He said that it is desirable for utilities to do more advertising and devote less effort to getting free publicity of the advertising type. He said that there should be no slacking of efforts to get the facts of the utility industry into the newspapers, but called attention to the fact that properly directed advertising efforts should not reduce the publication of legitimate news of the industry.

Improving Public Relations and Keeping Them Improved

A Symposium

Contributions from Successful Executives Giving the Results of Their Studies and Experiences in a Number of Phases of This Subject Respectively

A FEATURE of the American Association program on Tuesday morning was a symposium on the subject of public relations, presided over by Matthew C. Brush, vice-president American International Corporation.

Mr. Brush opened the symposium with some general remarks and then called on a number of active managers for comments on different phases of this subject. Those who responded were H. B. Flowers, general manager United Railways & Electric Company, Baltimore, Md.; Martin Schreiber, manager Southern Division Public Service Railway, Camden, N. J.; Britton I. Budd, president Elevated Railroads of Chicago; Barron Collier, president Barron G. Collier, Inc., New York City; L. S. Storrs, president The Connecticut Company, New Haven; W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill.; J. P. Barnes, president Louisville (Ky.) Railway; C. E. Morgan, general manager Brooklyn City Railroad, and P S. Arkwright, president Georgia Railway & Power Company, Atlanta, Ga.

Abstracts of the remarks of Mr. Brush and the contributions of the others named are given below.

The Basis of Public Relations

By M. C. Brush

ONE reason why Mr. Emmons selected me to preside on this occasion, as I understand it, was that my activity in the electric railway industry is not as great as it used to be. I have no authority in any street railway, and he figured that I was the one man who had been connected with the railway industry who dared to preside here on this occasion and get away with it.

The term "Public Relations" is so hackneyed that it is difficult to talk on the subject. It involves, to my mind, 99 per cent of our business. Regardless of what your mechanical devices may be, and no matter what your engineering training or managerial ability or your capacity as an operating official may be, it makes very little difference, in regard to all of these elements of our business, if our relations with the public—I am speaking of public relations in a very broad way—are not what they should be.

M. C. BRUSH

I think oftentimes we forget, in our efforts to accomplish real genuine success in the conduct of our transportation properties, that we are strictly a manufacturer and a seller of a commodity, namely transportation, and it does not do any good to manufacture this commodity in a good way, unless your relations with those who are to buy your commodity are of the proper kind. Unless you do get the good will of your patrons, you cannot expect to proceed in a broad way, as electric railway men—a type of salesmen—engaged in selling transportation.

The talks that Mr. Wheeler and Mayor Brough gave us this morning are very helpful, and I would like to put what Mr. Wheeler said in a rather different form. I agree with him absolutely, you cannot go on running an industry involving approximately an investment of $6,000,000,000 with the present investment and the additional capital you must have, if you are going to have a disinterested politically appointed body telling you how to run your business. It is not in the cards, gentlemen, and there is no other industry in the world that is subjected to it.

A public service commission appointed by a governing authority may hold office, for two days, for weeks or for months, or for a few years, but it cannot run your properties with my money invested in them, because the fellow who has got to run that property has got to carry with him the responsibility that goes with authority. You have three distinct elements today to consider—the labor union, the public service commission and the president or manager of the electric railway. They are all trying to run the railway, and it cannot be done, and will not be done. Under these circumstances you will never get the public to invest money in the street railway industry until that thing is remedied. I maintain that it can be remedied by establishing right relations with the man who puts up the money. He does not have to put it up, and unless you make the investment attractive, he will not put up the money which is absolutely necessary.

You must establish between the man who puts up his money, the man who gives his time and effort to running the road, and the man who rides and pays you the money for your services, those harmonious conditions which should prevail. There can never be the reciprocal relationship which must exist among these parties concerned, until you have your public relations on a broad and proper basis. If there is any dissatisfaction on the part of one or the other of these parties it is immediately felt and affects the other two.

You cannot have a man on the outside looking in and running your business. If he is going to run it, by heck, he has got to remain inside and look out, and assume the full responsibility that goes with the job. If the man outside thinks he can run the road better than you can, and will pay you back what you put into the proposition, let him run it.

There is not a man among the 110,000,000 of people in the United States who is more opposed to public ownership of public utilities than I am, but you are not going to have the transportation industry, over which you gentlemen are presiding today, successful in its operations, as successful as it should be, even with the character of men who are running it, until the situation I describe comes true.

Some gentlemen said to me several years ago "Can you not run the road and charge a 5-cent fare and make it a success?" I said "No, gentlemen, I do not know how to do that." They said "We do." I answered "Run it," and they did and you all know with what results. The people who elected them to office are the people who are paying the bills, and you have your reciprocal relationship there—you cannot do it otherwise.

I do not care how honest a commissioner I might be, you can never get as genuine a decision from me on any question on earth as you will get when the decision of a question affects my pocketbook. I may be a good fellow and tell you that I will give you a square deal, but when you come around and commence to talk about taking my money, then I will give you the decision which is prompted by the way in which your proposition affects my pocketbook.

I have no suggestion as to how the problem is to be solved. The question of public relations is particularly a matter, to my mind, of human nature. It is perfectly absurd to assume that because somebody in this room happened to be in the hardware business, and then decided to become a street railway man that the mere fact of this change causes a change in his entire nature. It does not. He takes more interest in the street railway business, naturally. The ordinary hardware merchant is not interested in your business until it affects him, but under ordinary conditions if he goes down to the store and has a chance to sell a hammer, he will let you wait; but if there is more money in helping you in your job he will help you.

Unfortunately, it would seem that human beings are such that any given person will think more of his own interest than anything else; his own interests are more important to him than anything else in the world. This idea of sitting down in your office as a street railway magnate and opening your wrist and squirting some juice into it and telling your associates what should be done under any given circumstances will not work—there is nothing in it.

On the Subject of Buses

I just want to utter one other thought which probably does not fit here, but I may not get this chance again to refer to it. May I make a suggestion to you transportation men, and I use the term "transportation men" advisedly, and not electric railway men.

It is impossible for you gentlemen in charge of this transportation business, with the responsibility for the care and management of millions of dollars, to tell the public what they have got to do. There are some electric railway men that still think they can do that. You members of the American Electric Railway Association—this is my nineteenth convention—you are transportation men, not merely electric railway men. You gentlemen are experts in furnishing transportation. You ought not to sit by and let any beggar buy a truck and put some seats in it and go into this business as a novice, merely because you say the people have got to ride in your cars. The transportation manager should not hold any such idea, because it cannot be done.

Therefore, I want to say that I want to see the men whom I have known so well for so many years become *transportation* men and undertake successfully to furnish that character of transportation which the people want and for which they will pay enough to insure a fair return on the amount of money invested in the business. It is immaterial whether this transportation be by airplane, electric bus, perpetual-motion machine or anything else. If I want to go home from my office, you are the men who can make it possible for me to do so, but you may not tell me I must ride in car number 203 which leaves a certain point at 8:06 if I prefer to ride in a bus.

I saw recently some buses running on a line I built some years ago, where the steel rails had all been taken out. I do not care whether they ride in buses or wheelbarrows, but why permit these parties to come in and undertake to furnish something which you have been trained to do throughout your lives, and to embark in competition with your business, in which you are experts? Five years from today you will find I am right.

There Are Two Sides to the Matter of Service

One more suggestion. Mr. Wheeler and the Mayor of Toledo referred to service. There is one element we put forward in any attempt to advance public relations, and one of the things which you must do in a public relations campaign—which I assume is a twenty-four-hour campaign, 365 days in the year—and that is to recognize the fact that the word "service" not only involves the movement of cars, and the carrying of passengers, but also involves payments to the man who furnishes the service in the form of capital.

In our campaign in Boston in 1918 on the Elevated Railway, we telephoned to 1,000 stockholders in the State of Massachusetts and found that many of our stockholders were trustees of little girls. There was one case in particular, which I recall, where the father had died, and left the little daughter some Elevated stock. Did we get the vote of that trustee in the Legislature? We did. For the point was involved that if the girl did not get any returns on the stock, she could not go to college. The girl was directly interested in what we were doing, and unless she received something on the investment in the stock in the company, she would be in a bad financial condition, and the trustee of the estate would have to take care of her. It is the only way you can get away with it. You cannot talk people into doing something for you unless their interest is involved.

This idea of a street railway man sitting up and being nice to some rabbit representing a public service body—just because you would shoot him if he did not hold that position—is not a very pleasing sight. I can speak advisedly on this subject because I ran some of the shipyards for the United States Government during the war, and my experience in the shipyards was no different from what it was in connection with the electric railways.

Keeping in Touch with Local Organizations

By H. B. Flowers

EVERY community is replete with organizations—improvement associations, lodges, church clubs, etc. The improvement association is usually born because people living in a certain community are dissatisfied with conditions generally; started because streets have not been paved nor sidewalks laid, water and gas mains not extended, transportation facilities lacking or inadequate. These associations are generally headed by officers who, naturally, are able to dominate others and usually also have influence outside of their own direct circle of associates.

It is very seldom that moves for extensions to existing car lines and other added facilities, or complaints about rates of fare, character of service, etc., are started outside of organizations of this kind, but frequently organizations result on account of what would appear to be a concerted effort on the part of a few to obtain betterments, etc.

Most street railway men are of the opinion that local organizations (and by that I mean neighborhood improvement associations and city-wide organizations for the promotion of civic progress) are nuisances. They find themselves frequently in a permanent state of irritation because of the demands made by representatives of these organizations; demands which the street railway officials too often regard as unreasonable.

Whatever may be the experience of those of you from other cities, we in Baltimore have found that these organizations, instead of giving trouble, actually save it. The reason is this: If in a certain locality there reside six "kickers," it is almost humanly certain that each of these six will have a different idea as to how to improve the street car service in his locality; each of the six heads a group which he dominates and which sympathizes with his particular hobby. You seek to create good will in that locality. What happens is that whatever change is made suits but one group and only causes greater irritation to the five other groups, because these others think that they have not only been disregarded but the plan actually put into effect has been a "slap in their faces."

Take this same locality, and create in it an improvement association. It is reasonable to assume that these six "kickers" will be members of it, securing membership with the definite purpose of gaining strength for their particular hobbies or ideas of improving the street car service. The several voices of these six will be aired in the meetings of the improvement association. When the time comes to make a change in service in that locality the street railway company has it comparatively easy. It must do business with the improvement association, and in doing business with it naturally has to do not six different and varying things, but the one plan for the improvement of the service which the organization, in meeting and after considerable discussion, has determined is the best in its plans for that locality. It is collective bargaining with the people just the same as with our employees, and the similarity goes even farther in that when you, by agreement with an improvement association, make a change in the street car service of its particular locality, the association must and does accept its part of the responsibility for not only approving the plan but seeing that the residents of that locality give it a fair trial, and no individual in that locality is allowed, because of the sentiment behind the organization, to attempt to get the street railway to change to some plan which he might personally favor.

It is not well to expect trade organizations, or lodges, of which your officers, or employees, may be members, to "pull your chestnuts out of the fire." To establish confidence in these organizations is the utmost that could be expected. The good effects are reflected in the individual members who are also interested in the improvement association organized to deal with matters in which utilities are concerned.

How I Used Paid Newspaper Space

BY W. H. SAWYER

I USE newspaper space because I believe it is good business to do so. A few years ago one of the companies with which I was then connected had a yearly contract with the local newspaper, whereby the company was to pay for $18 worth of advertising space per month, payment to be made in street car tickets. The company officials then did not believe that any amount of advertising space was really worth $18 a month to them, but today that company is paying the same newspaper $6,000 per year for advertising and this is not too much. A perplexing question is how much money it is good business to spend on advertising. Few progressive concerns in any other business spend less than 1 per cent of their gross revenue on advertising, many spend 5 per cent. The average street railway can, with advantage to the company and the community served, spend 1 per cent of its gross earnings on paid advertising. I would rather slightly overdo the advertising than not do enough.

Another problem is how best to utilize the space paid for. We have come through several stages. First we did not use advertising space. Then we hired a publicity man who was assumed to be able to write advertisements from the public's viewpoint. He was generally rather proud of the fact that he was not a street railway man and therefore did not have the narrow viewpoint of street railway men but did have the big, broad view of advertising values, and moreover had a proper conception of how to appeal to the public. In the third stage and present stage the progressive public utility company makes use of a publicity man, upon whom it depends to give thought not only to the amount of publicity, but to its kind and to the wording of the advertisements. He is part of the organization and must know his company's problems intimately. His work should be supervised by the executive in charge of the company like that of any other department head.

All advertisements must have a personal touch and especially those signed by the executive of the company. Such advertisements must be worded either in part by the executive himself, which is preferable, or phraseology distinctive of that executive must enter into the advertisements. Newspaper advertising is the medium through which the executive of a company personally talks to his public, his customers, explaining to them what he has done, what he wants to do and why he wants to do it.

I resent the use of the word "campaign" in newspaper advertising and in most other undertakings. I believe in advertising day after day, week after week, month after month. I believe in consistent, not defensive advertising —advertising calculated to prevent the need of a stone wall defense.

Do not misunderstand me; advertising is not the solution of all our troubles. We may still be unfairly and unduly attacked, but advertising is a duty which we owe to our public, our customers, and it is good business. No company has been criticized by a regulatory body for giving the public the facts which it is entitled to, and many commissions, during the past year, have criticised our public utility companies because they had not advertised. Commissions have openly instructed companies to advertise and give the public facts.

I do not assume that paying for advertising in a newspaper buys the the editorial columns, but I know that the newspaper man believes in advertising, it is part of his creed and belief; he does not believe that you are properly conducting your business from a business standpoint if you take the viewpoint that you do not have to advertise. He does not know whether you are oiling your cars properly, or using your current efficiently, or whether you pay proper salaries, or do the right kind of maintenance, but he does know from his life's experience that in that part of your business with which he is acquainted you are not working along good business lines if you do not advertise. You are antagonizing your cause, you are depreciating yourself in the eyes of a newspaper man when you tell him that you do not believe in advertising, and there is only one way to tell him that you do believe in advertising and that is to advertise.

We sometimes wonder how many people read our advertisements. One thing is sure; the newspaperman reads our advertisements and he knows more about our property than he ever would in any other way. Knowing the facts he is not inclined to attack us as he would if we persisted in withholding facts and information.

Of course, everybody does not read all advertisements. Many of them are not worth reading, or they may appeal to only a limited number of people. But they do, at least, let the public know that we are giving them facts and information; and it is to a certain extent secondary whether they read all the details.

Confidence of the Public Is Necessary

BY MARTIN SCHREIBER

IF PUBLIC support and service can be separated, all may be expressed as to what is necessary for public support in one word. This you may elaborate any way you choose. That word is confidence. Confidence in turn rests on honest and sincere efforts made for a worthy cause. Analyze any successful business and you will find the same answer.

Unfortunately, the utilities, led by the railroads, built a sort of unpopular screen around themselves for many years, principally on account of the nature of the development of the business and partly on account of too much diffidence toward their patrons. But any close student can now observe that the pendulum is swinging the other way. During the war the government actually carried out the principles that it had prohibited Harriman doing.

How fast the utilities come back will depend on a large measure upon its representatives. In order for a railway company to get the support of the public, the first requisite is to create an organization to work with you. It is foolish to have the general staff of a company struggling for public support, at the same time that the rank and file is giving the opposite impression. This holds irrespective of any pretty posters or trite official statements. Some of the general officers of a company rarely see the car riders, while there are trainmen that may see a regular rider 600 times a year. So, the first job is to get your own employees working with you. That task properly done is probably the greatest one thing to beget public confidence. Here is where a company section and a publication can do effective work. One-third of your men should be company section members and at least a two-page letter should go into their homes twice a month. After that, try to make the personnel of the company a real, sincere sympathetic part of the community. Work for the community through its civic organizations like the Chamber of Commerce or Rotary Club. That doesn't mean for officers or employees of the company to join these various organizations and pay their dues and never show up except when they want something; such a course fools only you or your company. It means to take an active part, showing real desire to produce a greater and better community and stand ready to back up that desire in any practical way that you can. If you belong to the Rotary Club, do not attend the weekly dinner just often enough to retain your membership, but actually enter into the life of Rotary and adopt its principles all the way down the line. Make Rotarians of your employees. It is not difficult. Any one in your employ, even if he labors with his hands for wage, can understand the wisdom of the Golden Rule.

So, I could go along at great length on this subject of making yourself and organization a part of the community in which you serve with transportation. Why should any one not accept a task for making his community bigger or better; that is just plain Americanism. Try it, and you will find for the proverbial "skeleton in the closet," the complaint file, will be substituted letters of commendation. In conclusion, if you do pursue this policy and some time along comes a day that you do want to put some improvement over or get some consideration from the people, you won't have to beg for it and not get it; that consideration, if worthy, will be gladly given. That was my experience when we decided to operate one-man cars, sell the company's stock, distribute metal tokens and introduce other improvements for the good of the community, and I believe it will be verified by any one else that works earnestly along the same lines.

Telling Your Story Through Employees

By C. E. Morgan

HUMANISM is of the essence of modern history. The problem in public utilities differs in many respects from the problem in ordinary private industries. The street railway business contrasts strongly with, for example, the business of gas, power and light, the problems of the latter being more simple both because of the smaller number of employees and the nature of the commodity. The electric railway salesman comes in direct contact with the buyer, while with a telephone company the contact of the salesman is much less direct. Production and selling in the railway industry are largely co-extensive and the employees exercise individual responsibility to a greater extent, perhaps, than in any other industry where large numbers are employed. And so, the public can at all times form judgments, sound or unsound, of the electric railway, the sale of whose service involves immediate personal association between the riders and the company's representatives—conductor, motorman or other agents.

In Brooklyn we are engaged in selling transportation through our 7,000 workers. When the Brooklyn City Railroad resumed independent operations three years ago, new plans were formed and carried out, one vital element being to humanize Brooklyn's transportation system. The transit question was approached from the viewpoint of merchandising.

Gradually, in accordance with carefully worked out plans, the workers became a huge selling force, the commodity being transportation. Following the 1920 strike an effort was made to secure the co-operation of all employees. Mass meetings of employees both of the Brooklyn City Railroad and the Brooklyn Rapid Transit Company were assembled at the depots and addressed by officials. At these day and night gatherings, at which great enthusiasm was readily created, close co-operation was urged between management and employees in the interest of the companies and of the public. The response was immediate and effective, and a new and refreshing morale soon was evident. Closer relations between the management officials and the surface workers was one of the chief aims attained. The result has been fewer accidents, lower operating costs and better service to the public. Every employee is now a salesman, working for the general good. Courtesy is made a prime essential. The letters which come to my office testify to the public's appreciation.

A discouraging situation, involving at the outset obstacles hardly without parallel in the country, has been converted into one of optimism and real achievement. Labor difficulties have been practically eliminated; the public, hostile at first to the point of rioting, is reposing confidence in the management; the press, critical still, but, on the whole, fair, is disposed to treat sanely questions of transit policy, despite the vigorous attacks upon the transit companies by the municipal administration of the city of New York. Broad plans of improvement and replacement are going on, and co-operation between management and employee is becoming more real and effective. Every employee is selling transportation, telling the story of the management's efforts to serve the community, and every rider is becoming a listener. Satisfied, courteous and interested traction workers are becoming a fixed thing in Brooklyn. The story they tell, more effectively by their course of conduct than by any other means, is one of the greatest agencies in informing the general public of the actual attitude of the management.

The sixty-eighth annual report of the Brooklyn City Railroad for the year ended June 30, 1922, disclosed increased earnings, conversion of a deficit into a surplus, an actual total investment largely in excess of capital and bonded debt, better service, extensive improvements, a more friendly and increasing patronage, and, above all, a personnel that works with and for, and not against, the management. Conditions like these are encouraging us to continue the education of our employees in "selling transportation." And as the story is being told and as it is finding willing auditors in the more than 1,000,000 passengers carried each day, the company is moved to make more useful its physical equipment.

In this march forward the employee, or salesman, has had no inconsiderable share. His story is told every minute of the day, and it reacts upon a receptive public. We believe that employee and employer have interests in common and that each should receive that treatment which each side deserves in respect to its rights. No new or unusual methods have been employed. The methods of this company are, it is submitted, the methods of sound business. The public, the stockholders and the employees are all regarded as essential factors in the one great problem whose solution means contented and helpful personnel, adequate return to the investor and proper provision for the needs of the community. Thus does co-operation make for durable satisfaction and lasting progress.

Utilizing Company Mediums

By Barron Collier

AS AN advertising man who believes in his remedy, this is indeed a happy day for me. Not because I have been selected to add my comment to this remarkable publicity symposium, but because I feel that at last we are on the right track to the ultimate solution of our electric railway problems. We are advertising. We are telling our story to the public. And we are getting results.

Two years ago the electric railways of the country were in much the same position as the Kimberley farmer who stood in the center of the wealthiest diamond deposit in the world and bemoaned the fact that his land would not produce crops.

We bemoaned our hard lot because the public did not understand our problems. For all too long a period we did not try to utilize the instruments all around us to make them understand. But today our situation is changed. We have come to recognize the value of our publicity mediums. Think of the change. Two years ago only about 2 per cent of the electric railway companies of the country were doing any advertising. Today, according to the most reliable figures obtainable, the advertising percentage is nearer 80 per cent.

Every class of medium is being used. This is well. We cannot overtell our story. We are prone, however, sometimes, to forget the value of our own mediums. Such as the window sign, the poster in the carhouse, the pay envelope stuffer and other company mediums distinct from company publications, the value of which Mr. Budd has so clearly set forth.

The window sign is super car advertising. How gladly, indeed, would advertisers of commercial lines purchase this space if they might.

Consider some of the manifold attractions of the window sign: It is the only sign which can be printed on both sides and catch the pedestrian as well as the car rider as the car moves along.

It reaches our best customer—the car rider—who in the end says how we shall be treated by public officials. It reaches in the course of every day, on the average, a number of persons equal to the population of the community in which the cars run. It tells our story to the average car rider at least twice a day and, thanks to the weekly pass and other business stimulating plans, more often than twice a day in some cities. It reaches our customer when he is using and enjoying our product—a ride. It talks to a steadily increasing clientele. It capitalizes the force of repetition. It holds the attention of the car rider for the longest time of any medium, for it is to him a traveling salesman who moves along with him in a friendly, unobtrusive way.

Those are some of the natural advantages of the medium. They apply regardless of how our message is written. Force, color and style added to our message compound its value.

Attractive posters well placed around carhouses and in club rooms, terminal stations and other places where employees and customers gather will pay handsome returns on the investment. This is particularly true of posters placed on company property. There the employee's mind is on his job. It is receptive to company messages.

The pay envelope insert is a little thing, but it reaches the employee when he is in the right frame of mind to entertain a suggestion for helping boost his company. That is, it does if he is the right kind of an employee, and I believe that the great body of our men are becoming boosters for us more and more every day.

The hen, we are told, enjoys a higher standing than the duck because she advertises her value to the community more. Likewise, she keeps on scratching regardless of how much corn there is in sight. Here are two lessons which, now that we are struggling upward to prosperity again, we may well keep in mind.

The Use of Company Publications

By Britton I. Budd

No public utility company can give the best service of which it is capable without the co-operation of its customers and of its employees. This co-operation is three-sided, and a company publication can be used to cement and hold together the three sides of the triangle. There are two kinds of such periodicals, each having functions which are distinct though closely connected. The first is intended primarily for the customers of a company and secondarily for the employees. The second is intended for employees only, its function being to inform and interest them in affairs that are closely related to themselves and the company for which they work. I shall treat the two kinds of publications separately, pointing out some of the things which may be accomplished by each in its own field, although I realize that there is some overlapping in their respective functions.

The company publication which goes to customers as well as employees may be used both as a business getter and as a good-will medium, by setting forth the advantages of the company's service, by establishing and maintaining good will between the customers and the employees and by promoting courtesy and safety. Thus, it offers the passenger a medium through which he can express appreciation of an act of courtesy shown him by an employee. That passengers will take advantage of such opportunity has been amply demonstrated in my own experience. The first issue of a little publication of this kind which we began on the Chicago Elevated Lines some six years ago contained no commendations of employees. At present hardly a day passes without the receipt of one or more letters from grateful passengers commending some employee for one of the hundreds of little things which an employee can do to please and accommodate customers. Each issue of this publication now carries from twenty to forty such commendations, the particular employee being identified by name and badge number. Such commendations stimulate employees with a desire to do better work. At the same time, they create a friendly feeling on the part of the passenger toward the company, because a passenger who takes the trouble to write a long letter commending some employee must feel rather friendly toward the company. It is a word from a pleased customer, which is the most valuable form of advertising a company can get and is a valuable asset in public relations.

That is only one of the ways in which such a publication is valuable. On every large property there are always details of operation which the average passenger does not understand and which frequently create irritation and cause complaint. The passenger wishes to know why certain things are done the way they are and why they are not done in the way he thinks they ought to be. When such inquiries are received care is taken to explain them fully in the next issue. We have found by experience that some of these operating details are read with more interest than any other items in the publication. Passengers after reading some explanation of that kind will write letters saying they had often wondered what the reason was, but now it was perfectly clear to them and they were satisfied. Frequently they will end such letters by asking for an explanation of some other detail in a future issue. The effect of all that is that it gets the customer interested in a friendly way in the company and the character of the service it gives. He looks forward to the appearance of the next issue to see the explanation of the detail about which he asked. If you can get your customers interested in your company you get their good will at the same time.

There are many other ways in which a publication of this kind can be made helpful in maintaining good public relations. In recent years many changes in rates of fare have come about and the company publication is a good medium through which to explain the necessity for the changes. This can be done by a plain statement of the facts, avoiding all appearance of complaining or making pleas of poverty. Matter written on this subject should point out the high quality of the service being given and the advantage to the public in having it maintained, rather than to show that a company is not making any money.

The company publication can be used to inform its customers of improvements being made or contemplated. It should tell in some detail the benefit the public will derive from the change and incidentally the cost to the company. If a new class of service is to be installed, explain how it will benefit passengers.

Such items are "news" and are read with interest. The benefit to the company is that the customers talk about it and get the impression that the company is constantly doing something in the way of improving the service. Care should be used in the preparation of such items to avoid all semblance of propaganda. Treat them solely for their news value and let the customers draw their own inferences.

The second kind of publication to which I have referred, the one which is intended mainly for the employees, must be a little different in character from the one intended for public consumption. There are differences of opinion as to the nature of the material to be used and the manner in which it should be presented. In the case of the Chicago Elevated Lines we have the two kinds, and as both are mailed to the home addresses of employees each month, naturally we seek to avoid duplication of news matter. None of the same material is used in both publications, except the commendations of employees. The reason for the exception is that in the employees' magazine we use commendations coming from superintendents and foremen as well as those coming from passengers, while in the other only letters coming from the public are used.

While, as I have said, there are differences of opinion about the kind of material that should be used in employees' magazines, my own opinion is that first of all such publications should be educational and informative in character. They should have a definite purpose in view, and that purpose should be to acquaint the employees with the business of the company by which they are employed.

In every large corporation the great majority of the employees are totally ignorant of the financial and business side of the enterprise. I do not believe that this ignorance on the part of the employees is due to lack of interest in the business of the company, but because the company has not given them an opportunity to learn. The main purpose of the employees' magazine, therefore, should be to supply, in a readable way, such information which can easily be understood. But if it contains too much company business or only long, heavy articles, no matter how well they may be written or how important the subjects are, it will not be read by the majority of the employees.

To make it interesting the greater part of each issue must be devoted to items that are of peculiar interest to the employees themselves. The employees must be made to feel, as far as possible, that it is their own publication and to accomplish that the company must be kept largely in the background. For one item dealing with purely company affairs there should be three dealing with the activities of the employees themselves. The magazine should chronicle all the activities in which the employees are interested, such as ball games and picnics in summer and indoor athletic meets, dances and other entertainments in winter. If such stories are illustrated with plenty of pictures it will add to the interest.

Some company publications seem to rely on their attractive appearance to arouse interest, rather than on the matter they contain. I believe that is a mistake. Fine paper and beautifully colored pictures will not take the place of interesting reading matter, for the employees know little and care less about the printer's art. They are interested in the little every-day affairs in their daily lives and if such things are written in a sympathetic, human-interest way they will be read and appreciated without respect to the quality of the paper on which they are printed. I do not mean to say that a company publication should be cheap looking. My point is that more attention should be paid to the quality of the reading matter than to the dress in which it appears. That an employees' magazine which is read all the way through is an important factor in building up the morale of the working forces and creating a friendly feeling between a company and its employees there is no doubt in my mind.

Although the two kinds of company publications I have described are somewhat different in purpose, the scope of the first being much broader than that of the second, there is one important characteristic which applies with equal force to both. Both must be well edited if they are to arouse and sustain interest. Preparation of the material should be done by a skilled writer, who not only knows how to write, but who understands and appreciates news values. An engineer, for instance, may know everything about a machine and be able to describe every part in exact detail, but it does not follow that he is able to write about it in a way that will interest the reader. A thing that is worth doing is worth doing well, and that applies to the editing of a company publication. If the publication is left to some department head who has his own work to do and who has had no special training in writing, the result is bound to show in the quality of the work.

If the company publication is the asset which I believe it is to the company, it is important that it should not be merely a piece of printed matter. It should show character and originality if it is to compete with other periodicals making a bid for attention. The worth-while company publication is not produced with scissors and paste pot. It must have an individuality of its own and that can be given it only by one who has special qualifications, training and experience in that line and who devotes time and attention to the work.

Relation of the Press to the Traction Problem

By Lucius S. Storrs

THE final solution of all problems of the public utilities is in the hands of the public, for commissions and regulating bodies embody in their decisions their interpretations of public interest. Further, the traction problem is essentially local in each case. While there are certain fundamental facts applying to the whole problem the ultimate solution must be by the locality affected; hence the need of informing the people in each locality concerning the problems involved. Properly enlightened treatment can only come through the medium of an informed, intelligent public opinion.

Public opinion can be influenced in only two ways. The first comes through the intimate personal contact with the people in their daily use of the service and the treatment accorded by the trainmen. The second approach to the people, and by far the more influential, is through the daily story of the street cars carried in the news columns of the press. It is vitally important that the press publish the facts concerning the electric railways. To this end, facts must be supplied.

We cannot excuse ourselves for neglect to make provisions for seeing newspaper reporters when they call. If the executive is too busy to meet the reporters regularly, he should assign to some responsible member of his organization the duty of doing so.

Editorial expressions are based on statements that first appear in the news columns. The editor reads his own paper and his competitor's. His opinions are formed in the same manner as those of the casual reader, upon the information printed. If this information is false, incomplete, confused or biased, then the opinions that later will find their way into the editorial columns will be fallacious, inadequate, harmful in their effect. It is, therefore, extremely important that there shall be a proper foundation for editorial expression, and this can be built only through the establishment of frank relations between the reporters and those charged with the responsibility of conducting electric railway operation.

When something gets into the papers that is untrue and likely to prove harmful, the best thing to do is to call on the managing editor of the paper and give him the facts. Newspaper men are usually high-grade men, who want to print the truth. To gain their confidence it is necessary to give them your confidence. Mutual respect thereby is established, and it stands both parties in good stead.

There are papers, some of them influential, which, for the sake of appearing to be the champions of the people, adopt, deliberately, a policy of attacking the electric railways. In many instances it is worth while to write statements to them containing the facts, even though to do so may seem to invite further attack. You at least get your side of the case before the readers of the paper, and among their readers there are fair-minded people who can reach fair judgments on the facts as presented.

These remarks apply particularly to moderate-sized properties. The large organizations have learned the wisdom of employing trained men to whom is delegated the duty of keeping the press informed of the company's affairs. Managers of small properties have always found it most advantageous to be on the closest possible terms with the newspaper men.

The Value of Public Utility Information Committees

By James P. Barnes

I HAVE been requested to express to you briefly my opinion as to the value of state public utility information bureaus. The Kentucky Committee on Public Utility Information is conducted under the auspices of the Kentucky Association of Public Utilities. The president of that association, as chairman, with other officers of the association make up the personnel of the committee.

A news service bulletin is compiled and edited by the secretary of the association and issued on the first and fifteenth of each month. This bulletin now has a circulation of nearly 1,000 copies. Two hundred and fifty copies go to Kentucky newspapers, the balance of the circulation going to railway, telephone, light, heat and power companies, public officers, from the Governor and his staff to the aldermen and councilmen of each community. The members of the State House of Representatives and the State Senate are on the mailing list.

Our bulletins are meeting with a cordial reception throughout the State of Kentucky and have brought comments to us from various newspapers throughout the State, such as:

"These are all courteous, bright and timely, and I am sure will go a long way toward bringing about the desired results."

"Your paper is spicy and well gotten up. If you will send me a half dozen copies of each issue I can place them where they will do good."

"Be sure and see that a copy of this bulletin is mailed to me regularly.

Wouldn't miss it for anything. Contains just the kind of reading matter we have been looking for, for some time."

"We think it's great. Have issued instructions to use at least two or three clippings from your service each issue."

After waiting until August, 1922, to make certain that the committee was not going to fall down or get stale with the publicity matter being sent out into the state, a president of a light and ice company way back in the State wrote the following letter to the committee:

"The writer has been greatly inspired by your 'News Service' and feels that as an encouragement to your efforts we owe it to your committee to express to you our unqualified indorsement of each and every issue.

"Your Bulletins are interesting reading matter and filled with facts, and if each of the utilities properly use the information contained in them, it will go far toward a better understanding between the utilities and the public.

"We use an article taken from the Bulletin weekly in our paper and believe it has done much good in view of the fact that our patrons are getting information that is intelligent and we have no trouble whatever from the intelligent and thinking classes."

The foregoing were entirely unsolicited and are indicative of the willingness as well as the eagerness with which the information is received.

Following along the same line, the Advertising Section of the American Electric Railway Association issued a pamphlet entitled "The Truth about Electric Railways." This pamphlet was given wide circulation in Kentucky through the mailing list of our News Service Bulletin.

A pointed illustration of the effect of this work occurred in the operation of our own company. Following the rejection of a compromise ordinance in our fare case, which ordinance was introduced by the Mayor and city attorney following a series of conferences between the city officials and the company executives with the view to withdrawing fare litigation from the Federal Courts, a news writer called the office and asked if "we had noted the bus proposition advanced by several of the councilmen."

This proposal as first announced was to bring to Louisville a nickel bus line to operate, not only on stated thoroughfares but to run wherever throngs accumulate for special events. The councilman who advanced the suggestion said that nineteen out of twenty-four councilmen would vote for such a franchise, and following the granting of a franchise an endeavor would be made to interest capital in the new plan to try it out.

The man who introduced the ordinance announced through an interview that "we believe that before we get through the Louisville Railway Company will be ready to offer a flat 6-cent fare for this year and a 5-cent fare thereafter." The local paper wanted information to combat this and called the secretary of our Committee on Public Utility Information, referred to the pamphlet and asked for that and such other information as was available to write his story combating the "crazy idea of this councilman." Needless to say it was furnished, and furnished promptly.

All during our fare case, which has recently been settled through the passage of an ordinance granting us a 7-cent cash fare with 6-cent tickets when purchased in lots of five, the newspapers of our city have been manifestly fair in their articles commenting on the situation. We have consistently enforced the rule that newspaper men must know all there is to a story in order to write their article intelligently and at the same time in a manner fair to both sides. I have yet to find a case where such confidence has been violated by a newspaper man when information was furnished for information but not for publication.

Give to the local press representatives any information they ask for, and if it is something you do not think would be of value to their readers, tell them so. Explaining this to the news writer in the proper manner will put them in possession of all the facts and they will readily see whether there is any news value to your story or not.

Do not try to force advertising through the editorial room. Use the advertising department; that's what it's for. The news writer for any paper today is just as keen to detect an effort on your part to throw propaganda into the news columns instead of paid advertisements as you can be.

A bulletin of state-wide distribution, which distributes in concise, usable form the facts regarding our industry, fearlessly presenting all the facts as information and not as propaganda, will find a warm reception in all proper quarters, and can but be productive of marked improvement in public understanding of the industry, which means improved public relations

Public Speaking as a Publicity Medium

By P. S. ARKWRIGHT

IT WAS once said: "In our day the orators hold the people." That was a remark made about twenty-three centuries ago by Aristotle. It is said that many business men, and particularly electric railway men, have a reluctance, and almost an abhorrence, of making what is known as a speech. I will go one step farther—they have a contempt, almost, for anybody else who will do it. They think it is an empty head which makes the most noise, and they have left it to people who know the influence of the spoken word to lead the people into regarding the electric railways as their hereditary enemies.

We cannot run this business on constitutional guarantees, and we cannot do it on the sense of justice of the members of public utility commissions. We cannot run it on injunction suits, or on the decisions of the judges of the courts. We have got to run it on an awakened intelligent, reasonable public sentiment of the people to whom we are furnishing the service and of the people who control the decisions of the public service commissions and of the legislatures, and of the organized city councils and of the vote.

If we know this business we can get up and talk about it. You will not get it over so well with the printed word. In attending various meetings in your community, the ward improvement clubs, the Rotary clubs, the automobile associations, the retail merchants' associations, the advertising clubs, all of them are glad to have representatives of the electric railways come and talk about a subject that interests everybody in the community. They will hear you with great pleasure and soon will find out that you are not a monster hidden away in a back office, robbing them from year to year, but that you are a human being, just like the others. They are beginning to think of the street railway as a personality, and it will do you good, too, because you will get a sympathetic understanding of the people you serve.

There is another very important point which I would like to bring to your attention. That is the reluctance which some men have of giving a talk before their employees. Any man can talk about something he knows about.

GETTING FULL ADVERTISING VALUE FROM A SPEECH

Another thing—if you want to get the real value of a talk of this kind, from the advertising standpoint, write it out in advance, and give it to the newspapers to be released when you make the address. They will publish your speech with headlines in the paper, while if you sent the same matter as a contributed article they would throw it in the wastebasket. When you make such an address, they regard it as local news. The difficulty about the matter is that if you write the talk out in advance, you may not be able to remember it, and you may not be able to forget it, and the result is that you reach for it and read it to your audience.

Let us overcome our reluctance to tell our story by word of mouth. We usually allow these occasions to go by until a bill is up before the legislature or there is something before the city council, or some one proposes to pass an act lowering our rate of fare. Then we secure a professional orator, and it is too late to accomplish what could be done by the officials of the company if they were prepared to appear before these bodies and make proper pleas. The men in the business should make it a part of their responsibilities to go around and talk to the people and explain this business to them, so that they can lead the people to a sympathetic understanding of their interest in the success of these enterprises, and then we will have right decisions from railroad commissions and votes, too.

Application of Scientific Methods to Industrial Analyses*

The Author Advocates a Threefold Program for Rating Employees, Involving Physical, Psychological, Personal and Historical Tests; Study of Character, and Development of a Personal-History Record

By Francis Lee Dunham, M.D.

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ATTEMPTS to apply exact experimental methods to problems of personnel are becoming more and more frequent as the economic value of their results is better understood. A more sympathetic attitude toward human welfare likewise emphasizes their more general use as a means of co-ordinating the interests of employer and employed.

The general purpose of a scientific technic in collecting, classifying and explaining observations as they relate to analyses of industrial personnel appeals directly to business efficiency. Novel methods of testing such important factors as mentality and conduct easily stimulate the imagination of administrators eager to be relieved of the difficulties resulting from irresponsible workmen. Consequently it has not been difficult for pseudo-exponents of "psychology" and "character analysis" to secure a hearing. Inaccurate estimates of the significance of intelligence tests and fantastic notions about personality thus have been frequently foisted upon executive groups inadequately equipped to judge of their efficiency. Sweeping denunciations sometimes have followed, reacting unfavorably upon the business situation and preventing the legitimate growth of the exact method in question.

It is gratifying to find industrial experts keen to take advantage of research and education yet emphasizing the need of caution in deciding what the rational next step should be.

HAPHAZARD SELECTION OF EMPLOYEES NOT SATISFACTORY

There is a tendency for business executives to assume that research and experiment in problems of personnel are to be avoided as theoretical and to tend toward the adoption of methods based upon "common-sense." Such results are thought to be more "practical." This involves the question of the difference between belief and knowledge, a fundamental economic consideration. Most of our beliefs are the result of personal opinions, based upon superficial judgments often without observational foundation, the product of so-called common-sense. Employees, for example, are generally now chosen by the employment superintendent's "sizing up" method. If the results are poor there are no means of checking up his estimates except by appealing to another person whose guesses have shown good results. Such habits are haphazard and now gradually are being discarded for methods utilizing scientific observation. A rational organization of a bureau for personnel analysis would adopt, as one of its functions, means for examining the special ability possessed by employees long in service whereby they are able to apply "common-sense" methods so advantageously.

F. L. DUNHAM

In order to arrive at a practical scheme for scientific analysis of personnel in its vocational aspects, industrial enterprises must submit first to the application of a uniform system of tests, the result of experimental research. This is not the place for a detailed description of such a technic. In passing it may be suggested that simplicity should and generally does characterize the best methods whose individual tests include not only laboratory examinations but also social estimates. Such observations may be called social tests and are becoming more available as they are better systematized. The variety of tests need not be extensive nor their application highly involved. It is not so difficult to apply vocational tests as it is adequately to interpret the results. Scientific training and experience here produce the soundest judgments and the most thorough analyses, just as business experience and training react most favorably upon industry.

In applying analytical methods to personnel problems the field of psychology has furnished much valuable data. It should not be forgotten, however, that there are other functional elements more important for use in selecting efficient workmen than mere mental factors. It is futile to adopt the results of intelligence tests as the sole criterion of an individual's social efficiency in industrial or other fields. Reflection shows at once the inadequacy of such a scheme. In order to estimate a man's efficiency we must know more about his personality than is contained in a survey of his mentality. Many of our most faithful workers, responsible parents and exemplary citizens, are persons whose school history and reaction to psychological tests indicate low intellectual levels. On the other hand it is not unusual to meet highly intellectual individuals of unstable character, whose conduct is disorderly and whose responsibility is too insecure to maintain them in positions of trust.

A broader conception of personnel analysis as applied to industry thus is seen to include consideration of three broad fields: that of physical fitness, covered by the general medical examination; that of mental and vocational ability, covered by psychological and trade tests and observations; and that of character, or the attainment of social stability in the organization of one's feelings and appetites.

A number of social observers, notably Trotter and LeBon, have emphasized the consideration of character as the most important asset of a stable society and have urged its scientific study as of greater analytical significance than the study of mental capacity. Whatever its relative importance in our present scheme we are willing to admit the desirability of tests or methods of estimating so-called emotional stability, i.e., the way the individual controls his appetites or natural desires and needs as well as the way he responds to fear, anger and a number of other fundamental biological tendencies with whose intense states the individual frequently unexpectedly is confronted.

A little reflection will convince even the most skeptical that in this field of character we are dealing with the foundations of society. Unfortunately at present we have no well-formulated means of estimating degrees of stability in respect of character. Although a number of technical devices have been suggested and laboratory methods are being tried out, still we are without tests comparable in exactness to those applied in examinations of mentality. But in this predicament we are not left entirely dependent upon "common-sense" methods. There is a means, I believe, too little utilized in our educational, vocational and legal situations dealing with the social adjustment of the individual, viz., the consideration of historical data, i.e., an accurate account of the stock from which the individual has sprung, the trends of his development, his interests and social aptitudes.

HISTORY AS A TECHNICAL INSTRUMENT

It is not difficult to formulate a series of questions designed to bring out the individual's inborn characteristics, the path his disposition unconsciously has followed and the control he has been able to develop over his appetites and feelings, i.e., how he has been able to get along with his fellows. Personal history of this nature need not involve publicity of intimate details nor even an attempt to follow the facts more closely than is required to bring out general tendencies. Biological and social data always have been employed to some extent in answering such superficial questions as involve honesty, reliability, cheerfulness, etc. Scientifically formulated plans designed to utilize personal history in interpreting conduct already are employed by a number of educational and judicial agencies. One of the most successful of these attempts has been in operation for the past three years at Harvard University. The Judge Baker Foundation of Boston, dealing with juvenile problems in conduct, is another agency making extensive use of this method of securing data for character analysis.

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*Abstract of contribution to discussion of report of committee on personnel and training of transportation department employees, at convention of American Electric Railway Transportation & Traffic Association, Chicago, Ill., Oct. 2-5, 1922.

Summarized, the preceding suggestions recommend as a practical scheme for the use of transportation departments in the railway industry inclusion of the following in its plan of organization:

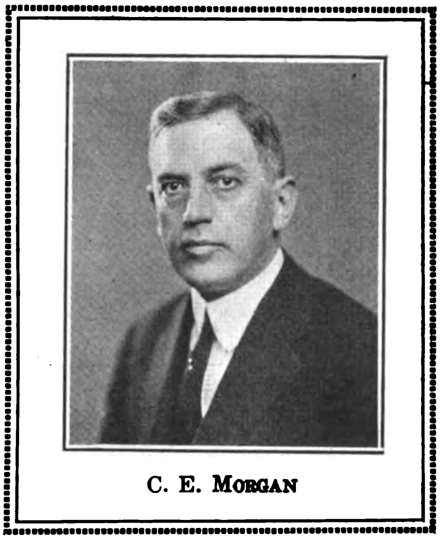
1. The formulation of a concise series of tests—physical, psychological, personal and historical—to be applied experimentally and uniformly in a number of localities, the results to be studied and embodied in an annual report. When a practical plan emerges from this experimental data it may be used as an educational method toward improving transportation personnel generally.
2. The more intensive study of character as a criterion of economic efficiency.
3. The development of a practical personal-history record as an aid to the interpretation and prediction of conduct reaction-types.

Economics of Operation of Interurban Lines*

The Writer Lays Stress on the Necessity of Cost Analysis and Points Out Various Ways by Which Economical Operation Can Be Secured, as by Schedule Revision

By C. E. Morgan
General Manager
Brooklyn City Railroad

THE failure of many business concerns can be traced almost directly to their negligence in keeping accurate account of their production expenditures. This omission either causes them to sell their merchandise at a loss instead of a profit or makes them unable to place a proper price upon the article so as to compete successfully with similar merchandise. Interurban roads cannot arbitrarily place a price on their commodity, transportation, as their rates of fare are fixed by franchise or by regulatory bodies, but it is their duty, through their officials, to scrutinize costs of operation very carefully with the view of rendering a service for which there is a demand. Statistics covering results of previous operation should be carefully weighed by those in charge, and these statistics should be up to the minute, for no matter how ample the detail or how well prepared the value of the data depends entirely upon its age. Further, when this information is available, it should be distributed promptly among those who are responsible, particularly the superintendent, trainmasters and other supervising officials. Each department head and his immediate subordinates should be conversant with the costs of operating any unit under their charge, as well as with general information as to the cost of operating other departments and other divisions of the system as a whole. We should know the cost of operating each unit, whether it be a motor passenger car or trailer, a freight motor or other type of equipment. Also, we should know the cost of each item in detail that enters into the maintenance and operation of the interurban line, not only for the system as a whole but by division, in the case of some of the larger properties.


C. E. MORGAN

When the wheels of the cars are stopped, they have no earning power, and if they are running when not needed they are wasting money. This is an instance in which a close study of operating results will show wherein a reduction in car mileage can be made.

All schedules should be laid out graphically, showing not merely the movement of the car or train, in accordance with the schedule which is usually termed revenue car-miles, but showing also all the time of the crews, including reporting, layover and time allowances of every kind. Careful study of these charts will, in many cases, result in a large reduction in platform time, as well as in the number of cars used to provide the service.

Many officials believe it wise to maintain a uniform leaving time from some terminal. This is very expensive if a line is too long or too short for a certain number of cars. It is true that uniformity of headway is to be desired, but it is then a question whether the net result is better with such uniform leaving time at the initial station with the use of a somewhat staggered leaving time better to utilize the time of the crews and cars.

When two or more divisions are operated from the same terminal or a connecting terminal, careful consideration should be given to the question whether the cars of one division should not be operated through over the other division, eliminating the terminal layover; or whether the system should be studied as a whole, routing the cars or trains where they will make the maximum mileage with the least platform expense. In laying out schedules, the mechanical and power departments should be borne in mind. Cars scheduled for inspection should be scheduled to the point of inspection, eliminating dead mileage. It may be advisable to stagger leaving times at terminals in order to save power and to secure better movements at or near meeting points. Careful consideration should be given to the question of running speed in operating schedules, as the cost of operation mounts rapidly with each mile per hour increase in speed. By consolidating divisions, savings can be made in supervisory and train dispatching forces, these savings depending, of course, on local conditions.

Before making changes in operating schedules, a careful survey of the passenger traffic should be made by taking cross section counts showing passengers and seats, which should be plotted graphically. From such calculations the various loading percentages in either direction on the entire line can be readily determined. These charts will, in many cases, show where short line service may be operated. This may involve the installation of track facilities to permit turning of equipment, the cost of which should be compared with the cost of operating additional car mileage due to the absence of such facilities.

Few interurban roads operate through densely settled territory. This results in heavy loading at the maximum point of travel and very light loading at other points on the line. By taking a cross section check, this will be apparent, and while it has been the practice to operate on an hourly headway, it will no doubt be found that many of such cars or trains can be eliminated, depending somewhat on local conditions, particularly competition. So, also, many of these hourly trains, particularly in the morning and evening, are run in trains or sections consisting of two or more cars, while with bus competition better results might be obtained by splitting up these trains and running them more frequently. At the same time this would result in a more uniform load factor in the power house.

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*Abstract of address presented as part of the discussion during "Interurban Hour" before the American Electric Railway Transportation & Traffic Association, Chicago, Ill., Oct. 2-5, 1922.

These matters bring home to the operator the necessity of scientifically analyzing all elements entering into the operation. Experience has shown that as to these costs, be they on a car-mile, car-hour, or seat-mile or ton-mile basis, the best results can be obtained if the operating officials work up this detail with the aid of the accountants so as to make it available within a few hours after the operation instead of days and weeks after. These data should be kept not only in comparative figures, but should be plotted graphically in connection with expenses.

When the cost per car-mile of operation is determined, these figures can be readily applied to the unit in question, and when compared with the earnings of such unit the answer is obvious. With companies operating several types of equipment and two or more divisions, the task of ascertaining which is putting the red ink on the balance sheet is not difficult and thus the management is enabled to stop the loss.

California Interurbans and the Bus[*]

Competitive Situation Gradually Clearing Up, but Much Is Yet to Be Accomplished on Account of Specially Favorable Conditions for Bus Operation in California

By D. W. Pontius
Vice-President and General Manager
Pacific Electric Railway,
Los Angeles, Calif.

D. W. PONTIUS

CALIFORNIA is the most fertile field for common carrier bus and truck operators, and unquestionably there are more of such operators in our state than in any other state in the Union. The reason for this intensive competition is due primarily to: (1) Climatic conditions; (2) favorable legislation; (3) an excellent system of highways, and (4) no tax for use of highways.

There are 6,000 miles of paved highways in California that are rapidly being crushed to pieces by heavily loaded common carrier buses and trucks—assisted of course by heavily loaded trucks in private use. The seriousness of the situation may best be explained by calling your attention to the fact that the State Highway Commission is now contemplating a $60,000,000 bond issue for the purpose of repairing the highways of the state.

Both state and county highway commissions have long appreciated the gravity of the situation, and have suggested and even attempted from time to time to have passed reasonable legislation to control the common carrier buses and trucks. To date their efforts in this direction have not been successful to any appreciable extent, due to the political power of the California motor bus and truck organizations.

Every owner or driver of a bus comes daily in contact with the public and politicians of the state, and seldom fails to further his cause. During the meeting of the last Legislature the bus and truck lobby at Sacramento was so large that it made the railroad lobby look like the German army after the boys from the United States went over the top in the recent war.

It will be interesting to you to know the effect the buses and trucks have on the revenue of the Pacific Electric.

There are now 380 buses and trucks operating directly in competition with the Pacific Electric, taking from the railway company an annual revenue of approximately $3,325,000.

Based upon figures obtained recently from the State Railroad Commission the total revenue of all commercial buses and trucks operating in the state amounts to $17,000,000 annually, and if this traffic had been handled by the railways, the taxes to the state on the revenue would have amounted to $892,500, while the taxes paid by the buses and trucks did not exceed 1 per cent, or $170,000.

LONG BEACH BUSES LEGITIMATE

The competition is not limited to interurban traffic. Local buses operate in several cities served by the Pacific Electric in direct competition with the railway company, and in many cases under exasperating conditions. In Long Beach, a city of 70,000 population, there are two bus companies rendering local service within the city for a 5-cent fare. These two companies operate seventy-seven buses, but are not permitted by the city of Long Beach to parallel the Pacific Electric street car lines. They are operated on paralleling streets in most instances, two or more blocks away from the street car line. This is competition of which the railway company cannot justly complain, due to the fact that the street car lines were not extended as the city increased in population and some kind of transportation service was necessary. The reason that the electric lines were not extended in Long Beach just previous to the war is the same as that which prevented most of the electric railways in the United States from extending their lines: Impossibility of profitable operation on a 5-cent fare, and at that time there seemed to be no chance of obtaining a higher fare.

However, the situation is entirely different in the city of Pasadena, where the city's Board of Directors deliberately granted applications for individual bus operators to operate on the same streets as the street car lines. These individually-owned buses travel directly in front of the cars, picking up passengers that would use the cars if it were not for the buses. The result of this competition has been disastrous. If the buses operated in Pasadena were required to use the streets over which street cars are not operated, the general opinion is that they could not exist.

In Pasadena at the present time railway trackage must be renewed, street car lines must be extended, and bus lines established, if the city is to be properly provided with transportation. There is not enough traffic to justify two classes of transportation on the same streets. The railway company stands ready to make the necessary expenditure but we are determined that unless relieved from paralleling bus competition the tracks that should be rebuilt will not be renewed, and further application will be made to abandon such tracks.

A somewhat similar condition exists in the Santa Monica Bay district, where we are working with the commissioners of Santa Monica and Venice to establish a comprehensive rail and bus service for that district, which has a total population of 35,000. It now looks favorable for this district to accept the proposition made by the railway company.

The Pacific Electric is now operating

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[*] Abstract of talk before American Electric Railway Transportation & Traffic Association, part of "Interurban Hour," Chicago, Ill., Oct. 2-5, 1922.

local bus service as feeders for its electric lines in three important cities served, and four more cities are being considered for bus line feeder service. If our propositions in Pasadena and Santa Monica are acted upon favorably, we will have sixty buses in service. The first buses placed in operation cost approximately $4,500 each, but it has been determined that a higher grade bus, costing approximately $8,000, will prove to be more economical.

These buses are not operated directly by the railway company, but by a subsidiary company—the Pacific Electric Land Company. The particular reason for this is to place the buses as nearly as possible on the same taxation basis as the individually owned buses operated in competition with the Pacific Electric. In other words, taxes are paid on the valuation of the buses instead of on a revenue basis of 5¼ cents of each dollar collected, which is the present plan of taxing public service corporations in California.

HIGH-CLASS EQUIPMENT USED

The city of Los Angeles, in common with many other municipalities throughout the United States, has had its experience with the jitney bus, and voted it out. The motor stage lines in and out of Los Angeles are probably more extensively operated than out of any other city in the United States. There are numerous large companies, operating a high class of equipment, and who have pretentious stations in Los Angeles and in many of the other cities which they serve. These companies operate to many points which have long been served by the railway, and of course it is the interurban service which makes the most serious inroads on our revenue. One company alone, operating out of Los Angeles, uses more than 700 miles of highway.

These bus lines were started before the law required them to obtain a "certificate of public convenience and necessity" from the State Railroad Commission, and when placed under the commission, they were permitted by the commission to continue operations.

In combating this competition we have used every fair and legitimate method. We have shown that it is manifestly unfair to penalize the railway company with a tax burden many times greater than is exacted from the common-carrier bus lines.

Articles have gone to the press through our publicity bureau.

Pamphlets have been distributed to the public.

In public addresses our officials have brought out these facts forcibly.

Magazines have been stimulated to publish articles on the subject, and our employees are educated through their company magazine.

Every application to the State Railroad Commission for permit to operate buses in competition with our lines has been vigorously protested before the commission, and no case has been lost since the commission has had jurisdiction.

Recently employees conducted a campaign in their local communities that created considerable favorable public interest and publicity.

We now see an awakening of the public mind on this subject. The people who in the end must pay the bill are beginning to rally to the support of legislation favoring adequate taxation of carriers who commercialize the highways. The time is not far distant, in my judgment, when common carrier buses and trucks in California will pay, at least to a reasonable extent, for the wear and tear they do to the highways, and pay a tax to the state that will be at least the same as other transportation lines must pay for the privilege of doing business. Once on such a basis there is little to fear as regards the future stability of electric railways.

At a recent hearing before the California Railroad Commission, which resulted in a readjustment of, and in some cases an increase in, fares, the chief engineer of the commission testified that "if it was not for the paralleling bus competition there would be no reason for an increase in Pacific Electric fares."

Common carrier bus lines in every state in the Union should be under the State Railroad Commission or Public Service Commission, as this is the only way that railways can be protected against paralleling bus competition.

With the development of California continuing in unabating vigor, the lack of extensions of electric railways throughout the state is causing deep concern. The California State Realty Board, appreciating the gravity of the situation, has started a movement to put before the voters of the state the question of vesting greater regulatory powers in the State Railroad Commission. In California many cities have stringent franchises, and other municipal ordinances, which have hampered the extension of electric lines, thus causing a lack of development of the suburban districts, and many public-spirited organizations are rallying to the support of the movement. Commercial bus and truck carriers would also be affected and co-ordinated with other transportation mediums should the amendment which goes before the voters of California in November be adopted. The success of the movement seems problematical; in any event, as a result of the campaign a considerable amount of favorable publicity is being given to the problems of the electric railway industry throughout the state.

THE FINANCIAL OUTLOOK IS IMPROVING

With the adjustment of the fares of the Pacific Electric in January of this year, the financial outlook of the company is brighter than at any time in its history, and we are looking to the future with confidence that our problems will be less burdensome. A very extensive summer program of rehabilitating tracks and equipment is being carried out.

In the face of a tremendous growth, southern California has had comparatively no electric railway extensions in late years. The population of Los Angeles has increased from 580,000 in 1917 to 810,000 in 1922, and it is now up to the railways to make extensions or install bus lines to handle the growing traffic.

The Los Angeles Railway, operating 385 miles of double-track railway, handles the bulk of the local traffic in Los Angeles and will, within the next few months, install numerous feeder bus lines or trackless trolleys, whichever the management considers the most desirable.

The Pacific Electric will install bus feeder lines.

Figuring the requirements of the two lines, there is now being installed, or under consideration for installation, a total of nineteen feeder bus lines in and around Los Angeles.

The Pacific Electric is extending some lines, both local and interurban; construction will be commenced at once on a tunnel in Los Angeles costing approximately $3,000,000; fifty steel cars for the Hollywood service are being delivered at the rate of five a week and placed in service, and upon completion of the tunnel will be operated in two and three car trains.

These improvements, together with 200 freight cars ordered for December delivery, represent a total expenditure of $5,250,000 now under way.

THE BUS IS A PERMANENT FACTOR

These things are cited to show you that we are not holding post-mortems over commercial bus and truck competition, nor over any of our many other difficulties in the past. On the contrary, it is the aim of the railway to keep pace with the fastest growing city and district in the world. Pardon my seeming egotism, but you have been invited to hold your next convention in California, which will give you an opportunity to come out and see for yourself, then you will believe.

In conclusion, I want to say that it is my opinion that bus transportation will never successfully supplant the electric railways; it is here to stay in one form or another. There is no doubt that in many instances, such as feeders, and when other forms of transportation are not provided, for service to partially developed sections, the bus can render a useful service, both to the public and to the electric railways.

In the end, with the present favorable trend of public opinion toward reasonable regulation for common carrier automobile buses and trucks, and the field so definitely defined, the present unfair competition will be greatly restricted. The problem of the electric railway is not to endeavor to put the buses and trucks out of business, but to endeavor to see that their service is rendered in districts not adequately served by rail transportation, and to forestall the uneconomic, unfair, and in some cases cut-throat, paralleling of railways.

The Turnstile Car on the New York State Railways*

Standard Cars Were Equipped with Turnstiles at the Rear or Center Entrance and the Front Was Used as an Exit—Safety Devices Are Used and Include Several New Features

By J. E. Duffy
and Harrison S. Sweet
Respectively General Superintendent Utica and Syracuse Lines and Engineer of Equipment New York State Railways

THE New York State Railways, on its Utica and Syracuse lines, has been confronted during recent years with an increased wage scale and high prices for the materials and in maintenance. While practicing rigid economy, the management found that this was not enough, and as the one-man car had been put in operation by many roads which were able to finance the purchase of new cars, our company felt that this type of operation might be accomplished with the same cars that were in use on the property.

In March, 1921, we were convinced that this type of operation was practical in our larger cities, so in April one-man cars were placed in operation on some of the lines in Syracuse using the existing standard double-truck rear-entrance front-exit cars and front-entrance center-exit cars of the Peter Witt type. The rear or center doors were locked, the passenger entering and leaving the car by the front doors. It was soon apparent that the use of the same doors for entrance and exit was slowing up service and causing congestion. Our mechanical department suggested that a turnstile be placed on the rear platform to allow passengers to enter but not to leave the car at the rear. Our first experiments along this line showed that the car could handle passengers with less delay than our other one-man cars. The car also will load very compactly during the rush, for the boarding passengers go forward of their own accord as they know the exit is at front. These cars gave such good results that we continued and extended this operation until we have at the present time cars of this type in service in Syracuse and Utica.

The following are the essential features of this car: First, there is the turnstile in rear end. Then a mirror projects from the front vestibule body post and gives the operator a complete view of the outside of the car and the rear step. Finally, the passengers deposit their fare in the fare box upon leaving the car.

J. E. DUFFY

The first cars were equipped with a very crude four-arm pipe turnstile which took up most of the rear vestibule and was built with the idea of providing a positive barrier against the use of the rear door as an exit. We gradually lowered the stile and changed its form until, at present, we have a three-arm wooden stile with only one row of arms. The stile serves as a guide for the public and allows plenty of room for passengers with baggage and small children.

INCREASED SEATING CAPACITY

The use of the three-arm stile made it possible to locate it in a different place and so to increase the seating capacity of the car. In fact, the car seats four or five more than when operated as a two-man car. Where loading or transfer conditions make it imperative to operate "Pay as you enter," the operation can be reversed and the turnstile used as an exit, or if the car is "Pay as you leave" at a heavy unloading point where there are no boarding passengers, the operator can release the turnstile and the street man collects fares at the rear door, thus discharging passengers from both ends. We have not found it necessary to do this.

H. S. SWEET

SAFETY FEATURES OF THE CONTROL

A safety control is used on this car which possesses several novel features. The dead-man control is from the power controller handle and is standard practice. That is, if the operator's hand is removed from the controller handle without his first applying the brakes, the circuit breaker is knocked out and the emergency brakes are applied, the track is sanded, the doors are balanced and the turnstile is released so as to turn freely, thereby allowing the rear door to be used as an exit. If the hand is removed from the controller handle after the brakes are applied, none of the above operations occurs but the doors open. Then when the hand is restored to the controller handle, the doors close.

This control of doors from the power controller handle effectively interlocks them with the brakes. They must be on before the controller handle is released or there is an emergency application of brakes. This insures that the brakes are applied before the doors are opened. Vice versa, the controller handle has to be pressed down before the brakes are released, thus insuring that the doors close when the brakes are released.

The selective operation of the doors which is necessary on our turnstile cars is done by connecting up the doors so that both front and rear doors open on the removal of the hand from the controller handle, but only the front closes when the handle is pressed down, the rear closing on release of the brakes. It is usually necessary to close the front door first so as to give an unobstructed view of the rear door through the mirror. Of course, both front and rear doors are provided with separate cutout valves located in front of the motorman. With this door control the operator gets selective control of the doors, in most cases without removing his hands from the controller or brake valve.

Another feature of the control is that after an emergency application of the brakes the doors do not balance instantaneously, but only after a time interval sufficient for the car to come to a stop. Low air pressure automatically applies the brakes when it falls below a fixed amount, for the same valve which keeps the air tanks from leaking off through any rupture that might occur to the piping will itself automatically apply the brakes if the air pressure falls below a predetermined pressure. This valve also insures that the car cannot be put into service without a safe working pressure, for when the compressor is started the brakes go on and continue to build up with the system until a predetermined pressure is reached, then they can be released. This has the odd advantage that it will detect a badly leaking brake cylinder gasket, for if the gasket leaks faster than the compressor can pump, the brakes cannot be released by the regular method.

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*Abstract of paper read at convention of American Electric Railway Transportation & Traffic Association, Chicago, Ill., Oct. 2 to 5, 1922.

In equipping a car with the above safety control, the same brake valve and arrangement can be used that are on the car, the additional equipment required being a standard emergency valve with sanding feature, protecting valve, controller dead-man valve, circuit-breaker, knockout cylinder, small sanding reservoir, check valves, etc.

TURNSTILE CAR "FILLS THE BILL"

We have now operated cars of this type in Syracuse and Utica for a year and feel that they "fill the bill" in every particular. At busy points, after passengers who have finished their journey have left the car, both doors are used for loading in order to facilitate movements through the busiest parts of our cities. This is possible because with turnstile cars all fares are paid when passengers leave. Operators on this type of car make change, sell tickets, issue transfers, etc.

Seventy-five per cent or more of our platform force are qualified one-man car operators and all new men are hired as motormen, receiving the regular course of instruction before being placed on cars and, after the expiration of thirty days are given further instruction on one-man cars, then, if found satisfactory, they are placed on the one-man car operators' list. When turnstile cars were first placed in operation it was necessary to instruct men who had been conductors in the duties of motormen and vice versa. It is gratifying to state that but a very small number were unable to qualify and these men were taken care of in other positions where possible.

All cars operated carry signs on the front designating "Rear entrance" or "Center entrance" as the case may be. This we find is important where more than one type is used.

INCREASE IN RUNNING TIME

Extensive check in Syracuse showed that the turnstile one-man car consumes 2.6 seconds per passenger interchange against 1.9 seconds for the two-man cars. These checks were made in January, 1922, after the turnstile car had been operating only a few months. Some of our recent one-man turnstile car checks are showing an average of 2.4 to 2.5 seconds per passenger interchange. Using these figures as a comparison, it is interesting theoretically to check the difference in schedule speed between one and two-man operation. Tests in Syracuse have shown that the total running time per trip for two-man cars was distributed as follows, 10.3 per cent for handling passengers, 3.6 per cent delay due to vehicles, etc., 86.1 per cent actual running time. These are actual averages for the city of Syracuse.

The turnstile one-man car increases this to 13.6 per cent of the time used in handling passengers as the ratio of 2.5 to 1.9. Therefore, the total time per trip is increased only 3.3 per cent. This can usually be taken care of by faster acceleration or less layover time.

Relations of Engineer and Accountant in Public Utility Development*

Reasons for Co-operation Between the Engineering and Accounting Departments Are Stated, Together with Practical Suggestions as to How Co-operation Can Be Brought About—Reasons for Previous Lack in This Direction Are Outlined

By Edwin D. Dreyfus

Engineer West Penn Railways
Pittsburgh, Pa.

E. D. DREYFUS

IN DEALING with the subject of the relationship of the accounting and engineering departments, we must keep in mind the places where their respective work dovetails. Accounting engages the engineering department when money is being devoted to new property and extensions, and also when it is being spent in rendering the service for which the utility is designed.

The two divisions of engineering are, in some companies, separate and distinct, but the accounting department remains a unit and logically provides for both through its proper capital account and expense accounts. Even when one engineering organization handles both operation and construction, due apportionment of the expenditure is, or should be, reported to the accounting department.

The contact between the accounting and engineering departments is as broad as the business itself, and the accounting department may prove to be most helpful to the engineering department, in any effort on the latter's part to secure low construction and operating costs, through the furnishing of the necessary details of cost directly allocated to the work under consideration.

Among the drawbacks that have operated against making any accurate and searching analysis of the business in the past were the respective positions assumed by the two departments. Sometimes this took on the form of opposition or utter disregard, with occasionally a sprinkle of toleration.

The nature of the training of the men who constitute the two departments has had much to do with this condition. The science of accounting is an exact art. It is positive in its application, and those who pursue such work are liable to become categorical in their attitude through environment and habit. On the other hand, engineering is an applied science. In dealing with the laws of nature, the engineer may employ certain factors of safety and make other allowances in order that the structure and equipment will be operative and durable. Hence engineering is a profession in which experience and judgment figure prominently. Since the engineer's judgment is so important within his own specific realm, he may become strongly opinionated, and therefore attach more value to his own estimate than to book records that have been prepared by the accountant. As a consequence friction often occurs, which produces no benefit whatever.

In consequence of the fundamental training of the two classes of men—distinctly opposite in character—it is not at all surprising that the two departments may sometimes be at variance on points bearing upon their joint duties. Where such conditions exist, it is important to change the attitude of both the accountant and the engineer. A little thought given by each to the requisites of the other fellow's work inevitably develops a sympathetic understanding.

A FEW CONCRETE SUGGESTIONS

The practical application of the idea of co-operation may be accomplished through any or all of the following:

1. Joint meetings and discussions to elucidate in a rudimentary way the procedure necessary successfully to carry out the work of each department.
2. Preparation of simple notes for exchange, describing the elements that must be cared for in fulfilling the functions of the two departments.
3. Provision of diagrams and such other illustrations as will show graphically the true nature of the other department's work. These will visualize, in the case of the engineering department, how the equipment is arranged in order to provide for the service, and how the operating force is organized to maintain the service. Furthermore the

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*Abstract of paper read at annual convention of American Electric Railway Engineering Association and American Electric Railway Accountants' Association, Chicago, Ill., Oct. 2 to 5, 1922.

significance of the different classes of service or charges obtaining can be graphically illustrated. For the accounting department it is possible to show the manner in which the information and costs are routed in order that all expenses are properly distributed and placed on record and afterward recast for the various purposes of the business.

The educational benefits derived from the meetings of the company sections, or special staff and interdepartment conferences of the companies, are of the character covered by the first proposition. In the case of the second we find the companies' own classification of accounts often supplemented by explanatory notes which guide the construction and operating departments in reporting on work done.

Although there never has been a time when it was not desirable to co-ordinate the work of the accounting and engineering departments, it is important to do so now because, while public service regulation is becoming more rational, it is nevertheless exacting greater proof of the facts. Valuations not already undertaken must some day be made, and careful and consistent records provide a firm foundation for them. Expense must be distributed to the proper accounts in conformity with established rules. Depreciation must be taken care of, as it is a part of the law, and the reserves to be set up are to be based upon the proved needs of the business. More statistical information is required. And, further, cost accounting could advantageously be carried out in much detail.

SOME TECHNICALITIES OF ACCOUNTING THAT NEED ATTENTION

There are various property values that might be mentioned, viz., market value, book value, investment value, value for taxation purposes and value for rate-making purposes. Eventually one value of the public utility will become predominant for all purposes, and that is the much discussed fair value regarding which we will find a wide divergence of opinion among engineers, economists, lawyers, the commissions and our courts. After all differences are ultimately rationalized and common principles of valuation universally adopted the accountants' records will then become controlling for rate regulation and likewise, in an equally strict sense, in all business matters of the utility corporation.

To accomplish this end, a complete system of authorizations, requisitions and work orders must be enforced where they have not already been put into effect, or where they have been treated in a perfunctory way. The work covered must be set forth very clearly, and sufficiently described by the engineering department so that the records will always be self-explanatory and, in addition, accurate when completed in the accounting department. As the work progresses, the engineering department must exercise particular care that all charges are properly designated and assigned to the account to which they belong. When the charges are received by the accounting department, there must be no question as to their being placed against the proper authorization and accounts, and after the work is completed it must be certain that the cost will be shown in full. The diagrams and descriptions of the work prepared by the engineering department, above referred to, will enable the accounting department to apply somewhat of a check as to the correct distribution of the various charges, some of which may not have been clearly assigned.

The accountant has the duty, also, of properly allocating all overhead expense and entering the due portion against each construction job. Part of this overhead may be best determined by a discussion of the details between the accounting and the engineering departments.

Extensions and improvements should, of course, absorb the greater part of the attention of the accountant and engineer. However, as the property grows, certain equipment becomes obsolete and is abandoned for its inadequacy and lack of utility when it still possesses serviceability. The disposition of the accounting in such instances requires special treatment, for the history of the case must dictate what corresponding value, if any, should be written off the books. It also depends upon whether the business has permitted the amortization of such equipment before it is retired or else it is to be carried temporarily as a deferred charge to be gradually wiped out through future earnings. Or, it may be necessary to capitalize the account as a developmental expense of the business, if it can be proved that this is the most equitable way under the particular circumstances.

Figuratively, an epidemic of cost and efficiency systems seized the industries, chiefly the manufacturing branch, several years ago. Leading manufacturers felt the necessity for more definite cost analyses in order to ascertain wherein competition could be best met, and also which products really produced the greatest net profits. While the public utility is on an entirely different plane from that of the producers of equipment and commodities, nevertheless it is required to differentiate among the various classes of service it renders.

In the first place, we must have cost accounting to establish our construction expenditures in a precise way. Not only do commissions require it but the bankers who finance utilities are beginning to insist upon an adequate record being kept of all disbursements of funds.

Unit costs are derived when the cost-accounting system is complete. These unit costs will afford an opportunity for comparisons as to relative efficiency and economy with which the work has been done, and also provide a more positive guide for future estimates.

Presently the arriving at the cost of rendering various kinds of service in a more methodical way will become quite general. Although every utility at this time has means of testing the adequacy of its various rates, fares and charges, there is room for improvement.

The facts that cost accounting will display will enable the utility to carry on its business with greater certainty than heretofore. It should also be in a stronger position absolutely to defend whatever rules, rates and system of charges it has or may put into effect. Results as here indicated are only possible through the earnest efforts of the accountant and engineer combined.

Every business which has to deal with man-made physical property must make provisions for the restoration of equipment and structures that are subject to wear and tear, age and the elements, and likewise to accidents and unforeseen happenings. Whatever the plan adopted it should be such as will clearly indicate to the accountant and engineer that the necessities of the business will be provided for, without, however, building up such reserves as may check the growth of the business or cause too great a contribution from present patrons.

The engineer and accountant should jointly work out some feasible plan of taking care of reserves, based upon sound experience of the business.

BUILDING UP A SPIRIT OF CO-OPERATION

Closer contact between the accountant and the engineer has come about through state and federal regulation and from intensive development of the business. The accountant should pay just enough attention to engineering to understand the principles of valuation and the general construction and operating features of the business. The engineer, however, should appreciate the essential elements of accounting, and those in more important positions should even require a reasonable understanding of the balance sheet so often considered "elusive." Admittedly the line must be drawn somewhere, but the limitations in each case must rest with the judgment of those who direct the utilities' affairs.

In building up an organization, with the attendant selection of employees for both engineering and accounting work, it is desirable that the qualifications of the applicants be broad enough to fit them for their particular responsibilities not only with reference to their immediate duties but also as regards other departments. Many employees already are conversant with both engineering and accounting, but the developing of more men of such qualifications should be encouraged. This is bound to enhance both the efficiency and the integrity of the organization.

Co-ordination has existed to some degree in every organization. It is to an organization what spirit is to the animate being. However good the different departments of an organization may be within themselves, without the essential spirit of co-operation with allied departments the strength of the organization is impaired.

Light-Weight Interurban Cars[*]

By J. P. Pope
General Manager
Kentucky Traction & Terminal Company
Lexington, Ky.

How a New Light One-Man Interurban Car Reduced the Energy Consumption from 33 to 47.8 per Cent, Eliminated Jitney Competition and Greatly Increased the Net Earnings

PRIOR to June, 1921, we had, from time to time, been giving a certain amount of study to the betterment of our interurban system. Shortly thereafter we started to investigate on the ground the existing types of cars of the Cincinnati, Lawrenceburg & Aurora Electric Street Railway and the Cincinnati, Milford & Blanchester Traction Company, both of these properties running out of Cincinnati, Ohio. A little later we investigated the system of the Union Traction Company of Nashville, Tenn., which operates a similar type of car.

In August, 1921, serious bus competition began to appear on our interurban lines and had reached very destructive proportions before we were able to close the order for ten of the present type of "Lexington" light-weight, one-man cars, which are a further development of the cars of the three roads mentioned. The company's aim in the purchase of these cars was fourfold, namely:

1. Maximum comfort to the car rider.
2. The interior of the cars must be attractive to the traveling public by the elimination of objectionable and useless interior fixtures.
3. The operation of the car must be made as easy and convenient for the motorman as possible.
4. The finish must impress the public with its taste and simplicity.

The cars are 40 ft. 3 in. over all and weigh completely equipped 25,100 lb.[†] and have a free running speed at 600 volts of about 36 m.p.h.

The data shown in Table I on the cars may be of interest.

On Dec. 1, 1921, about two and a half months before we received the first of the new cars, we began the education of the public and our employees to the pay-as-you-enter plan by installing a new type register just inside the rear door on all of our old interurban type cars. While our conductors were good motormen, our motormen were inexperienced in fare collection and therefore at frequent intervals we reversed their positions, with the result that they, as well as the public, soon became familiar with the new pay-as-you-enter system.

We had serious bus competition on the line on which this car was to run, and part of the general campaign for meeting this competition was a reduction in the fare rate, and a further reduction in the ticket over the fare rate, also put into effect on Dec. 1, and was made possible by the new cars.

TABLE I—DIMENSIONS OF LIGHT WEIGHT INTERURBAN CAR

Length over all	40 ft. 3 in.
Length of platform over bumper	Front 4 ft. 9 in. rear 5 ft. 0 in
Width over all	8 ft. 6⅜ in.
Rail to top of trolley boards	10ft. 4-3/16 in.
Rail to bottom of side sill	27-11/16 in.
Rail to step	16 in.
Step to platform	14 in.
Ramp, platform to car floor	2¼ in.
Post centers	33¾ in.
Clear height inside	7 ft. 3 in.
Seating capacity	44
Width of seats	37 in.
Width of aisle	26 in
Passenger door opening	36 in.
Merchandise door opening	42 in.
Trucks	Cincinnati arch bar
Truck centers	21 ft.
Truck wheelbase	5 ft.
Wheels	26 in. rolled steel 3 in. tread
Motor equipment	Four G.E. No. 264—25 hp. each
Controller	G.E.K-35, single end
Compressor	G.E. CP-27
Headlight	500-watt incandescent with G.E. Co. resistance.
Small storage battery furnishing light for the emergency lamp, markers and tail lights.	
Seat spacing, center to center	33in.

The former rate was 3.6 cents per mile either for cash or ticket. The new cash rate was fixed at 3.25 cents per mile, but to speed up loading, assist the car operator by avoiding congestion at terminals where a large number of people usually board the car, and further to merchandise the service, the ticket rate was made 3 cents per mile, with a further reduction of 5 cents on round-trip tickets to terminal points. Monthly commutation books and school books are sold at a reduction over the former rates. In addition to the above, a new twenty-four trip book was put out, good for anyone.

Still further to merchandise the service, on Jan. 22, 1922, a new hourly schedule was put into effect, with the old cars, in place of the former hour and a half service.

With the one-man operation, much time and trouble would have been involved in backing in and out of meeting points, as the sidings on the interurban divisions were all single ended. It was therefore decided to make all regular meeting points through sidings with spring switches, arranged so that cars would pass to the left, for convenience of the operators so they could step out of the door of one car into the other car. A 7 m.p.h. slow order was put in our rules to avoid splitting these spring switches. With the rapid braking and quick acceleration of the new cars, the time lost at switches is not appreciable.

On Feb. 11, 1922, we put the first of the new cars into service, the operators having received only a few days education in the safety features. By this time the passengers and our employees were familiar with the pay-as-you-enter plan, and there was practically no trouble or confusion.

TABLE II—GROSS REVENUE AND NET OPERATING REVENUE 1921-1922 COMPARED WITH CORRESPONDING PERIOD 1920-1921

	Gross Revenue	Net Operating Revenue
August, 1921	26.8 per cent decrease	42.5 per cent decrease
September, 1921	40.3 per cent decrease	67.8 per cent decrease
October, 1921	37.1 per cent decrease	59.7 per cent decrease
November, 1921	37.9 per cent decrease	66.0 per cent decrease
December, 1921	40.8 per cent decrease	75.3 per cent decrease
January, 1922	31.8 per cent decrease	69.1 per cent decrease
February, 1922	20.3 per cent decrease	39.5 per cent decrease
March, 1922	16.7 per cent decrease	23.4 per cent decrease
April, 1922	4.3 per cent decrease	6.9 per cent increase
May, 1922	12.7 per cent increase	42.6 per cent increase
June, 1922	8.3 per cent increase	17.7 per cent increase
July, 1922	7.2 per cent increase	33.3 per cent increase

TABLE III—COMPARISON OF PASSENGER STATISTICS FOR THREE DIFFERENT MONTHS

	August, 1921	August, 1920	Per Cent Decrease
Gross earnings per car-mile	$0.461	$0.620	$25.6
Gross earnings per car-hour	9.10	12.15	25.2
Expenses per car-mile	0.330	0.395	16.4
Expenses per car-hour	6.52	7.80	16.4
Net earnings per car-mile	0.131	0.225	11.8
Net earnings per car-hour	3.55	4.35	40.7
	December, 1921	December, 1920	Per Cent Decrease
Gross earnings per car-mile	0.329	0.586	43.6
Gross earnings per car-hour	6.45	11.62	44.5
Expenses per car-mile	0.292	0.428	92.0
Expenses per car-hour	5.73	8.50	32.6
Net earnings per car-mile	0.037	0.158	76.5
Net earnings per car-hour	0.72	3.12	76.8
	July, 1922	July, 1921	Per Cent Decrease
Gross earnings per car-mile	0.392	0.498	21.3
Gross earnings per car-hour	7.72	9.90	22.0
Expenses per car-mile	0.237	0.340	30.2
Expenses per car-hour	4.67	6.76	30.9
Net earnings per car-mile	0.155	0.158	1.9
Net earnings per car-hour	3.05	3.14	2.8

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[*] Abstract of paper read at the annual convention of the American Electric Railway Transportation & Traffic Association, Chicago, Ill., Oct. 2 to 5, 1922.

[†] For further particulars of these cars see *Electric Railway Journal* for June 3, 1922.

We had to do a small amount of advertising in our stations, and also distributed a card to each passenger who boarded the car at a terminal point where we sold tickets, calling their attention to the saving, not only in cash, but in time by purchasing tickets. We now have but few passengers boarding the cars at terminal points who do not have tickets. Delays at our terminals, due to loading, are much reduced with the new low-hung car with only one step. The car can be loaded to seating capacity in from ninety to 120 seconds, or about half the time taken by the old type car, even without passengers paying their fare. Formerly our register showed about 70 to 80 per cent of our passengers paid cash. Now only about 45 to 50 per cent pay cash.

Although the "Lexington" car has a free running speed of only 36 m.p.h., as against the 45 m.p.h. for the old equipment, it has been possible to maintain schedules much easier and better with the new cars, due to the quicker acceleration and the shorter space required for braking.

In the latter part of March the bus competition on our interurban lines was practically eliminated, due chiefly to the comfort and convenience of the cars.

A comparison of the gross revenue and net operating revenue of 1921-1922 with the corresponding months of 1920-1921 is shown in Table II.

The net operating revenue for July, 1922, was increased 485.4 per cent over that of December, 1921, the month of greatest bus competition, even with a reduction in fare of about 15 per cent.

After the buses were practically put out of commission, our net operating revenue on the hourly schedule each month from March to July showed an improvement over the corresponding month of last year.

Energy Consumption and Earnings

As was to have been expected, there has been a material reduction in the kilowatt-hours used per car-mile. Including transmission and conversion losses, the old cars consumed at the switchboard from 4.3 to 6.08 kw.-hr. per car-mile. The new cars have consumed from 2.66 to 2.99 kw.-hr. per car-mile, or on a monthly comparison with the previous year, from 33 per cent to 47.8 per cent less energy. The monthly car-miles, however, have been increased from 36.9 per cent to 45.9 per cent, so that actually the net reduction in kilowatt-hours has ranged from 10 per cent to 25 per cent. In July the kilowatt-hour consumption increased 2.7 per cent on account of increased service to our amusement park.

Table III compares passenger statistics for the three different months operation of our interurban property.

In August the bus competition just started; in December it was at its maximum height as shown by the very low net earnings per car-mile and per car-hour. In July there was no bus competition, and the net earnings per car-mile and per car-hour were about on a parity with the preceding year.

The Budget—Its Preparation and Administration[*]

An Analysis of the Work of the Budget Bureau with a View to Securing Completeness and Timeliness—The Author Shows How the Details Eventuate in the Cash Budget, Which Is the Form for the Executive

By Harry A. Snow
Controller Detroit Edison Company,
Detroit, Mich.

A CAREFULLY thought out plan or budget of activities furnishes a better standard of comparison for the study of realized results than past experience only.

For public utilities, with heavy construction programs, there are four subdivisions of budget work as follows: (1) Construction budget, (2) operating earnings and expenses, (3) materials and supplies on hand, (4) cash budget.

In comparing the term budget with the continuous budget, the former might be called the natural form, especially for construction, but it entails peaks of effort in its preparation and has only limited prevision as it nears expiration. It is difficult to revise.

The stages of a budget item are as follows: (1) An idea, (2) a budget item, (3) a work order, (4) commitments, (5) cash expenditures.

Budget administration is an executive function. The routine of preparation and revision is best performed in a budget bureau attached to the executive staff or by a committee of executives. In the preparation of a budget estimates should be prepared by those men responsible for the carrying out of the operation estimated upon. This is fundamental if the men are to be held closely to their estimate.

The estimates made as above are sent to the budget bureau for checking, sorting and assembling. The final budget is submitted to the executive for approval.

Estimates Should Be Checked and Budgets Revised Frequently

Regular checking of estimates against corresponding actual figures is essential to the success of a budget plan. No estimate can be required if actual figures to check it are not to be available. A budget system is dependent on accurate statistical and accounting departments and cannot exist without them.

H. A. SNOW

A budget is a program worked out to its logical conclusions and based upon certain assumptions and estimates. As information supplements estimates, and as ideas change, the budget must be revised. A budget is not an unalterable law.

There is no objection to continual revision of the budget by executives, but it should not be set aside at the will of subordinates. The budget system should be so designed as to permit of extensive and frequent revision.

It is, at times, wise to preserve the first, early estimates, to study the accuracy of early estimates and the reasons for later revision.

Budget systems for small companies are not different in principle from the elaborate system suggested here. Of course, a large part of the intricate mechanism is unnecessary in this case.

The construction budget is a forecast of estimated expenditures for construction and a method of control over these expenditures. New construction is justified to increase revenue, reduce expenses or better service. Plans for new construction originate in the engineering and sales departments, and approximate estimates of cost are added to the plan.

A new plan plus previous commitment plus cost of finishing work in progress constitute an approximate budget. Study of elaboration and refinement of the approximate budget is next in order. For this purpose separate items are typed on individual sheets and the items are carefully defined. Executive approval of the budget is then secured.

Replacements are handled through the construction budget, which contains provision for imperative, desirable and contingent items. Budget items are best grouped roughly according to the property classification.

Expenditures should be scheduled by months to assist the treasurer. Against approved budget items and under the supervision of the budget bureau, work orders may be issued which, alone, are final authority to proceed with the work. Standard work order records of expenditures must be kept in the accounting department.

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[*] Abstract of paper read at convention of American Electric Railway Accountants' Association, Chicago, Ill., Oct. 2 to 5, 1922.

A budget item is ordinarily subdivided into several work orders. Overhead expense may be handled on separate work orders, to be pro-rated later. The plan must provide for supplemental, preliminary, standing and withdrawal work orders.

Neither commitments nor expenditures against the work order may exceed the work order estimate. This control work belongs to the budget bureau. The construction budget serves as an engineering plan of proposed construction, a scheduled estimate of the cost of the proposed work and a means of control over expenditures.

THE OPERATING BUDGET

A budget of the operating earnings and expenses and an estimate of profits form the operating budget. This will give information as to money available from operations to meet obligations and as to the probable profitableness of operation. Further, it will insure advance consideration by department heads of operating costs. Estimates are made up by the department heads and summarized by the budget bureau.

The steps necessary in preparing an operating budget are the following: (1) A classification, (2) forms, (3) assignment of responsibility, (4) preparation of estimates by department heads, (5) selection and assembly by budget bureau, (6) approval by executives.

Estimators should be furnished with records of past performance to assist them. Each employee who is responsible for the spending of a single unit of time or material should be given an opportunity to plan his work in advance.

Estimates of earnings should be based on estimates of sale of current or of passengers carried and revenue from different sources should be estimated separately.

Actual records of operation should be continually compared with the estimates and all persons responsible for the preparation and revision of estimates should be furnished the comparisons. Study of variations warns the management of unexpected situations and gives the management an opportunity to examine and correct the causes. Another result of the study of variations may suggest revisions.

A budget cannot and should not be a fixed and unalterable law. It must be continually revised to reflect new lines. Control should be exercised with judgment and with moderation. It is sometimes not desirable to exercise rigid financial control on research and service departments.

THE MATERIALS AND SUPPLIES BUDGET

It is advantageous to maintain a stock of materials on hand, but difficult to keep this stock in a healthy condition and to obtain proper knowledge of variations in this investment. Stock control is the problem of the storekeeper, but with operation and construction planned in advance, the storekeeper derives valuable assistance from a knowledge of these plans.

Effective stock control may be assisted by a stock catalog, by records of turnover and by the segregation of general stock, spare parts and construction items. Additions to investment in spare parts should be budgeted and handled on the work order plan.

Adequate warning of increases or decreases in the investment in materials and supplies must be given by the storekeeper to the budget department to assist it in the preparation of the cash budget.

THE CASH BUDGET

A financial summary of the operations of the company as set forth in the construction, operating and materials and supplies budgets serves to inform the financial officer of expected necessary financing, for time and amount.

Before the figures from the other three supporting budgets can be used, it is necessary to place them on a cash basis. This cash budget is prepared by the budget department under the supervision of the financial officer. A continuous budget is preferable to a term budget for this work.

Control curves are desirable for use in daily checking of the cash budget. The items of interest in this connection are (1) Daily bank balance, (2) receipts from operation, (3) disbursements for labor, (4) disbursements for materials, (5) other disbursements, (6) interest, dividends and tax payments, (7) financing.

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Present-Day Responsibilities of Public Utility Accountants*

An Analysis of the Accountant's Opportunity to Assist in the Development of Utility Service, Showing Why Accounting Is One of the Essential Elements of This Service — Benjamin Franklin Furnishes the Theme

By Walter H. Timm
Secretary
Public Service Commission
of New Hampshire

W. H. TIMM

WHEN I cast about for a plain text which would express the theme around which I chose to frame a few thoughts with respect to the present-day responsibilities of public utility accountants, I found it in a proverb of Benjamin Franklin, namely, "It is hard for an empty bag to stand upright."

The establishment and maintenance of public utilities upon a stable and conservative financial basis is a condition precedent to the rendering of adequate service at reasonable rates. The growth and development of every community is directly dependent upon the success attained and prosperity of its public utilities. Instability and a narrowed or speculative financial policy inevitably reflect their penalties alike upon both the public and the utilities. Whatever is inimical to the welfare of the one is inimical to the welfare of the other. Both are placed in the throes of ineffectiveness when treasuries, unsupported by adequate revenues, ample credit and proper financial structures, grow empty.

Out of the necessity for determining financial standing, of knowing accurately the results of doing business, there arises the need for accounting. Accounting is the one important gage by which the success or failure of business venture is ascertained. I shall discuss in rather a general way (1) the growth and development of public utility accounting, (2) the fundamental theory of standardized street railway accounting, (3) certain essential features of public utility accounting practice, and (4) standardized accounting is not a finality.

GROWTH AND DEVELOPMENT OF PUBLIC UTILITY ACCOUNTING

The term "public utility" is a distinctive designation commonly applied to those business enterprises which are considered to partake of the nature of a public calling. The case of Munn vs. Illinois, 94 U.S. 113, is the leading decision of the United States Supreme Court to apply the rule of the common law to public utility undertakings. The rule is stated therein as follows:

> We find that when private property is "affected with a public interest, it ceases to be juris privati only." This was said by Lord Chief Justice Hale more than two hundred years ago in his treatise, De Portubis Maris, 1 Harg. Law Tracts, 78, and has been accepted without objection as an essential element in the law of property ever since. Property does become clothed with a public interest when used in a manner to make it of public consequence and

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*Abstract of paper read at the convention of the American Electric Railway Accountants' Association, Chicago, Ill., Oct. 2 to 5, 1922.

> affect the community at large. When, therefore, one devotes his property to a use in which the public has an interest, he, in effect, grants to the public an interest in that use, and must submit to be controlled by the public for the common good, to the extent of the interest he has thus created.

The dependence of society upon transportation has resulted in the placing of the facilities for social intercourse in the class of public callings. The degree to which each utility has projected itself into the comforts, necessities and welfare of the respective communities in which they are located has determined in a large measure the extent of the supervision that has been assumed over it. As effective competition in each industry ceased, the economic ground for regulation arose. Most of them are monopolistic, and regulation rests upon the cognizance taken by the public of this monopolistic characteristic of their activities.

When it had been demonstrated that competition could not be insured in these lines of business, because they were inherently monopolistic, the first control over them by governmental action was sought to be exercised by legislatures, both local and state, through the control of franchises and by the enactment of general laws controlling rates. This situation prevailed, generally speaking, until 1880. It was without great success. At this time a movement for public ownership made considerable headway. This movement also proved unsatisfactory.

Thereupon the regulation of public utilities by commissions grew up in extensive proportions. This movement now practically has replaced both competition and the rather hit or miss policy of supervision by legislatures. In theory, it creates a body of technically trained, impartial experts of permanence, knowledge and power equal to those of the public utilities, and clothes it with the authority of the legislature itself by delegation of that authority. By virtually guaranteeing the utility a monopoly, it hopes thereby to secure adequate service at reasonable rates.

INSURING GOOD SERVICE AT REASONABLE RATES

The dominating design of the jurisdiction of these commissions may be said to extend to the power of insuring "to the public from public service corporations reasonably safe and adequate service and just and reasonable rates."[1] No better description of the plan and purpose of this regulation can be presented than the following concise observation of the Public Utilities Commission of the District of Columbia with respect to its own powers:

> The spirit and letter of the public utilities law charge the commission with ascertaining and keeping itself informed as to the manner and method in which the business of every public utility is conducted. It is charged with supervision and regulation of the utility's organization, franchises, property, finances, accounting, rates, operation, and its compliance with every law applicable to it, including the provisions of its own charter. It is armed with ample inquisitorial powers to obtain information in any detail.

Thus it is within the dominion of the commissions to exercise supervision over the accounting practices of utilities. Because of its relation and vital effect upon the other delegated powers, the power over accounting is one of the most important. The commissions were not slow to recognize the fact that fair rates could not be determined without accurate records of the investment and the earnings and operating expenses of a given utility, nor that they could intelligently pass upon the necessity for new enterprises, consolidations and the issuance of securities without similar information. It was, therefore, not long before each had assumed the prerogative of regulating accounts. And public utility owners and managers, quick to realize the possibilities of enormous benefits to be reaped from the greater use of standard statistics and accounts with which to gage the results of their business operations, co-operated wholeheartedly in an effort to promote the work. It now dominates the entire public utility field.

It is not surprising, therefore, that public utility accounting is now recognized as a separate and distinct branch of the science of accounting.

FUNDAMENTAL THEORY OF UNIFORM CLASSIFICATION

The need for a true knowledge of "costs" and "efficiency" by all the large industrial enterprises has been such that accounting has become the most important instrumentality through which they are operated. Control over revenues and expenses is afforded by the scientific construction and analysis of accounts. The demand for intelligible and reliable information of the true relation between all factors of a business and complete knowledge of its status has been met, not by any radical change in the fundamental theories and principles of accounting, but rather by a studied and planned arrangement, and a coherent grouping of the accounts. The grouping, arranging and classifying of accounts into a comprehensive plan designed to reveal the economic effect of every factor essential to a true statement of the progress or condition of an enterprise constitutes the promulgation of "classifications of accounts."

Coincidentally with the development of classifications of accounts, there arose a demand for standardization; that is, the use of similar classifications of accounts by industries similarly engaged. It was desirable that the scheme of classification adopted by one enterprise be the same as those adopted by other enterprises in the same line of industry.

The standardization of railroad and street railway accounting was perhaps the pioneer achievement in the work of unification, and the success attained and its effect upon the general practice of the science of accounting and the use of statistics in determining efficiency of operation has been epochmaking. The classification of accounts for street railways prescribed by the Interstate Commerce Commission dominates practically the whole of the industry, for only a small number of states have prescribed their own classifications. Yet the work of standardization is far from complete.

While the adopted classification is comprehensive in scope and sufficiently elastic to cover all conditions and sizes of companies, it fails to include adequate rules and definitions for the apportionment of investment, revenues and expenses between street railway activities proper and non-operating undertakings conducted jointly, and between different phases of street railway operation such as urban, interurban, surface, subway and elevated operations. Neither have there yet been computed any standard rules for computing traffic statistics. Too little attention has thus far been given to the use by street railways of cost accounting. It is important to commissions as well as to companies that information be available to show which lines and classes of traffic are profitable or unprofitable. The operation by street railways of motor buses and trackless trolleys has accentuated this need for a greater knowledge of comparative operating costs and has raised increased responsibilties for the accountant.

CONSISTENT TERMINOLOGY IS A DESIDERATUM

Much is still to be desired also in the direction of uniformity in accounting terminology. There is still no definite and general conception of what is meant by many important accounting terms. The position of the public utility accountant justifies him in taking the initiative upon this subject. Further, the street railway accountant should at an early date institute a definite and scientific basis of segregation between all right-of-way costs and direct transportation costs, so called, the need for which is speedily approaching, due to the more general recognition that the former costs should justly be met by general taxation. Then, too, there is the responsibility for bringing about through intensive co-operation a more uniform interpretation of the accounting principles already enunciated in the classification.

CERTAIN ESSENTIAL FEATURES OF PUBLIC UTILITY ACCOUNTING PRACTICE

While the foregoing are some of the tasks that lie before the public utility accountant in the direction of placing the theory of accounting on the road to complete standardization, there also are open to him still many channels for constructive endeavor in the field of practical accountancy.

There is no more difficult problem in accounting than the practical compliance with the basic principles of the classification of accounts which are designed to insure the integrity of "capital" and the correctness of the charges to "cost of operation."

Were all expenditures of utilities for labor, materials and other items of outlay incurred during a given fiscal period promptly consumed and fully utilized, so that no part thereof remained at the end of that period, their costs in all cases would constitute an operating expense chargeable to the period during which they would be incurred. But a large part of the expenditures consists of outlays for items that last longer than the adopted fiscal period of one year. Naturally, these items, being unconsumed and not fully utilized, are not properly chargeable to the cost of the service of a single year. The whole problem of correct accounting, therefore, is that of determining which expenditures during a fiscal year represent items of outlay entirely exhausted in value and use during that year, viz., which are operating expenses or revenue expenditures, so called, and which, being not fully exhausted in value and use, are chargeable to fixed capital as capital expenditures, so called.

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[1] Petition of Berlin Electric Light Company, 3 N. H. P. S. C., 177.

The accomplishment of this desired purpose requires not only ample accounting forms constructed to insure the proper distinction between capital and revenue expenditures and a personnel thoroughly instructed in the keeping of these records from the point of origination to the books of ultimate entry, but constant vigilance and audit in their keeping.

ACCOUNTING FOR DEPRECIATION A REAL PROBLEM

If the lives of capital assets were everlasting, they would properly continue in fixed capital indefinitely. But practically all assets have a limited period of life. The wasting character of physical property raises a further problem in accounting. The destruction and consumption of items of property having an expectation of life of more than one year is just as much a part of the cost of operation as the cost of items immediately consumed. The only difference is in the period of time that elapses during the consumption; in the case of operating expense items, the consumption becomes complete during one fiscal period, while in the case of capital expenditures it is spread over a series of periods. If the period of life of all properties used in operation coincided with the adopted fiscal period for determining the financial condition of the business, their total costs would be treated solely as operating expenses. There would then be no need of a distinction between operating expenses and capital expenditures. But financial statements are needed at regular periods in the life of a utility, and many statements may be required between the dates that many assets are acquired and the dates when they are discarded. If these financial statements are to be correct, then that portion of the service value of all capital used in rendering service which disappears during each period must be included in the operating expenses of that period. In other words, as a result of the wasting character of practically all plant investment (land being one of a few exceptions), capital expenditures may well be looked upon as deferred charges to operation, some portion of which must be charged off yearly.

This depreciation is one of the most important and troublesome subjects of public utility accounting. Its far-reaching effects upon the finances of the public utility cannot be overemphasized. Without proper allowances to cover its impairment of capital, the costs of operation cannot accurately be ascertained. However troublesome it may be, it must be reckoned with. Its correct treatment in practice presents a threefold problem: (1) To fix depreciation allowances which will be sufficient at all times to enable the utility to make replacements of property as required; (2) to apportion these allowances equitably over a period of years, and (3) to record the allowances made for depreciation, and the uses made thereof, upon the books of account upon an intelligible basis.

Notwithstanding the refinement of plant investment accounts and the definitions and instructions with respect to the manner of keeping them, prescribed in the classifications of accounts of the public service commissions, experience has demonstrated that much is still to be desired both by the commissions and by the utilities in their practical application. The difficulty in this connection lies in the impossibility of relating the charges and credits to fixed capital accounts to definite items of physical property with a view to determining their correctness. The fixed capital accounts constitute in effect an inventory of property by classification under particular and similar units. Accordingly, under this method of inventory, if it is not substantiated by proper records, endless analysis of accounts is required to segregate the charges to a particular piece of construction work for the purpose of determining the amount or reasonableness of its cost.

Likewise, experience has shown that it is an impossible task to determine the original cost of any particular item of property retired. The trouble arises from the impossibility of locating and individualizing the original costs and associating them with the specific physical units abandoned. The result is that retirements in this event are apt to be credited out at estimated figures, or not be credited out at all, and the plant account will consequently to that extent be distorted. This situation was very soon recognized. Indeed, when regulation was becoming the established policy of the states, some of the more progressive public utilities had already come to realize the need of separating their records, both of construction and of certain maintenance work, also under different programs of work done.

The two methods of segregating charges to plant investment thus adopted are sometimes referred to as the "inventory" classification and "project" classification, respectively, of fixed capital. The former consists of the distribution and detail of charges to plant investment by a classification of units of property based upon their similarity of use, life, etc., while the latter may be defined as the method of segregating under special and separate accounts all charges and credits relating to particular projects.

The "project" classification of fixed capital is usually referred to as the "work order" system. Sometimes, also, it is referred to as the "job order" system. However, the latter title is more commonly applied to the system of recording the transactions under contracts for merchandise and jobbing work entered into with customers. For practical purposes it is advisable to adopt definite distinguishing titles. The term "work order" should refer to the "project" classification of expenditures relating to fixed capital, while the term "job order" should refer to work chargeable to consumers.

OTHER ADVANTAGES OF THE WORK ORDER SYSTEM

The work order system has many advantages in addition to those that accrue from corrective accounting. The procedure under it usually requires that the cost of work on given projects be accurately estimated in advance and that the work be passed upon by properly authorized officials before it is commenced. This procedure places the control of all expenditures for construction and reconstruction directly in the hands of the managing officials. In this way, the finances of the utility may be prearranged to care for the planned expenditures; the estimates may be scanned and checked up and economies be effected thereby; the advisability of proceeding with proposed work may be determined from a comparison of the estimated costs with the estimated revenues to be derived therefrom, and after the work is completed the actual costs may be compared with the estimated costs with a view to detecting waste in materials used or in failure to account for scrap retired. The detailed costs then available may, also, be used for purposes of calculations of probable costs of work under consideration in the future. And further, these same costs may be made the basis for computations accompanying requests for credit through loans and for petitions to commissions for permission to increase capital liabilities. All these benefits, and still others, are derived from proper work order records.

WHAT IS A BUDGET?

Just as the work order system should be used as a guide for the efficient and economic supervision of individual projects, so it is essential that ways and means be devised by a proper accounting procedure of charting and planning into definite programs all future operations. This procedure is afforded by the "budget." The "budget" is a prearranged schedule and plan for the future conduct of the business. While in its ordinary use it refers primarily to a worked-out plan for the management of the finances of a company, it is really, with all its supplemental data, a summarized exhibit of the application of foresight in the formulation of all the future policies of the business. In other words, it is the function of the budget to attempt to predetermine the future.

Both the "work order system" and the "budget system" are designed principally to produce economy in expenditures. In this respect they really go hand in hand. The one is the means for a preconceived financial program for the future growth of the operations of the utility prepared under the direct supervision of the officers, while the other is, in part, the medium for the efficient control of expenditures incurred in carrying out this preconceived plan. Thus the budget, in the first instance, is the guide for future work-order operations, and thereupon the actual costs and other data assembled under the work orders in turn become useful in the preparation of future budgets.

VOUCHER SYSTEM INDISPENSABLE

The accounting profession is quite generally in agreement that today a voucher system of some form is indispensable to an efficient public utility accounting practice. The primary function of the voucher system is to secure, for purposes of accounting record, positive evidence of the payment of particular liabilities. This end is accomplished by the use of a form of voucher or voucher check so used as to secure a receipted bill. But as a system, the voucher system consists, also, of a well ordered procedure for the verification and approval of invoices and for preparing, filing, paying and indexing the vouchers issued upon them. In the main, the essential features of this procedure are the same wherever the voucher system is used. Yet it must be elaborated upon more or less to meet the needs of individual companies. This, again, is a responsibility of the accountant.

Through the medium of the voucher system and of other records, the cash funds of a public utility are accounted for and safeguarded most carefully. The need for such care is self-evident. Yet money is valuable only as a medium of exchange, and since a large proportion of the funds of a utility is used in the acquisition of materials and supplies, it follows that proper and adequate records to record the purchase and use of materials and supplies are likewise essential, although this fact is not always so fully recognized or appreciated.

Materials and supplies constitute one of the primary elements of cost in the rendering of public utility service. For the most part they must be purchased in advance of their immediate use; that is, the needs of the public utility business require the keeping on hand of a considerable stock of supplies. The primary purpose of material records is to account accurately for, and to preserve the value of, the stock of materials thus carried on hand. Being received for the payment of money, and in fact being the equivalent of money, they should be safeguarded as such.

Accounting for stores, therefore, is a work of large consequence. The task of the accountant extends to the adaptation of the system to the scope of the operations of the company, and as well to regular checks of its current effectiveness, for materials accounting is very largely dependent upon the human element. If the procedure is correct and it is operated efficiently, it should serve (1) to avoid thefts of supplies, (2) to eliminate wasteful use thereof, (3) to effect a systematic method of ordering goods, (4) to produce an accurate distribution of materials and supplies to appropriate construction or expense accounts, (5) to set up a definite method for the disposition of scrap, and (6) to simplify the work of periodically inventorying materials and supplies on hand.

Confronted with this array of benefits accruing from a proper procedure in the handling of materials and supplies, utilities and accountants are given ample excuse for exercising a diligent endeavor for greater efficiency in the operation of their stores departments.

STANDARDIZED ACCOUNTING NOT A FINALITY

Thus public utility accounting reveals itself as a highly specialized and effectively standardized procedure. Because it was indispensable to governmental department having control over rates, service, finance and taxation, its use in the regulated enterprises is far in advance of that in the so-called private industries.

In the uniform classifications of accounts that have been developed there have been applied certain underlying principles to all classes and sizes of utilities. These principles recognize that in the main the accounting problems of one state or one utility are really the accounting problems of all. The design has been to create a procedure correct in principle and logical in scheme throughout the entire public utility field. Its development has been a gradual evolution, occasioned by a search, as it were, for "a common language of accounts."

Yet it would, indeed, be far from the truth to say that public utility accounting is, or ever will be, a copy-book method of accounting. Standardized accounting is not a finality. Neither is a knowledge of standardized accounting a finality. Speaking metaphorically, it is not merely an anchor to which to tie, but a chart and compass by which to navigate. But it is merely a plan, and no plan will work itself. It must be given the direction of human judgment and discretion. Accounting differs in no way from other businesses or professions. Outside of certain guiding principles, no definite rules can be laid down for engineering, or medicine, or manufacturing, and none can be made for accounting. The standards fixed and adopted in public utility accounting are merely the guiding principles. Although they are an exhibit of a rare attainment in accounting, they remain but abstract "standards," without the application of those human qualities which in all worldly affairs make for what is commonly termed "success."

Among the first of these necessary attributes which the accountant should bring to the solution of the problems of the future is "initiative." Initiative consists to a large degree in the application of common sense. The application of common sense to accounting distinguishes accounting from bookkeeping. It involves the original planning and the subsequent interpretation of the work of bookkeeping. Hence without originality, initiative and individuality the accountant becomes merely a bookkeeper. He also needs physical as well as mental good health. And again, he must have confidence in himself and in the future of public utility accounting as a field for constructive endeavor; he must have personality and character.

The responsibility of the accountant is a large one. He is the only official who has equal contact with every other department and activity of the utility. His duties require that he be interested in and know the facts of every part of the history and work of its organization. Good accountancy requires it. Every department and every man must be drawn upon for the facts, if the accounting records are to be exact. This is a work of no small magnitude. The accountant must train himself to shoulder these responsibilities.

Accounting records are the instrument by which the manner of the discharge of the tremendous trust reposed in managing officials by investors is exhibited. The accountant is thereby placed in direct control of the destinies of business. He is one of its executive officials, its principal business adviser. If he is to meet his full responsibilities, his education cannot be wholly in the field of accounting. The scope of his vision must extend to the field of law, banking, finance, labor, psychology, and, in fact, to a clear perspective of all the activities of our social and economic life.

With your permission, I will leave off as I began, quoting an adage, the common adage, "A stream cannot rise higher than its source." Likewise, a public utility cannot achieve greater success or attain a higher degree of progress than the ambitions and attainments held out for it by its officials. Let the success and progress of the nation's public service corporations, which have been so noteworthy in the past, not be limited in the future by a lack of vision on the part of its accounting officials.

Finally, out of a considerable experience close to public and utility service, I have an unshaken faith that if the utilities and commissions continue to meet the obligations of the future as they have met the demands of the past they will have earned the lasting praise of all coming generations.

Welding as Practiced by Electric Railways

A Symposium

Papers Forming Basis of Discussion at Joint Meeting of American Welding Society and American Electric Railway Engineering Association at Chicago Convention—Fields of the Several Varieties of Welding Were Outlined

A NOVEL FEATURE of the annual convention of the American Electric Railway Engineering Association this year was the joint meeting with the American Welding Society. Papers were read by representatives of the Welding Society, the electric railways and manufacturers.

In opening the symposium C. A. McCune, president American Welding Society, explained the organization of his association and the field which it is endeavoring to cover. It was organized to provide united and co-operative action and extend the knowledge of the art of welding by every recognized process; also its field of industrial application. This is accomplished through society activities, the American Bureau of Welding and the society *Journal.*

Sections of the society are now organized in nine leading industrial centers. Regular monthly meetings are held in each, at which papers and lectures form the basis of discussion.

WHAT IS THE AMERICAN BUREAU OF WELDING?

The American Bureau of Welding was organized by the society and the Division of Engineering of the National Research Council, as an advisory committee on welding research and standardization. The bureau is the research department of the society. It is made up of one representative each from a number of co-operating organizations, E. M. T. Ryder being the representative of the American Electric Railway Association.

The *Journal* of the society is a monthly publication distributed free to members. It covers the latest developments in welding, the progress made by research committees of the bureau and their findings, news of local sections, employment opportunities, etc.

Mr. McCune was followed by W. Spraragen, secretary of the American Bureau of Welding, who explained in detail the organization and method of operation of the bureau. This, he said, is a joint advisory committee of the American Welding Society and the Division of Engineering, National Research Council.

The Council is a co-operative organization of American societies organized in 1916, under the charter of the National Academy of Sciences, to co-ordinate the research facilities of the country for work on war problems. In 1918, by executive order of the President of the United States, it was reorganized as a permanent body for the promotion of research and the dissemination of scientific knowledge for the national well-being.

The council is not a governmental bureau, although it is in close and cordial relations with the government. It is supported in part by a $5,000,000 gift made by the Carnegie Corporation in December, 1919. A building is under erection in Washington for the joint use of the council and the National Academy of Sciences.

The Division of Engineering is one of thirteen divisions of the council, and it, with the assistance of an advisory committee or board for each field of engineering, plans programs for projects brought to it or proposed by it, aids in organizing the interested group, finds men and means for carrying out the plans, co-ordinates the work of societies, industries, governmental bureaus, universities and individuals, and in general stimulates research on the problems selected. Work on each problem is conducted under the supervision of a research committee, led by a chairman who is a recognized expert.

The American Bureau of Welding is organized to foster the improvement of welding methods, material and equipment and to establish codes and standards. Its director is Prof. C. A. Adams of Harvard University.

The procedure developed by the bureau for its work consists somewhat as follows: (a) Preparation of bibliography and critical summary of present knowledge. (b) Consideration of summary and laying out of specific tests. (c) Assignment of definite portions of the program to appropriate laboratories, sub-committees, companies or individuals. (d) Stimulation of research in this field as may be fitting, by individuals, government bureaus, corporations or universities.

WELDED RAIL JOINTS

The subject of rail joint welding was covered by E. M. T. Ryder, engineer of way Third Avenue Railway System, New York, N. Y. He said that way engineers find this subject fascinating, besides promising substantially to solve one of the most serious track problems. At the same time it carries a lurking danger in the allurement it offers for experimentation on a large scale, with unknown ultimate expense.

Taking up the history of the subject, Mr. Ryder called attention to the fact that the Falk cast-weld joint was in use before horse cars disappeared, and Lorain bar welds were being tried out nearly thirty years ago. Cast-weld joints were installed in Brooklyn in 1890 on old rail and in 1894 in St. Louis on new rail. Five hundred thousand of these joints were installed in five years.

To the Lorain Steel Company and its predecessor, the Johnson Company, is due the credit for making a success of the bar-weld joint, the pioneer work of which was done in 1894. The original bar weld has been improved by the addition of a chock block welded under the head of the rail directly at the joint and also welded to the web of the rail and to the main welding bar. Some 800,000 bar welds have been installed.

The Lorain Steel Company is now also installing a butt weld under the Jacobs patents, upward of 1,000 having been put in during the past year.

PROGRESS OF THE ELECTRIC SEAM WELD

As to the electric seam weld, this type was first developed on a commercial scale in Germany and introduced into this country in 1914 by the Atlantic Welding Company. Four years before that date, however, joints designed by C. F. Gailor had been installed in track in Hartford, Conn., using acetylene gas in making the weld.

The Atlantic Welding Company in its first work in New York City used double refined iron plates, Swedish iron rods and a semi-automatic control for the electrode holders, the current being obtained from imported motor-generator sets weighing 5 tons. Changes were gradually made to the present methods, using steel plates and rods and hand control for the electrodes with generating apparatus light enough to be moved about by two or three men.

As to method of reducing voltage for the arc, the resistance method is also in use and both metallic and carbon electrodes have their advocates.

In describing present conditions, Mr. Ryder used the term "experimental or developmental" and said that an impartial observer could hardly say that we have reached normalcy.

Thermit welding, said Mr. Ryder, was

introduced into the United States in 1904 and has had three principal stages of development. The first was that in which the face and web of the weld only were welded. In the second stage the rails were separated, the thermit casting filling the entire space, and forming part of the running surface of the rail. The third, or present method, introduced ten years ago, involves inserting a head shim of rail steel to form the running surface, the thermit steel welding the rest of the section including, in girder rails, the lip and the outside of the head. Recent improvements have cut down the amount of thermit metal and of manual labor required, while at the same time increasing the reliability of the process.

Mr. Ryder next took up the present conditions in the art of welding rail joints and, by quoting from progress report No. 1 of the committee on welded rail joints, he showed that the whole art is yet in its embryonic stage. This led to a statement of the importance of co-operation to secure satisfactory future development. Scientific study of such complicated problems as exist in the production of welded rail joints, said he, can be undertaken to advantage only under expert direction and with adequate resources. Both of these requirements seem in a fair way to be met by the organization of the committee on welded rail joints. This committee should have the backing of the entire electric railway industry.

WELDING IN ELECTRIC RAILWAY SHOPS

In discussing welding for car maintenance, J. S. McWhirter, superintendent of equipment and buildings Third Avenue Railway System, referred to the extent of the system with which he is connected and the advantages of having all but minor welding repairs done at a central repair shop. At present, the Third Avenue Railway is doing 40 per cent of its welding with the graphite electrode, 55 per cent with the metallic electrode and 5 per cent with the oxyacetylene torch. The equipment used consists of five constant-energy, 200-amp. individual motor-generator sets and two constant-potential motor-generator sets, one of 300-amp. rating and one of 400-amp. rating. The company still uses two banks of resistances fed by the railway circuit, but it is planning to replace these resistances as fast as the development of the art and operating economy justify the change.

The oxyacetylene torch is used principally for repairing bronze armature bearings, brushholders and like parts. This is preferred to electric welding for such metals because of the objectionable fumes which result when bronze is welded with the arc. When electric welding was first undertaken, the graphite electrode was used, but the company has gradually changed over toward the metallic electrode, as welds made by this latter method have proved more satisfactory when subjected to stress.

The present welding organization consists of one foreman, who devotes about 60 per cent of his time to other work, one semi-automatic-welding-machine operator, four metallic-electrode welders, two carbon-arc welders and one oxyacetylene welder. This force has been found sufficient to do all the welding necessary for maintaining 1,600 cars and, in addition, for a considerable amount of reconstruction work. The volume of work turned out runs to about 25,000 lb. of bare soft steel welding and 1,500 lb. of manganese bronze per year. The average amounts of metal used per operator with the three types of welding are 1.2 lb. per man per hour with the metallic electrode, 1.6 lb. with the graphite electrode, and 0.6 lb. with the oxyacetylene torch.

WHAT THE THIRD AVENUE DOES IN THE SHOP ALONG WELDING LINES

Referring to the various classes of work done, Mr. McWhirter said that the biggest routine welding job is the rebuilding of worn axle-bearing seats on cast-steel motor shells of 65-hp. motors. Two of these shells are welded per day, one operator hand welding with $\frac{3}{16}$-in. metallic electrodes and one operator working with $\frac{1}{8}$-in. metallic electrodes fed by the semi-automatic welding machine. The concave surfaces of the axle bearing seats do not permit the use of full automatic machines. The welding and reinforcing of cast-steel and forged truck frames is now done with $\frac{3}{8}$-in. metallic electrodes, and very satisfactory results are secured.

Gear-case welding also has proved very economical. Mr. McWhirter estimated the annual saving on gear cases alone as about $12,000 for his company. Most of the gear cases welded are of malleable iron.

In regard to the welding of axles, Mr. McWhirter said that when the automatic welding machine was first developed, one of these was installed on a second-hand lathe and used for welding axles. The deposited metal was laid on in the form of a screw thread as the axle revolved in the lathe. A careful record was kept of all welded axles, and it was found that these broke through the welds at from six to nine months of service. Investigation of the cause of these breakages showed them to be due to the quenching action of the mass of the axle upon the surface of the axle subject to the heat of the arc, the result being a hard and brittle layer of metal surrounding the axle immediately under the soft deposited metal. It was found that this hard layer could be removed successfully by annealing the welded axle under close temperature control, but after the axle was annealed, it was necessary to remove the warpage caused by the annealing and to true the bearing surface in a lathe. When the cost of the labor, material, electric current and equipment required to reclaim the axle was totaled, it was found that the saving was only about 20 per cent of the final cost of the new axle.

Other parts reclaimed by welding are brakeshoe heads, brake beams, side and center bearings, journal boxes, step hangers and other truck and car-body parts. Mr. McWhirter estimated the annual net saving of these parts to be about $45,000. This saving is after deduction of other shop labor on the reclaimed material and with a liberal allowance for maintenance, depreciation and fixed charges on the welding equipment, wages of foremen and clerks, superintendent, building rental and other items of overhead.

THERMIT IN THE SHOP AND ELSEWHERE

The use of thermit welding by electric railways was discussed by J. H. Deppeler, chief engineer Metal & Thermit Corporation. Mr. Deppeler said that one of the most striking developments in the use of thermit by electric railways was for welding rail sections to form frogs and single and double-track crossings. This method of construction has advantages over the bolted type, and the cost is much less than that of manganese. Service tests indicate that the thermit type of construction has held its own in comparison with other installations costing two or three times as much.

Another use for thermit welding in the shop is in connection with the making of compromise joints. Due to the increase in the size and depth of rail used by electric railways, most railways have a large variety of sizes and types of rails in use, and wherever these sections come together compromise joints can be made very satisfactorily with the thermit process.

Mr. Deppeler said that several railways are obtaining very satisfactory results through the use of thermit welding for motor cases and truck frames. With this class of work thermit welding produces a great saving when compared with the cost of new parts.

Oxyacetylene welding in electric railway shops was discussed by T. Gillespie, sales engineer Oxweld Acetylene Company. Mr. Gillespie said that there has been a large increase in the use of gas welding and cutting in electric railway shops. Gas welding and cutting is now considered almost indispensable for a very considerable list of operations, particularly for cast-iron welding and for reclamation work where welded joints are subjected to unusual strain and vibrations.

Referring to the three methods of welding, thermit, electric and oxyacetylene, Mr. Gillespie said that he considered each to have its particular field of usefulness and economy. Thermit welding is generally conceded to be superior for joining heavy sections and electric welding for use where electric current is generated in the regular course of a company's operation as in the electric railway field. It thus possesses certain advantages of economy over other processes. Mr. Gillespie enumerated the large number of uses which electric railways were making of the oxyacetylene process and these included all forms of repairs and reclamation work.

American Association Proceedings

In Addition to Addresses from Distinguished Business Men, the Program Contained Stimulating Discussion on Public Relations—Addresses by Past-Presidents Were Impressive — Attendance of More than 4,000 Broke Record

THE forty-first annual convention of the American Electric Railway Association was called to order by President Todd at 10:20 a.m. on Tuesday, Oct. 4. At that time there was a good attendance in the hall, and it later increased to a large audience.

The first order of business was the presentation of the president's address, which will be found in abstract on another page of this issue. Then followed the address of the executive secretary.

REPORT OF THE EXECUTIVE SECRETARY

In his report this year J. W. Welsh, executive secretary of the American Association, departed from precedents in matter and form, placing the statistical information in a series of appendixes and devoting the body of his report to an explanation of what the association is trying to do, together with a plea for co-operation. To supplement the text he used a number of charts showing the organization and giving other information.

Mr. Welsh divided the major activities of the association into the following seven sections: Committee work, publicity, information service, *Aera*, the Washington office, co-operation with other associations, and the annual convention, midyear meeting and exhibits. During the year 500 committeemen, representing fifty different committees, held approximately 100 meetings. As to publicity work, when this was started by the association, only twenty companies were doing advertising, while today more than 200 are doing it. Last year the Bureau of Information and Service answered 10,353 requests for information. All of the association staff are called upon to carry on this work, but personal mention was made of the work of E. J. Murphy, chief statistician, and the research work of Miss Julia Kelly, librarian. Mr. Welsh also mentioned the fact that J. W. Colton comes before the membership this year for the first time as editor of the association magazine.

The report called attention to the fact that in the field of engineering the association can assist member companies when regulations on the part of public utility commissions or legislation in the states may call for special action. The association's special engineer, G. C. Hecker, in addition to his work for the Engineering Association, is in a position to act for member companies in such cases and his services are available without charge.

R. I. TODD

Referring to the Washington office, Mr. Welsh said that these activities are covered by the report of the committee on national relations, but he reminded the members that the services of the office are at their disposal. Companies coming under the jurisdiction of the Interstate Commerce Commission may be relieved of the expense of having a special representative by appointing Charles L. Henry as their statutory agent.

The association is also doing a great deal to co-operate with other associations. Cordial relations, for example, are being established with those having to do with establishing standards of municipal regulations affecting construction of track and roadways, etc., the regulation of traffic on streets and highways, and many others.

President Todd, in calling for the report of the treasurer, explained that it would be read by Mr. Faber, as the treasurer, Barron G. Collier, was prevented from attendance because he was being installed as Deputy Police Commissioner in New York City. A summary of the report of the treasurer for the nine months ended July 31, 1922, follows:

On July 31, 1922, the cash net bank balance was $55,056. The total receipts for this period amounted to $173,219, of which $142,654 was for dues. The corresponding expenditures for this period were $104,951, making the net income $68,267. Adding this to the surplus existing Nov. 1, 1921, of $2,372, there was available on July 31, 1922, a surplus of $70,640. As the association year does not end until Oct. 31, it is not possible to present a financial report for the year. The cash bank balance on Sept. 30, 1922, was $77,038.01, but the major portion of the association's expenditures result from the holding of the convention and exhibit, and the principal bills have not yet been received. The final audited report for the twelve months ended Oct. 31 will be published in complete detail in the proceedings of the association.

An abstract of the report of the finance committee was then read.

FINANCE

This committee was created in accordance with the provision of the constitution adopted at the last convention. It has investigated and approved regular and routine salaries and expenditures and passed on all other expenditures before commitments were made. All vouchers were approved by the signature of one member of the committee, before being sent to the treasurer for payment.

The policy of rigid economy was adopted, the personnel was kept down to the lowest possible number and no salaries were increased without urgent cause. Up to this time, in the opinion of the committee, the production mark of the organization has not suffered but the volume has materially increased and the expenses for personal effort and additional facilities must necessari'y increase in the future. The excellent financial results of this year have been made possible almost entirely by the active, intelligent and loyal co-operation of the executive secretary and his entire staff.

As the income of the association is limited more or less by the dues, which should not be increased at this time, and as expenses will necessarily increase in the future, the committee recommends that the surplus of the association be gradually built up so that it will have sufficient available assets for any emergency.

The report was signed by John H. Pardee, chairman; R. P. Stevens and J. G. Barry.

The president then announced the committee on resolutions, consisting of Thomas N. McCarter, chairman; P. N. Jones. W. R. Alberger, P. S. Arkwright and H. W. Blake.

ADDRESS BY H. A. WHEELER

President Todd then introduced as the next speaker Harry A. Wheeler, vice-president Union Trust Company, Chicago, and former president United States Chamber of Commerce. Mr. Wheeler's address appears in abstract on another page.

An unannounced number on the program was an address by Mayor B. F. Brough of Toledo, who has been instrumental in working out on a constructive basis Toledo's city transportation problem.

MAYOR BROUGH SPEAKS

Mayor Brough said, in part, that he was very much impressed with the address of Mr. Wheeler and that he was glad to see before him a body of business men gathered from all parts of the country to discuss business matters. He declared that this country is a republic and not a democracy, and urged the delegates to study the federal constitution, to determine for themselves what he meant by that remark. Continuing, he said that he was present because his problems, to a certain extent, are railway problems. In Toledo the street railway system is being operated under the plan of service at cost, and therefore the fares are determined by the amount of business which the company does. When he became Mayor on Jan. 1, 1922, he found the ridiculous situation of a practically municipally owned transportation system being run down because the city was permitting direct competition of jitney buses with that line. The city was interested because the fares depended on the receipts. He believed that a transportation system in a city the size of Toledo has necessarily got to be a monopoly. It is all right to have bus service and other forms of transportation, but they must operate simply as feeders and helpers to the one principal form of transportation which must necessarily be maintained if the people are going to have a big, growing city. Toledo has gone so far under its present plan that it is doing the paving between the tracks and taking the money out of the general fund; in other words, it is spreading the whole cost of that paving throughout the city on the principle, which he thinks is correct, that the transportation is absolutely a necessity for every one in the city regardless of whether he has a Ford or a Packard, or any other form of transportation, so that he can ride in a vehicle of his own and never patronize the street railway company.

TELEGRAMS READ

President Todd then read telegrams from Lord Ashfield, better known to American electric railway men as Albert Stanley, giving his greetings and best wishes for a successful convention, and also from Past-President P. H. Gadsden, who voiced regret that unexpected business detained him from attending the convention.

President Todd next introduced M. C. Brush, senior vice-president of the American International Corporation, Philadelphia, who took charge of the meeting during the symposium on public relations. Before introducing the speakers, Mr. Brush made a few comments of his own on this subject. His remarks and those of the other speakers appear elsewhere in this issue.

Wednesday Session

The Wednesday morning session was called to order promptly at 10 o'clock by President Todd. The first order of business was the presentation of a number of committee reports, and the following were presented:

COMPANY AND ASSOCIATE MEMBERSHIP

New company members for the year were reported by the committee on company and associate membership to number sixty-three, which is approximately 10 per cent of the number of the roll of Sept. 20, 1922. There was a loss of five railway members, a gain of ten manufacturer members, and fifteen companies were elected to the new grade of associate membership. The net gain in company members was twenty, the present total therefore being just two less than 600.

The association's advertising section was credited with substantial aid to the committee, particularly in the preparation of a display card embodying the emblem, adhesive seals for use on correspondence, and a booklet entitled "Why Belong to the American Electric Railway Association?" The campaign was carried on by dividing the country into local sections which were assigned to members of the committee. W. R. Alberger received honorable mention for bringing in a total of six railways and one manufacturer.

This report was signed by F. R. Coates, chairman; W. R. Alberger, F. G. Buffe, L. E. Gould, J. H. Hanna, P. N. Jones, M. B. Lambert, Henry H. Norris, W. S. Rodger, E. M. Walker, E. P. Waller, Rolla Wells and E. F. Wickwire.

CONSTITUTION AND BY-LAWS

For the committee on constitution and by-laws, the chairman, L. S. Storrs, referred to the letters sent to the membership on Aug. 9 and 28 regarding a proposed revision of the constitution and by-laws with respect to the number of regular meetings of the executive committee. The revision referred to consists in a change in the plan for holding regular monthly meetings to one involving a total of nine regular meetings during the association year. Three of the regular meetings are proposed to be held at the time of the meetings of the association, one immediately before the annual convention, one immediately thereafter and one at the time of the midyear meeting. The time and place of the remaining regular meetings would be fixed by the executive committee at its first meeting in the association year. Special meetings would be callable by the president or any five members of the executive committee, and seven voting members would constitute a quorum.

Mr. Storrs explained that while there has been an exceptionally large attendance at the monthly meetings during the past year and many matters of importance have come up each time for action, the general belief on the part of the executive committee was that the present plan allows too short a period between meetings and imposes an unnecessary burden of time and expense upon the members of the committee.

PUBLICATIONS

The publications committee came into existence with the adoption of the new constitution at the 1921 annual meeting. With the active co-operation of the executive secretary general direction has been assumed of editing all matters presented for publication.

Acting upon what appeared to be the general feeling, as expressed at the last annual meeting, it seemed necessary to make some changes in the editorial policy of *Aera*, and to accomplish this and relieve the executive secretary as much as possible it was decided to employ as editor a man having a broad experience in the publishing field as well as detailed knowledge of the industry. John W. Colton was selected. Improvement can be made only through the whole-hearted co-operation of everybody who has the interest of the industry at heart. Listed, the aims of *Aera* include the following:

To be an authoritative, strong, able, forceful publication.

To keep electric railway men fully informed of changing conditions.

To speak with authority on matters that affect the very foundations of the industry.

To interpret developments and weld together and harmonize the purposes of the industry throughout the entire land.

To be the official publication in which record is made of the work of the association.

To be the personal organ of every member of the association.

To publish in concise form statistics, quotations from reports, important court decisions and other matters that are vital in their effect on the industry, so as to assist executives in obtaining data needed for addresses before local clubs, chambers of commerce and the like.

To be intensely interesting not only to executives and officials but to the employees, company section members, public utility commissions and to the public, which is especially interested in the maintenance of electric railway service.

To be conducted so that every branch of the industry may learn something in it of interest, and every branch may learn what other branches are doing.

To teach the realization of the interdependence of all of the branches of the business.

To publish digested interpretive information on: new forms of franchises, new methods of control, newly developed vehicles for public transportation, new aspects of the ever-present problems of financing, competition to electric railways, legal principles governing protection of capital invested in public service corporations, important ventures in municipal ownership and operation, and other developments.

Not in any way to compete with the present excellent trade publications.

The method of treatment proposed is: To be dignified without being dull, to be snappy without being impertinent and offensive, to be earnest and sincere without being solemn, to be constructive, helpful, courageous and informative.

The report was signed by L. S. Storrs, chairman; Harlow C. Clark, E. C. Faber, M. B. Lambert, C. E. Morgan, Charles C. Peirce, A. M. Robinson and Martin Schreiber.

Following the presentation of this report Mr. Storrs appealed to company executives and members of the association in general to send advice to help the committee and editor of *Aera* to find the best and most useful place in the field for *Aera* service.

The report of the publicity committee was then presented by J. N. Shannahan, its chairman. An abstract is given below:

PUBLICITY

The publicity committee has continued to direct the work of the advertising section of the association, in co-operation with the committee of one hundred. It reports a greatly widened interest in public relations, publicity and advertising work in the industry and a marked contrast in public conditions to those when the section was organized two years ago. Out of 239 companies, representing one-half the mileage of the country, 207 are advertising in newspapers or through company channels or both, and only thirty-two are doing no advertising. These thirty-two represent only 5 per cent of the mileage of the 207. The advertising section is called upon frequently by national news associations, newspapers, magazines, special writers and others for help in the preparation of special material, and its news releases enjoy a high standing.

The service performed by the section includes the following:

Preparing booklets and advertising material dealing with current situations and forwarding this matter regularly to all electric railway companies in the United States.

Giving counsel for special campaigns when requested by individual companies.

Co-operating with the committee of manufacturers in preparing goodwill electric railway advertising literature.

Issuing a monthly bulletin called *Truth*, containing news items, editorial comments and other material to be used in house organs, speeches, interviews, etc.

Co-operating with state committees on public utility information, the N.E.L.A., A.G.A., and other national organizations.

Preparing association advertising copy for membership drives, conventions and other activities.

Suggesting and arranging special advertising features for regular occasions, such as National Electric Railway Day.

The director also attends state and local conventions and meetings and talks on public relations and advertising problems.

The report gives a list of the booklets, posters, etc., issued during the year, an elaboration of a number of the services mentioned above, and an account of the organization of a publicity men's committee, consisting of the publicity men of a number of large companies, to offer advice to the publicity committee as to methods for improving its work. In conclusion the report refers to May 4, 1923, as marking the thirty-fifth anniversary of the completion of the first commercially successful overhead trolley line in the United States and recommends that this be made the occasion of a national celebration of the greatest possible magnitude. The members of the committee on publicity were: J. N. Shannahan, chairman; Barron G. Collier, vice-chairman; P. S. Arkwright, Walter A. Draper, L. E. Gould, W. F. Ham, S. W. Huff, H. D. Shute and L. S. Storrs.

A Telegram from

CHARLES M. SCHWAB

to the Convention
Thursday said:

"We have great reason to be optimistic today over the future economic condition of the country. We have been through a trying period, but my own personal feeling is that we shall emerge once again into the sunlight of good business. The period through which we have just passed has been to business as a period of training is to an athlete. Sacrifices have been made by almost all of us, but it is well to remember that it is only by sacrifice that we progress. The personal note which I wish to sound at the present time is that the opportunity of this country to continue to be the workshop of the world to an even greater extent than ever before is limited only by her capacity for hard work and sound business judgment. Qualities which have made America great will make her still greater in the future."

Mr. Shannahan said in addition, to indicate the effectiveness of the work of the director of the advertising section, that with nineteen conventions in Chicago already on the third day of the convention more than 4,000 newspaper column inches of publicity on the convention had appeared in Chicago papers.

The report of the committee of one hundred was presented by A. W. Brady in the absence of Guy E. Tripp, the chairman of the committee. An abstract will be published later.

W. H. Sawyer, chairman of the committee on co-operation with state and sectional associations, presented the report of that committee. An abstract follows:

CO-OPERATION WITH STATE AND SECTIONAL ASSOCIATIONS

The committee on co-operation with state and sectional associations is, as the name indicates, a committee on co-operation serving as a connecting co-operating link between each of the different state and sectional associations and between these associations and the American Electric Railway Association. This committee is a new committee and has no defined functions other than to co-operate to the greatest extent practicable.

Each member and each association has been requested to furnish each and every other member and association with copies of all letters, data and information sent out to its own membership, the thought being that in this way each association could be posted and informed as to the functioning of each other association. The plan if strictly followed out will be very helpful and will make this committee a most important one.

The committee has been somewhat disappointed that up to the present there has not been the co-operation between the different associations that should be. It has not been feasible to reap the full benefit from the possibilities of this committee due to the fact that a number of the state and sectional associations have not considered that what they were doing was important enough to keep others advised.

In addition to advising each other as to association details, one of the functions naturally falling to this committee should be to keep the parent association advised of such legislative and regulatory proposals as are of national interest. The parent association can then co-operate and can also assist with data and information as to what has been done elsewhere along the same lines.

The report was signed by W. H. Sawyer, chairman.

The report of the committee on company section and individual membership was then made by Martin Schreiber, its chairman.

The feature of the morning session was the report of the committee on nominations and the election of officers. The list of officers elected is given elsewhere in these columns.

The next report received was that by the committee on valuation, presented by J. P. Barnes, chairman. An abstract is presented herewith.

VALUATION

The committee on valuation reported that the most recent decisions uphold "fair value of the property . . . at the time of the inquiry" as the proper base for rate making. There is still much confusion in the use of the terms "depreciation" and "deferred maintenance"; this, however, is more a question of accounting than valuation except for its effect on valuation made on a basis of "cost less depreciation."

The principal work of the committee has been to carry on the study recommended by the 1921 committee of "yardstick" methods of valuation. Details of two particular valuations show the efficacy of this method:

1. The Connecticut Company (for specific details see *Electric Railway Journal*, vol. 57, pages 947 and 985, issues of May 21 and May 28, 1921). Two principles were the basis of this valuation:

a. The determination of hidden quantities and fixing of unit cost are matters of opinion and different results may be obtained by different values.

b. While there is a variation in minor details of property, the major part of these differences do not appreciably affect the total cost.

These two principles led to two conclusions:

a. There is little warrant for making a highly detailed appraisal of a part of the property if at much less cost these facts can be found with at least the degree of accuracy obtained in the case of another and considerable portion of the same property.

b. Specific record of each minor difference is unnecessary if average figures can be applied to groups of such differing elements.

The committee gave reasons for the accuracy of yardstick methods, and indicated the limitations within which the methods may be applied. Checks on the method are given from work done under Professor Swain where both yardstick valuations and figures of cost were compared, showing variations of from 0.7 to 5.6 per cent.

2. The Louisville Railway, of which six rapid valuations and one detailed valuation were made by various agencies, the six rapid valuations giving an average figure 3.4 per cent higher than the detailed valuation.

The committee recommended:

a. That wherever applicable the yardstick method of valuation be employed.

b. That the committee for next year endeavor to complete arrangements with the National Association of Railway and Public Utilities Commissioners, in a search for broad, fundamental principles of valuation.

c. That a study be made of "price trends" and a method worked out by which they may be used in determining the "fair value of the property useful and used by the company, at the time of the inquiry." The report was signed by: James P. Barnes, chairman; Arthur W. Brady, Robert M. Feustel, Williston Fish, J. H. Hanna, W. H. Maltbie, A. T. Perkins, Albert S. Richey, W. H. Sawyer and Paul Shoup.

Following this report the following letter from Albert T. Perkins, manager for the receivers, United Railways of St. Louis, was read:

"The first of the three recommendations in the report of the committee on valuation reads as follows: 'That wherever applicable the "yardstick" method of valuation be employed.' While signing the report of the commitee I felt that some interpretation of the qualification 'wherever applicable' should be made. My understanding of that qualification is about as follows:

"*Yardstick methods are applicable:* (1) when valuations are carried out jointly by corporations and commissions for taxation assessment purposes, when no third parties appear; (2) when valuations are carried out jointly by corporations and commissions for rate-making or reorganization purposes when no third parties, such as municipalities, civic associations, etc., are contestants, and when court review is not probable; (3) when valuations are made by representatives of financial institutions; where the general character and extent of plant are to be appraised for financial standing.

"*Yardstick methods are not applicable:* (1) when valuations for rate-making or reorganization purposes are carried on before public commissions and the extent and value of the property are contested by third parties, such as municipalities, civic associations, etc.; (2) when court review of the results will probably be necessary.

"These explanations seem to me to be quite necessary, especially when political considerations become a factor. Unfortunately there seem to be some 'engineers' who seem willing to make up so-called 'valuations' on 'yardstick' methods in almost any way to meet the desires of politician clients. That sort of thing has to be met in controversies before public service commissions and courts. In such cases you might have your own 'yardstick' valuations by the most reputable engineers you can find and then you would have to establish before the commission or before the court the fact that your own engineers are reliable and that the engineers of the other parties are unreliable and unworthy of credence, and perhaps more difficult still, you would have to establish that same thing in the public press."

W. H. Sawyer, East St. Louis, a member of the committee, said that he did not agree with Mr. Perkins. As a business proposition he thought railways should approach a greater use of the yardstick method as a matter of good business. He said he thought that that was largely the view of the members of the committee.

W. H. Maltbie, Baltimore, also a member of the committee, said that he agreed with Mr. Sawyer. There is a certain type of court which does not now accept the yardstick method as sufficient evidence, and a certain type of cross-examination seems to underlie the method, but that is only a temporary condition and even then does not actually militate against the advantageous use of the method. Mr. Maltbie said he thought it was also useful with third parties present and interested. Of course, as Mr. Maltbie pointed out, in Maryland, court cases have to start from the beginning anyway so that even when appeal is taken to court, the fact that yardstick methods have been used in lower hearings creates no embarrassment. However, Mr. Maltbie urged that this association carry on the work so that finally yardstick methods will be recognized by commissions in their practice and eventually established by statute.

E. F. Wickwire, chairman of the committee on co-operation of manufacturers, presented the report of that committee with his usual witticisms. An abstract follows:

CO-OPERATION OF MANUFACTURERS

This committee was appointed and began its work less than a year ago, but has sent out approximately seventy-five separate pieces of electric railway propaganda to all manufacturing members of the association and to various other manufacturers who come in contact with electric railways, altogether to the extent of more than 700 individual companies. Many manufacturers approved the plan, but did not know how to go about it. To show this has been part of the task of the committee. A booklet which it has issued entitled "The Truth About Electric Railways" sets out in concise manner the high points of the electric railway situation. This booklet was distributed through the manufacturers to virtually every salesman of the electric railway supplies in the country and many factory workers received copies. A bulletin called "Truth" containing various news items and editorial comments about electric railways has also been issued.

Progress is evident. Some manufacturers have been presenting excellent articles to the general public through the medium of advertising space in the general magazines. Others have been sending out inserts with dividend checks, reminding the stockholder that he is serving his own interests when he helps the electric railways to get fair treatment. These are only a few of the various ways in which the manufacturer can spread the gospel of fair play to the electric railways. Mr. St. Clair of the association staff and Mr. Kelsey, publicity director of the Community Traction Company of Toledo, have made personal visits to many of the manufacturers in connection with this work. Response to these efforts has thus far been very gratifying. A series of colored posters which strike at different phases of the problem and drive important points home have been sent to manufacturers for use on factory bulletin boards. Special slogans have been suggested, such as: "The bus may be all right in its place, but not in the place of the trolley." A large number of manufacturers are cooperating and their efforts are sure to show results.

One railroad man has suggested that *Aera* publish an "Honor Roll" containing the names of the manufacturers who are showing evidence of the fact that they are taking an active part in the work of the committee. The idea is a good one and the list will appear shortly.

The report was interspersed with numerous anecdotes to drive the different points home and concluded with the plea that all companies make sure that they are doing justice to the job.

The report was signed by E. F. Wickwire, chairman; P. N. Jones, E. C. Faber, J. C. McQuiston and Frank Gale.

RAILWAYS SHOULD HELP

C. E. Morgan, Brooklyn City Railroad, in discussing the report, said that the report should cause the manager of every electric railway company to ask himself these questions:

"What have I done in the way of rendering assistance to these manufacturers or to their committee?

"Have I given the manufacturers located or represented in the territory served by my company the necessary ammunition to enable them to work among their employees, clubs, Chambers of Commerce and other bodies in our interest?

"What have I done within our own organization to create the spirit of co-operation among individuals in departments and with the public, so that our organization will be working with the all-together spirit and move as a unit in efficiently accomplishing the desired results?

"How can the manufacturers or other bodies bring about their results if we do not co-operate with them?"

"Can the operating official, with all sincerity, expect the manufacturers to be active in spreading education about the railway if he knows in his own heart that he is making no effort to put his own house in order by properly schooling his own forces? Consider the case of an ex-employee of a manufacturing company who has been taught to respect and appreciate the railway service in his city. He enters the service of the railway and finds that his fellow employees of the railway company know little or nothing of the objects that are to be attained. Or consider the case of a former employee of a railway company which has given no attention to this important matter and who enters the service of a manufacturer who has been and is continually bringing forward the necessities of the railway service. The mental attitude of the employee will sometimes cause the manufacturer to question the importance of the subject. Or picture the factory employee leaving work and boarding a trolley car after having listened to a talk or reading a shop bulletin pertaining to the railway. With this on his mind, he asks the conductor or motorman about this or that, but finds that the railway's representative does not understand what he is talking about and is unable to give him any information, other than perhaps that which concerns his immediate duties in connection with the operation of his car. The factory employee will begin to discount the good work that had been done by the manufacturer."

"Remember," Mr. Morgan continued, "there is no 'just as good' substitute for good will, when lost. It can sometimes be regained by expending a large amount of time, labor and money. Also, that there is no public utility that has opportunities compared with the electric railway in that the employees, such as conductors, motormen, inspectors and agents, are in daily contact with a great number of the population served.

Results of Election

***President.*—C. D. EMMONS, president United Railways & Electric Company, Baltimore, Md.**

***First Vice-President.*—BRITTON I. BUDD, president Metropolitan West Side Elevated Railways, Chicago, Ill.**

***Second Vice-President.*—J. N. SHANNAHAN, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.**

***Third Vice-President.*—FRANK R. COATES, president Community Traction Company, Toledo, Ohio.**

***Fourth Vice-President.*—W. H. SAWYER, president East St. Louis & Suburban Railway, East St. Louis, Ill.**

***Treasurer.*—BARRON COLLIER, president Barron G. Collier, Inc., New York City.**

Members of the Executive Committee representing railway companies whose terms expire in 1925.—PAUL SHOUP, president Pacific Electric Railway, San Francisco, Cal.; JAMES P. BARNES, president Louisville (Ky.) Railway.

Members of the Executive Committee representing manufacturer companies whose terms expire in 1925.—H. D. SHUTE, vice-president Westinghouse Electric & Manufacturing Company, East Pittsburgh; A. A. HALE, Eastern Representative Griffin Wheel Company, Boston, Mass.

This being the case, had we not better keep in touch with the car rider and learn whether we are serving him to his satisfaction? Our employees, after all, are the ones who really mold public opinion. When asked a question about the street railway upon which they work, do they say 'the company' or 'our company'? To obtain proper results, every railway company should establish policies which will bring about a feeling of mutual confidence and a desire to co-operate in the minds of all its employees from the highest to the lowest, its patrons and the citizens of the communities served."

The reports on mail pay, national relations and of the joint committee of national utility associations were then presented. Abstracts of these reports appear below in the order in which they were presented:

MAIL PAY

The report of the committee on mail pay was submitted by L. H. Palmer, chairman. It said that in March the joint claims in the hands of the Post-Office Department and of the association were sent to mail-carrying companies. A number of returns have been received and the data contained therein are being tabulated. The answers, however, are not in very good shape, and this has required considerable additional correspondence on the part of the counsel of the committee. The coming year ought to see the completion of the tabulations and the presentation of the case before the Interstate Commerce Commission. In conclusion it might be said that the calculations so far received indicate that the electric railways are entitled to a further substantial increase in mail-pay rates.

The report was signed by the chairman and C. L. S. Tingley, J. K. Jeffries, Samuel Riddle, W. S. Rodger, R. A. Leussler, Gordon Campbell and H. D. Weatherwax.

NATIONAL RELATIONS

The work of this committee has been quite varied. In addition to a large amount of correspondence and many personal conferences conducted, attention was given to a number of matters before the Interstate Commerce Commission and committees of Congress.

One of the most important matters before Congress calling for the attention of the committee was the so-called Bacharach bill. The practical effect of this bill, if it had been enacted into a law, would have left entirely without remedy, in so far as a trial of the facts was concerned, except in the local courts, the adjudication of public utility rate matters. Other utility organizations also presented arguments opposing the bill and nothing has been heard from it since the date of the final hearing on June 8. In connection with the railroad interchangeable mileage book, the committee was instrumental, with others, in an amendment permitting the commission to exempt, either in whole or in part, any carrier where the peculiar circumstances shown to the commission should justify such exemption. This bill with amendment has since passed. The committee observes that probably many electric railway companies will desire to co-operate in the use of the interchangeable mileage ticket, provided it is issued at such a rate and under such rules and regulations as will not be injurious to their business.

The committee appeared before the I.C.C. in a proceeding calling for a decision of jurisdiction on the question of depreciation between the Columbia Public Utilities Commission and the I.C.C., the matter involving to a greater or lesser extent the general proposition of whether such account shall be controlled by the I.C.C. or by the public service commissions of the various states. At the time of hearing for general freight rate reductions, the committee filed a brief with the I.C.C., setting forth the situation as it touched the various classes of interurban electric railways. Electric railways have not been compelled by the action of the I.C.C. to reduce their freight rates except in a few special instances.

The committee sent out to member companies two circulars issued by the Department of Internal Revenue, relating to the transportation tax. It also supplied the joint Congressional Commission of Agricultural Inquiry with electric railway data which otherwise would have had to be supplied by individual companies at great cost. The committee gave evidence in Congress of the desirability in the revenue bill of 1922 of omitting the transportation tax. It also arranged for appearance in the I.C.C. hearing on the efficiency of power brakes, but it developed that the examiners did not intend to consider the kind of brakes used on electric cars. Reference was also made in the report to taxes under the transportation act of 1920 and the joint coal committee.

The report was signed by Charles L. Henry, chairman; W. R. Alberger, Arthur W. Brady, Henry G. Bradlee, C. D. Cass, B. C. Cobb, Samuel M. Curwen, John J. Stanley and Lucius S. Storrs.

NATIONAL UTILITIES ASSOCIATIONS

The Joint Committee of the National Utility Associations was organized in the latter part of 1920. Its membership is composed of from seven to nine representatives each of the American Gas Association, American Electric Railway Association and National Electric Light Association, and its purpose is to act jointly for the three associations named in matters where their interests are equally concerned and thus avoid the duplication of effort that would result from the independent action of each association. The officers of the committee are Randall Morgan, chairman; Sidney Z. Mitchell, vice-chairman; and Oscar H. Fogg, secretary. Among its active sub-committees are the following: Federal taxation, P. H. Gadsden, chairman; public utility fuel, J. W. Lieb, chairman; public utility financing, S. Z. Mitchell, chairman; public information, M. H. Aylesworth, chairman.

First among the matters of importance in which the committee has been active during the current year have been the questions of federal taxation, the bill introduced in Congress (H. R. 10212) designed to restrict the power of injunction by the federal courts, and the present and still serious coal emergency.

In the matter of federal taxation the commmittee approved the following program: First: Any sales tax passed by Congress should follow the example of the French and Canadian acts and exempt regulated industries. Second: If a sales tax is adopted it should provide sufficient revenue to enable the elimination of the existing surtax and excess profits tax on individual and corporate income. Third: On the question of the normal income tax the public utilities should urge that the normal income tax on public utilities should not exceed the present rate. This is in line with the report of the taxation committee of the Industrial Conference Board. Fourth: Any tax on undistributed earnings of corporations should be so worded as not to apply to earnings which are reinvested or held for reinvestment in the property within twelve months after the year in which they accrued, or which, together with the earnings distributed, do not exceed say 10 per cent return on the value of the property. Fifth: In the event the sales tax is not passed, an attempt should be made to have reduced the very high registers of the surtax on personal incomes on the ground that the present registers are so confiscatory that they are defeating the purpose for which they were created, namely, to raise revenue, and the longer they continue to exist in force, the more they will defeat that end.

The sub-committee has co-operated with various other national organizations which are opposed to the continued issuance of tax-exempt securities and are united in demanding an appropriate amendment to the Constitution, and the action of these organizations, the indorsement of Secretaries Houston and Mellon and the strong recommendation of the President demonstrate that public opinion has been aroused to the evil of this large volume of tax-exempt securities.

Representatives of the joint committee appeared in opposition to the Bacharach bill at public hearings held in Washington, and the sub-committee on fuel has taken an active part in the present coal crisis. In public information the activity of the three associations has been to some extent co-ordinated and it is felt that particular benefit has been derived thereby. These associations as well as the joint committee enthusiastically support the work of the state committees on public utility information and render them all possible assistance. Plans have been discussed for the more uniform preparation of statistical and other educational information by the national associations for the use of the state committees and in any other educational activity.

The report was signed by Randall Morgan, chairman; Britton I. Budd, Joseph K. Choate, Edwin C. Faber, Lucius S. Storrs and Robert I. Todd.

President Todd then introduced Hon. Walter W. Warwick, Assistant Director of the Budget, United States Treasury, Washington, D. C., to speak on the subject "Electric Railway Financing." Judge Warwick's address will be found on another page.

At the conclusion of Judge Warwick's address, Mr. Todd said that the part on the program known as "Past-Presidents' Day" had now been reached. He himself might perhaps use the salutation of the Romans "About to die I salute you." Nevertheless, this was not the actual situation. When a president returns to the ranks there is much that he can do of great value to the association, as shown by the services of the past-presidents. He then invited the past-presidents of the association to take seats on the platform. Those who did so, with their terms of office, were: John M. Roach (1899-1900), Walton H. Holmes (1900-1901), Arthur W. Brady (1910-1911), Thomas N. McCarter (1911-1912), George H. Harries (1912-1913), Charles L. Henry (1915-1916) and L. S. Storrs (1916-1917).

Mr. Todd then introduced Mr. Roach as the senior past-president and Mr. Roach welcomed the association to Chicago in behalf of the Chicago Surface Lines. He then explained that General Harries was in charge of the remainder of the session. General Harries then took the chair and asked the audience to stand as a mark of respect to those who had passed beyond. After a few impressive words on the past-presidents who had died, he introduced with a few chosen words each of those who were present. Each gave a short address.

In conclusion General Harries presented a gold watch fob to Thomas E. Crossman, the official reporter of the association. He explained that Mr. Crossman had been the official reporter of the association for forty years, having reported the first convention and all subsequent ones, and he paid a high tribute to his ability. Mr. Crossman replied briefly and the meeting adjourned.

Thursday Session

The final session of the American Association was called to order at 10:15 o'clock Thursday morning with President Robert I. Todd in the chair. The first order of business was the presentation of the report of the committee on education, which had been postponed from the Wednesday period. This report was presented by the chairman, Edward Dana of Boston.

EDUCATION

The committee's work this year was largely along ten lines, of which the first four related to co-operation with educational institutions and six to educational efforts within the railway company's organization. In speaking of co-operative courses with universities and colleges, the committee pointed out that a limited number of college men might be employed during the summers following the first three years at college, to take the places of the regular employees who were on vacation, but a much better co-operative plan would be to arrange a course throughout three or four years of the student's time at college, during which he would spend regular periods of from two to three months with the railway, going through a course of training in different departments. Both Massachusetts Institute of Technology and Harvard University have such co-operative courses with industrial concerns and the Massachusetts Institute of Technology has recently proposed a detailed course for the training of men for railways situated within three or four hundred miles of Boston. The University of Cincinnati and Marquette University also have successful co-operative course with electric railways.

Similar co-operation with high schools and trade schools in either day or night courses is desirable for the training of minor executives and skilled workmen. There are several such courses in the vicinity of Boston, and similar courses are available in other large cities. Street railways should take an active interest in seeing that their employees avail themselves of such facilities. Certain large manufacturing establishments serving the electric railway industry also have a co-operative plan for the exchange and development of promising young men. Arrangements have been made by which one or two such young engineers have worked as car inspectors, car wiremen or on testing work of various kinds for six months and young men in the railway employ have had the advantage of six months' training in manufacturing plants.

The state university extension plan is also available in most cities for training in mathematics, drawing and electricity. In one state the Department of Education offers a special course for the training of motormen.

Within the organization the report recommends that the supervisory force on an electric railway should have instruction in the fundamental economic problems of the industry in general and of the property employing them in particular. They will be better equipped to handle their own jobs and to grow into executive jobs, and some of the information that they gain will reach the rank and file of the employees and the patrons of the railroad they work for. Such instruction can be given by lectures from a specialist or specialists preferably from outside the railroad organization. The attendance should be voluntary, and the lecture followed by discussion. Such a course of study will show which employees are sufficiently interested in railway problems to be considered later for promotion to executive positions.

During the winter of 1921 and 1922 the Chicago Elevated Railroads arranged for such a series of lectures to be delivered by a professor of commercial economics. The average attendance was 152 and the management is so well pleased with the work accomplished that further efforts along the lines of a school for future executives will be made at once.

One excellent way of assisting in the training of executives is by company section meetings. In connection with this work, there is the opportunity of using the Question Box. Employees can be invited to submit such questions as they desire to have answered, and occasionally difficult problems reach a solution through this method.

There is little new to report on the provision of shop and departmental apprentice courses mentioned in the report on apprenticeship systems submitted to the Engineering Association in 1921. The tentative plan promulgated by the committee provides for the training of two classes of employees—apprentices and engineers. For the development of engineers the committee recommended the Schneider plan of co-operative education, which has been proved a success. A survey of the various systems of training for trades apprentices indicates that there is little hope for a standardized method of training which would meet all conditions found in the electric railway industry.

Much can be done in the distribution of company and association literature of an educational nature. Literature of this nature not only is of direct benefit but should have a psychological effect upon the employee to the extent that he would realize that his employer is taking an interest in him, and he in turn will take more active interest in the problems.

Electric railways that have any number of employees who do not speak English may well take up an Americanization program, the ultimate objective of which is that every employee shall understand, speak, read and write English and become an American citizen. Some excellent work along these

Looking North on Michigan Avenue, Chicago lines has been done by the Chicago, North Shore & Milwaukee Railroad.

Finally, there should be provision of instruction along the lines of courtesy to the public. In these days of standardized employment, the fostering of the spirit of courtesy is made rather more difficult by the fact that the individual employee does not feel that his reward is directly commensurate with his own effort. This really is not true, and an important task for the management is to make each employee realize that if he is courteous this fact will rebound to his own progress. While as a conductor a man may not be rewarded financially beyond the agreed-on wage scale, he does not need to remain a conductor all his life, but has ahead of him any opening up to presidency. He must somehow be made to realize this.

Under the head of "Existing Difficulties of the Present Situation," the committee says that the high schools, trade schools and the university extension departments report that the men already in the employ of electric railway companies do not enroll in the courses offered, while the universities and colleges report little interest on the part of students to prepare for work with the electric railways. On the other hand, the trade schools and high schools have done very little to study the ways and means of educating the present personnel of electric railways for higher positions. The courses offered by these schools are in all cases merely general courses in mathematics, drawing and science. Those in charge of courses at colleges and universities must be made to appreciate the possibilities and need for high grade engineering in electric street railway operation.

The greatest service which can be rendered at the present time is to bring together these two groups, the one responsible for the operation of electric railways, the other for the education of engineers and operators. The type of men desired for each position should be determined and stated as accurately as possible. Methods should then be inaugurated for the selection of men of the right type and educational plans drawn up for giving the men the necessary training and education. The educators should be educated concerning the opportunities which exist in the electric railway field and the training which men should have in order to fill these positions.

An appendix gives theses by committee members and others. Professor Norris briefly outlined what has been done in previous years. Professor Timbie explained the M.I.T. plan for training electric railway executives. A co-operative course in electric railways, similar to one which has been in successful operation for three years in electrical engineering in connection with the General Electric Company at Lynn and the Edison Electrical Illuminating Company of Boston, was outlined and the curriculum given. Mr. Von Phul suggested that the association establish a central research agency to consider employment methods somewhat like the work of the Industrial Relations Association of California. The association might also encourage the preparation of text books on electric railway methods and the placing of electric railway equipment in schools. C. S. Coler compared education to lubrication, which helps to create an understanding between the axle and its journal. A. E. Potter recommended that *Aera* publish a course of study lessons. M. B. Lambert recommended among other things the encouragement of study among employees by the publication of a pamphlet explaining why men failed to study after they leave the common school and by the establishment of a four or six-year educational course for all men who desire to enroll. Thomas S. Wheelwright told about the work done by the Virginia Railway & Power Company, including the educational work conducted under the direction of the Y.M.C.A. A summary of previous educational work done by the American Electric Railway Association and its affiliated associations is also part of the appendix.

The committee was: Edward Dana, chairman; Edward J. Blair, Thomas Finigan, M. B. Lambert, Henry H. Norris, F. R. Phillips, A. E. Potter, Thomas N. Schoepf, Edward A. West and Thomas S. Wheelwright.

DISCUSSION ON EDUCATION FOR ELECTRIC RAILWAY SERVICE

In discussion on this paper Prof. W. H. Timbie of the Massachusetts Institute of Technology, Boston, said that, being a more or less constant attendant at technical conventions, he was surprised here to find so few men from educational institutions. While he did not believe that a lack of attendance of college professors at the convention was the sole lack of success of the electric railway industry, nevertheless there was one thing which professors can do.

Railways, he pointed out, need both men and money. College professors form the last class from whom money might perhaps be obtained, but they do have an influence and touch with the best most "trained" minds in the world. Note, he pointed out, that he did not say "best" minds, but the best trained minds.

Professor Timbie went on to outline the work being done at the Massachusetts Institute of Technology in bringing in at the right time your college men to industries. In other words, the co-operative course between industries, that is railways, and educational institutions tends to bring the right kind of college men in contact with the utility and makes him available upon graduation.

Edward Dana spoke of the hope which he on the Boston Elevated had for good results to be obtained from the arrangement which the Boston Elevated made with the Massachusetts institute for co-operative work in training men.

The next order of business was the presentation of the report of the committee on trackless transportation by H. B. Flowers, Baltimore, chairman.

TRACKLESS TRANSPORTATION

The committee on trackless transportation reported its belief that all of the transportation requirements of any community should be furnished by one agency and that that agency should be the electric railway company. It alone has the trained organization and ripe experience required for handling passenger transportation problems and the development of any other agency would result merely in a duplication of service which could produce only a higher cost of transportation for the public. We have already to a large extent convinced the public that our business is a natural monopoly, as is evidenced by many rulings of state commissions in eliminating or refusing permits for duplicate service. Hence it is our duty, as public servants charged with the responsibility for conducting the highway transportation in our respective communities, to study and consider the availability of every feasible unit or method for furnishing this service.

Railless transportation is recognized by the electric railway industry as an aid to transportation if properly fostered, and is recognized by regulatory authorities as a menace unless properly supervised and controlled and required to pay its just share of taxes and public charges. The automotive industry is now producing vehicles of a design suitable for passenger transportation service. In the light of these findings the questions arise as to the economic and practical field of the railless vehicle.

It is recognized that the electric car running on rails is the most essential, reliable and economical method of urban, suburban and interurban travel, considering the transportation problem as a whole and especially for mass transportation. This condition arises largely from the fact that the operating cost per passenger is higher for bus operation than with electric cars.

There is, however, a field in transportation in which the railless vehicle can furnish service satisfactory alike in operation and economy; that is, where the traffic is so light that the higher cost per passenger of operating the bus is offset by the relatively high fixed charges per passenger with such light traffic, which result from the electric railway's investment in track. The possibility of utilizing the motor bus or trackless trolley should therefore be kept in mind by electric railway operators, either where they are confronted by the necessity of extending transportation service into sections where traffic will be light or in the economically similar situation of being required to rebuild tracks on a line where the traffic is too light to warrant the track investment. In the latter case the economic procedure might be to abandon the track and install bus service.

One of the most important matters affecting the cost of bus operation is that of special taxes or charges by states or municipalities for the wear on pavement or road surface caused by bus operation. This question is receiving every year more study by state legislatures and other governing bodies, resulting in many cases in recommendations or legislation increasing these charges. Governmental policy on this subject is still in too indefinite shape to admit of a general statement at this time, other than to say that the matter should be weighted in considering the adoption of railless transportation in any locality, and to recommend the further study of this phase of the subject by our association.

A committee of the Engineering Association was instructed to study the subject of railless transportation from the viewpoint of design, and has collected data which are on file at the headquarters of the association. The committee feels, however, that the development of motor and trackless trolley buses as adjuncts to the electric railways is still at too early a stage to warrant the recommendation at this time of standards of design. Individual companies must be governed by their local requirements, working in collaboration with the various manufacturing interests. A corresponding committee of the Transportation & Traffic Association has also collected valuable data which are on file at the association headquarters.

The committee has given some consideration to the effect of bus service upon the financial situation of the electric railways. The basic transportation service in any community is and will be furnished upon rails. Trackless service will be found supplementing but not competing with that of the electric railway. If the services of both means of transportation are co-ordinated, the net return of each will be reflected in the net return of the electric railway. New capital is annually required in the operation of a street railway. Part of this new capital may well be used in the development of trackless service in the field above mentioned. Present investment in the electric railway is thereby conserved, the growing demands for service met and the return to the investor stabilized.

In addition to the function of supplementing the street railway service at the same rate of fare, there has been found to exist in some of the larger cities a demand (at a higher rate of fare) for a transportation service in addition to the electric railway which shall insure a seat for every passenger. Such service is similar to that furnished by the Fifth Avenue Coach Company in New York and by others in Chicago, Baltimore and other cities. This service is furnished by buses; it costs more to furnish than the existing electric carfare will pay for, but it is believed to be proved, in this and other kinds of business, that the public is willing to pay a rate of fare which will compensate for the cost of the service it wants. Further study of development in the design and construction of railless vehicles and their adaptability for highway transportation should be carried on by an association committee.

The report was signed by H. B. Flowers, chairman; R. E. Danforth, W. J. Flickinger, S. W. Greenland, C. W. Kellogg, R. V. Miller, H. A. Mullett, D. W. Pontius, H. B. Potter and J. N. Shannahan.

Discussion of Trackless Transportation

In discussion on this work, Zenas Carter, of the White Company, Cleveland, Ohio, said that he realized from contact during the convention with electric railway men that this question is disturbing to many and vital to many. In a great number of cases the discussion had been inspiring, as viewed by a motor manufacturer, with reference to the constructive attitude taken by many electric railway officials. Mr. Carter pointed out that his company was confident from its study that electric railways need have no fear from the motor bus as a competitor or otherwise, provided electric railway men in their organization are alive to their responsibility to provide transportation in their community, in line with the report of the trackless transportation committee. Motor bus men agree fundamentally with the report. It is unfortunate only that in many places electric railway men have not wholly visualized their opportunities.

Mr. Carter went on to say that of course it is possible to transport in practically all cases passengers and freight at less cost by electric motor power than by gas. There are some exceptions in light traffic, of course, where the actual cost is less by motor vehicle. Electric railways have the exceptional opportunity of being the transportation people on the ground, and some of them have had wonderful foresight and vision, having taken steps five years ago in motor vehicle development because they realize the transportation possibilities.

Mr. Carter then went on to describe the Youngstown-Warren installation of the Pennsylvania-Ohio Electric Company, and the Milwaukee-Fond du Lac installation of the Milwaukee Electric Light & Traction Company, which have been described at various times in *Electric Railway Journal* and *Bus Transportation.* He pointed out that on the Pennsylvania-Ohio lines between Youngstown and Warren the company had been operating for some time and the average load factor over the period had been 73 per cent and on Friday and Saturday, Sept. 29 and Sept. 30, the load factor on this particular line was exactly 100 per cent.

W. H. McGrath, of the Puget Sound Light & Power Company, which owns the Pacific Northwest Traction Company operating in and around Seattle, Wash., said there was one phase of the trackless transportation business which had been omitted in the consideration by the committee. This phase was that of considering the improvement of the financial condition of the railways themselves. In addition to putting money in the stage business itself and in addition to whatever benefits may be derived therefrom the greatest benefit, judging from the experience around Seattle, is that from co-operation with the stage men themselves. There is a very definite field, particularly in those states where there is a provision for a certificate of public convenience and necessity for starting new transportation lines, which should not be overlooked. In Seattle, the company has adopted the policy of owning the trunk line facilities, both interurban and stage, and offers facilities to independent operators at the various terminals, ticket facilities, joint advertising of schedules, etc., and as a result there has been a great use of these depots by independent operators who bring in large numbers of passengers to the interurban lines. As a result there has been an improvement of 40 per cent in the net earnings of the interurban. This is a result of the operation during only the past six months. The policy of the company is to co-operate with the others. The result is more earnings to the interurban, more money to the independents themselves, and finally, a general improvement of the whole transportation condition of the community as a result of the example set by the company itself.

The next order of business was the presentation of the report of the committee to draft a proposed uniform motor vehicle law, presented by C. D. Cass, Waterloo, Iowa, chairman.

Report of Committee on Uniform Motor Vehicle Regulatory Law

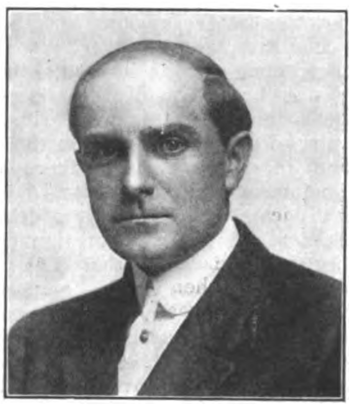
The committee undertook to study motor bus and motor truck operations with a view to recommending a uniform regulatory law that might be useful in formulating fair and effective motor bus and motor truck regulations. The proposed bill requires a certificate of necessity and convenience before a motor bus company can commence operation.

The study shows that there was no uniform method of taxing motor vehicle common carriers or of securing permits for operation. The committee held that inadequate taxation for the use of public highways results in a public subsidy for such carriers. With this viewpoint the committee determined that a ton-mile tax for all motor vehicle common carriers, whether passenger or freight, would provide funds of an amount that would represent the actual deterioration of the highways caused by this class of carriers.

The bill as drafted first defines a motor vehicle, then a motor carrier and a public highway. It vests the state utility commission with power to supervise the rates, accounting practices, schedules, etc., for all motor carriers. A certificate of convenience and necessity must be secured from the commission before any motor carrier can start operations. Revocation of a certificate can only be made by the commission after a hearing. It may be suspended, altered or amended, however, without a hearing.

Special rules are laid down for applicants filing petitions for a certificate. Taxes for the use of the highway are suggested on a ton-mile basis, the rate

B. I. Budd
First Vice-President



C. D. Emmons
President

J. N. Shannahan
Second Vice-President

F. R. Coates
Third Vice-President

W. H. Sawyer
Fourth Vice-President

Newly Elected and Re-elected Officers and Members of Executive Committee

Barron Collier
Treasurer

Paul Shoup

J. P. Barnes

H. D. Shute

A. A. Hale

Members of Executive Committee with Terms Expiring in 1925 being lower for pneumatic tired vehicles. For purposes of assessing this tax, motor carriers are required to keep a daily record of vehicles in operation or laid up for repairs, as well as the ton-miles of travel for both passengers and freight. These records are to be filed monthly with the commission under oath.

The bill also requires that liability insurance be taken out before a certificate is granted, in such sum as the commission may determine, adequately to protect the interests of the public with due regard to the number of persons and amount of property involved. A bond is also required conditioned on the payment of all fees, taxes or charges which may be due the state.

The commission can promulgate such safety rules and regulations as it deems necessary to govern and control the operations of motor carriers in the state and to enforce them by penalties. Motor carriers are required to maintain their vehicles in a safe and sanitary condition. Drivers shall be at least twenty-one years old, of good moral character and competent to hold a regular chauffeur's license from the state motor vehicle department. The speed of operation of passenger buses is limited to 25 m.p.h., and the freight trucks to 20 m.p.h. Accidents must be reported to the railroad commission. Violations of the law will be considered as a misdemeanor and punishable by fine not exceeding $1,000 or one year imprisonment or both.

H. V. Bozell, New York, asked whether the committee had given any consideration to the inclusion of a gross receipt tax as one of the methods of taxing motor vehicle common carriers. C. D. Cass answered that the aim of the committee had been to make the law as simple as possible and to indicate that naturally the motor carriers could be expected to pay for the destruction to the highway, and it seemed more practicable to approach the question from the standpoint which the committee did. Garrett Seely, Youngstown, Ohio, raised two questions with reference to the report of the committee. The first was that any regulation which may seem to impose heavy burdens upon the motor carriers may some day come back to plague those railways who go into the business themselves. Second, that the amount of the tax seems heavy. With the six motor coaches now being operated between Youngstown and Warren on a 15-mile run, it would be necessary, according to this bill, to pay $25,000 per year, which, pointed out Mr. Seely, would certainly pay the entire cost of the maintenance of the highway and put no charge against any other vehicle using it whatsoever.

Thomas N. McCarter, Newark, N. J., said he wished to extend his sympathy to any committee which tried to pass this law in the forty-eight states of the Union.

A. W. Brady, Anderson, Ind., said that the objection to the provision because it might react on the electric railway industries using buses was not valid because the matter should be approached from what was proper no matter who was operating the vehicles. Mr. Brady said he thought that this form of charge against the commercial vehicle was coming to be recognized as the proper one. With reference to the cost—the actual figure—there was naturally some question, but this could be worked out on an engineering basis later, certainly.

L. S. Storrs, New Haven, Conn., pointed out that the method of arriving at the tax suggested by the committee was now in operation in Maryland on a ton-mile basis on freight vehicles, and on a seat-mile basis on passenger vehicles.

Walter Jackson, New York, said that there was one feature which was overlooked and that is that from a historical standpoint if a tax is levied only on account of wear the state would not get much. What the public has always done is to tax transportation facilities for its revenue on a gross receipt basis or something like that, and that appeared to be logical in view of past developments.

Another point which Mr. Jackson mentioned is that the motor stage as operated by Mr. Seely and Mr. McGrath is really an enlarged limousine which in its actual operation is eliminating the inefficiently operated private car, and actually this motor vehicle will not do as much damage to the highway—will not wear the highways so much—as the inefficiently operated private cars would do which it drives from the highways. Mr. Jackson said that a per cent on gross earnings or a per cent on net earnings or a gasoline tax should certainly be used in this problem.

Mr. Flowers said that according to the Maryland method of charging, Mr. Seely, on the basis of twenty trips per day, would have to pay $28,064 per year. In Baltimore, the company has to pay $2,524 per year per bus for the double seaters.

C. L. Henry, Indianapolis, said that the study now going on in Indiana in co-operation with the farmers has led to the proposal of almost the same bill, and the approach had been from an entirely different angle. This, he said, justifies the committee. On motion by Mr. Henry, the association approved and adopted these reports.

COST OF CONSTRUCTION OF HIGHWAYS

The report of the committee on cost of construction and maintenance of highways was then presented by Chairman Harvie. The committee was not appointed until last June, so that it was able to make only a progress report. It has not yet received replies to all the questionnaires sent out. When these are received a compilation and study of the facts will be made.

President Todd then introduced Hon. Carl D. Jackson, chairman Wisconsin Railway Commission. His address in abstract will be found on another page.

At the conclusion of Mr. Jackson's address, President Todd introduced Hon. Marcus A. Dow, of the New York Central Lines and National Council of Safety, who said it was a great privilege for him to address the association. He said the first question apt to be raised in connection with a safety campaign was: Will it prevent accidents? This can be answered unqualifiedly, Yes. It will conserve life, increase efficiency of operation and reduce human sacrifice. This has been shown many times. St. Louis had probably the first safety week. This was in 1918 and the results were so markedly favorable that a permanent organization was founded to promote safety work in St. Louis. The speaker gave statistics as to the reduction in accidents which had been accomplished, divided into different classes of hazards such as school children, industrial accidents, etc. He then gave similar statistics for Milwaukee and Detroit. The New York Central Lines, by their safety campaigns, have cut accidents in half between 1913 and 1921, when measured on a unit basis. They have had safety committees, education of employees, and have built up a great safety morale. The same principle applies to electric roads. A company can do no greater service to a city or to its own interests than to support this matter. The speaker then gave statistics of accident reduction through safety measures on a number of electric roads, as supplied by the National Safety Council. He concluded by pointing out the great advantage in the saving of time which resulted from this movement.

Mr. Emmons then read a telegram from Charles M. Schwab, expressing his regret at not being able to be present at the meeting and declaring he was optimistic on the business situation.

W. J. Harvie, chairman committee on electrolysis, presented that report. He said it was a progress report only. As explained in last year's report the committee had developed considerable data which were at the disposal of members. During the last year certain phases of the question at hand closely related to the matter of electric railway power distribution and generation had come to the attention of the committee, and it had seemed best to place this phase in the hands of the engineering association. That association, therefore, was requested to place this matter on its program.

Thomas N. McCarter, chairman committee on resolutions, then presented resolutions expressing the regret of the association on the death of several prominent members, expression of thanks to the committees on meetings and subjects, exhibits, entertainments, and safety, to the speakers, officers and members of the executive committee, members of organization staff, technical press and others.

INSTALLATION OF OFFICERS

Mr. Todd then asked the newly elected officers to mount the platform, and asked Arthur W. Brady, Anderson, Ind., to introduce them to the association. Mr. Brady said it was a great pleasure for him to do this and referred to the fact that while three of those standing on the platform were officials of roads in Indiana and the newly elected president was not, yet Indiana was proud that for many years he had been the general manager of an Indiana electric railway. Mr. Emmons expressed his appreciation for the honor accorded to him. He then asked for co-operation of all during the coming year by saying that he believed that it would be a very constructive period. He then earnestly urged those who would accept committee appointments to be present at committee meetings.

As Mr. Budd was absent Mr. Shannahan was next introduced and urged that the new officers receive all possible support from the members of the association.

Mr. Coates, who has been elected third vice-president, pledged the support of all and urged particularly the securing of new members.

W. H. Sawyer, president East St. Louis & Suburban Railway, spoke of the association as having had an illustrious past and said that it was his ambition not only to continue this high standard, but also to take such action as might be necessary from time to time so that the association would meet changing conditions and the members could give that satisfying and satisfactory service that was necessary.

Mr. Collier, the treasurer, was introduced with words of commendation for the treasurer's report and said that he was pleased that it was satisfactory. The meeting then adjourned.

Last Meeting of Outgoing American Executive Committee

The last regular meeting of the outgoing executive committee was held Monday morning, Oct. 2, at the Drake Hotel in Chicago.

Executive Secretary J. W. Welsh, in giving his financial report, showed materially less unpaid dues at the end of this year as compared with the end of 1921. He also reported upon the basis of actual expenditures for ten months and two months estimated, a surplus of substantial proportions.

The report of the finance committee presented by Mr. Barry indicated the business-like manner in which this committee and the executive secretary had conducted the business affairs of the association during the past year. Quarterly audits have been made; personal supervision by the finance committee over expenditures and vouchers have been made; the office force has been kept on a small and business-like basis and the final result shows a healthy and desirable surplus which makes for stability in the operation of the association's affairs. The committee examined into the question as to whether or not there should be modification of dues and recommended that the association continue to operate under the present system of dues.

The report of the policy committee presented by Mr. Budd recorded the questions of policy which had been referred to the committee and showed the effectiveness with which the American executive committee was keeping in contact with the affiliated associations, particularly in their relations and joint activities with other societies.

A report was received and approved from the subjects and meetings committee for recommendation for the incoming executive committee for the coming year.

After extensive discussion on the question of the relation of interurban electric railways to the national transportation act, the executive committee authorized a special sub-committee of the national relations committee to handle this particular question in Washington. After extended informal discussion on various matters for the convention the committee adjourned.

Those who were present at the committee meeting were President R. I. Todd, Vice-Presidents Budd, Emmons, Coates and Shannahan, and Messrs. Kimball, Palmer, Sawyer, Arkwright, Chubbuck, Gould, Trontrup, Barry and Finigan, and Past-Presidents Brady and Henry and Executive Secretary J. W. Welsh. W. V. Hill was present for Paul Shoup and Carl Beck for C. R. Ellicott.

First Meeting of the New American Executive Committee

The first meeting of the new executive committee of the American Association was held at the Drake Hotel in Chicago on Thursday afternoon, Oct. 5. The first business before the committee was the election of an executive secretary, and to this position J. W. Welsh was re-elected by a unanimous vote.

The resignation of W. H. Sawyer, fourth vice-president-elect, as member-at-large representing operating companies was received and accepted and a committee appointed to nominate a successor for consideration by the executive committee at its next meeting. President Emmons appointed on this nominating committee W. H. Sawyer, H. E. Chubbuck and L. S. Storrs. Upon request of President-elect Wallace Muir of the Claims Association, the constitutional amendment to the Claims Association constitution redefining the objects of the association, which amendment had already been adopted unanimously by the executive committee of the Claims Association, was approved.

INVITATIONS RECEIVED FOR 1923 MIDWINTER CONFERENCE

W. R. Alberger, Oakland, Calif., presented a personal invitation of the California Electric Railway Association to the American Electric Railway Association to hold its midwinter conference in 1923 in California, at Del Monte. The invitation suggested that the holding of the conference in California be augmented by a special trip of inspection of California and California electric railways. An invitation was also received from J. H. Hanna of Washington, D. C., to hold the midwinter conference in Washington. After much discussion the committee voted to request the subjects and meetings committee, which has this question in hand, to give serious consideration to holding the meeting in California.

Invitations were read from electric railway officials and city officials in Buffalo, N. Y., to hold the 1923 annual convention at Buffalo, but no action was taken, as this is a matter to be considered by the committee on locations.

W. J. Harvie presented a progress report of the joint committee on electrolysis, the committee approving the action Mr. Harvie and his associates from this association have taken to date.

E. J. Blair made a report for the exhibit committee, details of which will be given when final figures are ascertained. The executive committee voted to tender a vote of thanks to Mr. Blair for the excellent way in which the exhibits were handled. At the request of the committee, E. M. T. Ryder, of the Engineering Association, and H. L. Whittemore, of the Bureau of Standards, appeared to discuss details of the request of the engineers for an appropriation for rail joint research. After considerable discussion the executive committee voted an appropriation of $10,000 for the purpose and instructed Executive Secretary J. W. Welsh to solicit with the approval of the executive committee an additional $10,000 from such railways and manufacturers who have an especial interest in this subject.

The committee also voted to authorize C. L. Henry, chairman national relations committee, and Executive Secretary J. W. Welsh to attend the annual meeting of the National Association of Railway and Public Utility Commissioners at Detroit during the week of Nov. 14.

The committee decided to hold its next meeting in New York on Friday, Nov. 24.

Those in attendance at this very full meeting of the executive committee were: President C. D. Emmons, Vice-Presidents B. I. Budd, J. N. Shannahan and W. H. Sawyer; Past-Presidents George H. Harries, C. L. Henry, A. W. Brady, L. S. Storrs, R. I. Todd; Presidents Affiliated Associations Wallace Muir, Garrett Seely, L. C. Datz and W. G. Nicholson, and following members at large: J. P. Barnes, H. E. Chubbuck, J. G. Barry, L. E. Gould, A. A. Hale, and W. H. Heulings for S. M. Curwen; M. B. Lambert for H. D. Shute; Carl Beck for C. R. Ellicott, Executive Secretary J. W. Welsh, and the following guests: W. J. Harvie, W. R. Alberger, W. V. Hill, L. H. Palmer, E. J. Blair and Labert St. Clair.

T. & T. Association Proceedings

The Session Was Devoted, Principally, to the Following Subjects: Promoting Sales, Traffic Regulation, Safety, Car Design from a Traffic Standpoint, Training of Personnel, and Interurban Problems

L. H. PALMER

THE first session of the Transportation & Traffic Association was held Oct. 2 when President Palmer called the meeting to order at 2:40. After announcing that the constitution requires the president to present an address, President Palmer reviewed the work of the association and pointed out directions in which he believed it could be of even greater benefit to the industry. Some of the high points of this address are given below.

PRESIDENT PALMER'S ADDRESS

In his presidential address L. H. Palmer spoke first of the efforts which had been made by the committees of the association to visualize the important problems facing the industry and concretely to point out effective methods of meeting and solving them.

In commenting on the work of the committees he commended the committee on safety upon a strenuous year's work, referring particularly to the exhibit at the convention. As to merchandising transportation, he pointed out that the first duty of a company is to give good service, although the "wares" of the electric railway must be popularized. If good and desired service is given, first and always, it can be consistently talked about. An element in merchandising is a proper personnel. The field for study here is so great that it is hardly yet comprehended by the electric railways.

Referring to the suggestions made in the presidential address last year by R. P. Stevens, Mr. Palmer said that these recommendations had been carefully considered by the executive committee and adopted in large part. One suggestion, that there be but one vice-president and a larger executive committee, was not adopted because it appeared to be unwise to change the form of the organization. As to the suggestion that association work be started promptly, action on this is well under way. Plans are in hand to have committees appointed promptly after the convention, to have their work started at once and a meeting held not later than Dec. 1.

On his own behalf Mr. Palmer suggested that a special committee be appointed to increase the individual membership in the association, by means of printed matter, letters and personal contact. The membership should be doubled during the coming year. Calling attention to the fact that last year the association adopted a classification of freight expense accounts, recommending that it be put in effect on member roads as of Jan. 1, 1922, he said that it should soon be possible to secure statistics in this field on a comparable basis. The subject should be followed up during the coming year.

Another suggestion was that in nominating and electing future officers, and members of the executive committee this be done with due appreciation of earnest work accomplished by members.

Mr. Palmer also expressed his thanks for the wholehearted co-operation received from the technical press, the association office and the railway companies in Chicago.

In closing, he said that the success of electric railways in the future lies in dealing rightly with the public we serve. Here is the work of the Transportation & Traffic Association. It is almost entirely through its members and their subordinates that this contact comes. In the nature of things the mechanical departments do not have that direct touch with patrons. The transportation men must sell the service to the car rider. They must be trained, encouraged, schooled and guided in the best methods of accomplishing this. On the shoulders of the transportation department rests most largely the burden of obtaining and holding good public relations. A good salesman sells his customer what the latter wants, he sells the selfish interests of his customer; that is, he tries to meet his views and fit his product to them. This psychological problem must be studied constantly and the men trained in accordance with its needs.

Better service to patrons and to the communities in which the railway operates is the great aim. The last year has seen a partial re-establishment of the electric railway business in the position it formerly occupied in community life. The high place previously held has not yet been gained, but the future promises better times and better business. It is for electric railway men to read these portents aright; to start on the hopeful upward path, and with clear vision pick their way to better things.

GARRETT T. SEELY

At the conclusion of the address the president said that the report of the executive committee would be printed and distributed among the members in due course and then called for the report of the secretary.

REPORT OF THE SECRETARY

Secretary J. W. Welsh, in his annual report, outlined the activities of the six committees of the association, stating that their personnel totaled seventy-one members and that the committees had held fourteen meetings during the year with a total attendance of fifty-nine.

A number of data sheets were sent out and co-operation was maintained with the National Safety Council, the National Electric Light Association, the American Gas Association, the International Traffic Officers' Association, and the American Engineering Standards Committee. On Sept. 15 the number of individual members was 106. The secretary referred to the successful exhibit held under the auspices of this committee during the year.

President Palmer then announced the following convention committees:

Committee on resolutions: P. E. Wilson, Cleveland; H. V. Bozell, New York; Claud Van Auken, Chicago; F. G. Buffe, Kansas City; E. M. Graham, Bangor.

Committee on nominations: Samuel Riddle, Louisville; D. E. Parsons, East St. Louis; S. S. Crane, Altoona.

There was then a four-minute address on safety, given by Fred M. Rosseland, chief of the public safety division of the National Safety Council. Mr. Rosseland briefly set forth the claims of this important subject, saying among other things that he recently had an opportunity of doing considerable work with the association committee on safety and he complimented the association on the excellent report of this committee. He pointed out that the money spent for claims was the only item of expense for which the railways did not get a direct return and the economic advantage of safety, irrespective of its importance from the viewpoint of public relations. He declared that a company was not efficiently operated unless safely operated.

The report of the committee on merchandising transportation was then presented by E. M. Walker, chairman, who read an epitome of each of the contributions. An abstract follows:

MERCHANDISING TRANSPORTATION

The committee declared that selling transportation, like selling anything else, is based on good service, fair rates, fair treatment, enthusiasm, integrity and work. The report took the form of a series of articles by the several members of the committee on methods by which the use of transportation can be increased by salesmanship. No special recommendations were made by the committee as to practices and methods to be followed, the reason being that there are as many methods of salesmanship as there are salesmen, and circumstances, which are always changing, suggest changes in methods. An abstract of the various contributions follows:

W. R. Alberger, San Francisco-Oakland Terminal Railways, described the restaurant service on the ferry boats operated by that company between Oakland and San Francisco. News stands and boot-shining stands are also operated by the company. No increase in price for restaurant service was made during the war. The net returns of the commissary department increased from $29,928 in 1917 to $121,876 in 1921. This latter figure represents 22 per cent of the net receipts during the same year.

W. H. Boyce, Beaver Valley Traction Company, gave results of the use of the zone system and the pass system on that property. (Further particulars will be found in the *Electric Railway Journal* for April 9, 1921, and April 22, 1922.) There was an increase in gross business on the whole system of 23 per cent after the fare was reduced from 7 cents to 5 cents. The passes proved popular, and so far 80 per cent of the revenue received from the sale of passes has been an increase in revenue. As the company was not bothered by jitney competition, this new business was secured either from pedestrians or people formerly riding in privately owned automobiles.

F. W. Shappert, Chicago, North Shore & Milwaukee Railroad, described briefly how passenger and freight business on that line had been increased by personal solicitation and service.

V. S. Curtis, The Connecticut Company, pointed out that electric railway companies in New England had successfully met jitney competition through educating the public as to the fly-by-night character of the jitneys and the essential nature of the railways. When jitneys begin operation they have a certain popularity, but when they reach the stage of development where they threaten the regular service rendered by the railways, the public finds them detrimental to its interests and deals with them accordingly. In Connecticut the jitneys have been put under the control of the Public Utilities Commission and made common carriers.

F. C. Lewis, Boston & Worcester Street Railway, described that company's methods of increasing its freight business. Some of his suggestions follow: Frequent and safe movement of shipment is more desirable than fast movement. The schedule should be regular. Shipments should not be split, that is, loaded part on one car and part on another. Patrons should be notified promptly of arrival of shipments. The rate schedule should be such as to attract business. The method of accounting, including the way bill and billing system, should be systematic. Much depends on the tactfulness of the solicitor and the personnel of the rest of the organization. The attitude of the road toward the public should be one of courtesy and patience. Even a businesslike answer, if curt, sometimes gives offense. Advertising should not be overlooked. In advertising, the company has made a feature of the fact that the cars save the highways as compared with motor trucks.

A. Stuart Pratt, Stone & Webster Management Corporation, described how a street railway on the Pacific Coast used advertising to encourage auto drivers to use the cars. The advertising consisted of short items placed in the reading matter of the papers on the fundamental theme: "The street car is the surest, safest and most economical form of conveyance; use the street car and save money." This advertising was resented by the automobile dealers who asked that it be discontinued. The manager offered not directly to refer to automobiles in these advertisements but continue them along strict "economy" lines. This was not satisfactory to the dealers, who began to advertise to knock the street car. A typical paragraph read: "In stormy weather, the automobile, for business use, appears at its best. No waiting in the wet, no tramping through water if you drive your own car." This advertising on the whole was helpful to the railway, as it got the public interested. Some arguments which may be used for the car are as follows: The tires wear out. Cost of insurance. Auto may skid. Auto may be stolen. Cost of ride $1. Let wife have use of car. Difficulty in parking auto. Bank account vs. auto. Standing in sun or snow rots auto top. Autos run out of gas. Save auto for real pleasure trips. Avoid traffic worries. Cost of one tire. Garage bill cut by winter storage. Meet neighbors on car. Cost of repainting. Other fellow a careless driver. Auto depreciation.

Samuel Riddle, Louisville Railway, pointed out that the agency of increasing sales through employees has not been utilized to the extent that is practicable and profitable until recently. The principles of such salesmanship can be explained to the employees, particularly to the platform employees, at employees' meetings. It can be shown that a car not on time results in loss of revenue, that the short haul is the profitable haul and that the man who wants to ride only a few blocks will not wait for a car. The employees' magazine further enables the expression of the company's plans, policies and achievements. When an employee makes a practicable suggestion for the improvement of service, it should be published in the employees' magazine with proper credit.

K. A. Simmon, Westinghouse Electric & Manufacturing Company, laid stress on the way to make salesmen of employees. During the training period the employee acquires a general knowledge of the property, community and industry as a whole, means of competing transportation, appreciation of car riders' characteristics, feeling of personal responsibility and knowledge of the service expected. He also learns a courtesy code. Too little attention, however, has been given to the period after training. The training should be followed up by observations on performance, guidance, recognition of good service, or unusual performance and provision of incentive for better service. Mr. Simmon prepared a synopsis of these various steps.

S. L. Vaughn, Grand Rapids, Grand Haven & Muskegon Railway, described how shipments are made by combination boat and trolley routes from Chicago, Grand Rapids and other points in Michigan, and J. B. Stewart, Jr., Youngstown Municipal Railway, described the use of the weekly pass on that and other properties, and methods of introducing it.

E. M. Walker, Terre Haute, Indianapolis & Eastern Traction Company, emphasized the value of the one-man safety car in merchandising transportation, and Harold B. Weatherwax, United Traction Company, Albany, gave pointers on the proper ways of developing a summer resort business. A good and well-located park is an asset, but there are many pitfalls to be avoided, because it is very difficult to revive a park once it has become unpopular. Retrenchment in attractions to save expenses has been one cause for unpopularity. Another is poor management. Resort management is really a highly skilled profession. Satisfaction and good spirit among the concessionnaires are also essential for a successful resort. Good policing is essential.

The report contained many reproductions of advertising posters, etc., which had proved successful and were signed by the members of the committee, whose names have been mentioned as contributing independent articles.

The chairman then introduced Edward Hungerford as one of the speakers to discuss the report. He spoke of Mr. Hungerford as a prominent writer in the popular press and also referred to his connection for a number of years with the Brooklyn Rapid Transit Company where he had charge of the department of public relations for that company. The address by Mr. Hungerford is published in abstract elsewhere in this issue.

Edward C. Spring, Lehigh Valley Transit Company, read a paper on methods of increasing interurban business. He said that the basis of all business is service and that the companies should be sure that the public understands the usefulness and needs of railway service and the economic laws that govern its conduct. The interests of the electric railways should be safeguarded by those who believe in progress. The American public always wants something a little better than it asks for and the company that caters to these demands is the one that will make a hit with its patrons. Mr. Spring believed in encouraging the public to write to the company on all matters and that every letter should be answered quickly, fully and courteously. He referred to a series of prizes offered by a certain company for the best answers to the following questions:

What do you like least as regards the service and why?

What do you like best as regards the service and why?

What other service would you like to see installed and why?

F. W. Brown, Michigan Railway, read a written communication. He said, in part, that the lesson to be drawn from Mr. Alberger's paper is not only that increased revenue can be obtained from by-products (so-called), but by doing so the convenience and comfort of patrons is greatly increased. When it is possible to increase the gross revenue nearly 25 per cent. and without an enormous initial investment and without any hazard, such opportunity should not be overlooked.

Unfortunately, a great many lines are not of a character to permit of similar additions to their service, but there are other opportunities which are open to all lines. One is that a class of employees be engaged who are thoughtful and interested in the comfort of their patrons.

As to meeting motor-bus and truck competition, Mr. Brown said that they are a development of the times and introduce a condition which must be met. However, there should be no let-up in the efforts of the electric railways to have the buses and trucks regulated. Recent legislation in California places the bus and truck operators entirely under the jurisdiction of the California Railroad Commission.

Truck and bus lines acting as feeders to electric lines are desirable. Therefore, if legislation could be enacted that would require their operators, when they wished to enter the field either in competition with lines already established or as feeders to such, first to secure a certificate of necessity and convenience before they can begin such operation, this would make it possible to eliminate competition and duplication of service in a great many instances.

It is a mistake to lower rates and fares to meet such competition, with the thought in mind of making it unprofitable for the bus or truck lines to operate. One of the best methods of meeting this competition is entirely through service. There is a certain amount of travel that will go to the bus regardless of what the other lines may offer.

Not many years ago electric lines confined their freight operations to their own immediate territory. A few exceptions existed where connecting electric lines extended their through freight service over two lines, but rarely beyond the 200-mile limit. It was also a general practice to maintain a rate higher than that existing among competing steam railroads. The thought was that on account of the quicker service by electric lines than steam the traffic, or at least a portion of it, would still flow to the electrics on account of superior service. In some cases the rates were not only higher but four classes were maintained against six on the steam lines.

The traffic manager realized that the maintaining of higher rates was a disadvantage, and electric lines are now careful to maintain the same rates as those existing on steam lines. This has resulted in a decided increase in the amount of business and has overcome the loss sustained in the lowering of the level of rates.

Again, the motor truck came into competition, confining itself to a large extent to short haul. The electric lines immediately felt the effect of this competition, as the truck had the advantage of picking up a shipment at the consignor's door and delivering it in front of the consignee's place of business.

To meet this competition through competitive rates for long distances have been established, as in Michigan. Here one of the difficulties encountered was the dividing of the revenue among many carriers. This has been overcome and a division sheet established, giving to the originating and terminal lines a minimum of 20 per cent, while each intermediate carrier gets a constructive mileage of 50 when the actual mileage is in excess of 50 miles.

The other means of meeting truck competition is by absorbing drayage charges. The trucks pick up at the door of the factory and deliver at the place of business of the consignee, where again the electric line is placed at a disadvantage. In order to meet the changing conditions, some plan must be devised whereby this advantage can be overcome. It might be possible to agree to absorb drayage charges when shipments are large.

Providing facilities equal to those furnished by competitors is not confined entirely to fast service and competitive rates, but include terminal facilities, such as adequate warehouse room and truck room.

Thus far electric railways have confined their activities to shipments that can be moved in ordinary box or flat car, with few attempts to provide insulated cars to protect shipments against either heat or cold. This phase of the business might well be given consideration in view of the development of the freight transportation as an important part in the gross revenue of the electric railways.

ROUND TABLE ON WEEKLY PASS

At this point President Palmer turned the meeting over to G. T. Seely, Youngstown, Ohio, for the purpose of conducting a round-table discussion on the weekly pass. The first speaker was E. M. Walker, Terre Haute, Ind. He gave as the main reason for adopting the pass in Terre Haute the hope of securing all of the travel of the man who was dividing his rides between the street cars and jitneys. He said the pass had been effective in this respect insofar as the jitneys were competitive. On account of the coal strike which seriously affected the amount of traffic in Terre Haute, and also because of the strike of railroad shop men, it had been impossible to tell definitely what influence the pass had had on the amount of riding. However, an analysis of the traffic figures of the company for the past five months as compared to the corresponding period last year, led Mr. Walker to believe that the amount of riding had been maintained higher than would have been the case without the pass. Mr. Walker emphasized the value of the round sum of $1 for the weekly pass as being a very convenient selling figure. He said that he had found that instead of people buying passes for the sake of riding promiscuously, they were careful to figure out whether they would have use for more than twenty rides before buying a pass. Mr. Walker said that 12 per cent of the total riders were using the pass and producing approximately 15 per cent of the revenue. He said he considered the pass the only known method of giving the wholesale user a wholesale rate for transportation.

S. W. Greenland, Fort Wayne, Ind., stated that contrary to the usual circumstance, the reason for introducing the weekly pass in Fort Wayne was to reduce the amount of revenue, as the company had earned the full allowed 7½ per cent during the previous year. However, the pass had increased the revenue rather than decreased it and the company was now faced with the necessity either to sell the pass for a lower sum, perhaps 85 cents, or decrease the cash fare rate.

J. R. Blackhall, Chicago & Joliet Electric Railway, spoke particularly in regard to the use of monthly passes or identification cards which carry a small primary charge with the privilege of riding for 5 cents when the basic fare is more than that amount. He said prior to 1912 the fares were 5 cents with six tickets for 25 cents and fifty tickets for $2. At the time a new franchise was granted the requirements for the sale of tickets was discontinued. He did not think there has been any resulting loss in traffic. The straight 5-cent fare was continued until 1918 when it was raised to 7 cents and in 1919 it was raised to 10 cents. On Jan. 1, 1922, when a reduction in fare became necessary it was decided to continue the 10-cent cash fare and sell monthly identification cards for 75 cents, entitling the purchaser to ride as often as he desired during the month on the payment of 5 cents per ride. For the first nine months of 1922 the sales were as follows: 2136, 2408, 2386, 1216, 1978, 1845, 1689, 1644, 1720. The speaker believes that the decreased sales during the last five months were due to industrial conditions that prevailed during that period in Joliet.

There is no convenient way of segregating the car card fares from the half fares paid by children to determine the average rides per month per card, but as nearly as can be estimated the rides per month average forty-eight and the average fare per customer has been reduced from 9.62 cents in 1921 to 8.64 cents in 1922. Mr. Blackhall believes the system has some advantages over the weekly pass, particularly in that it provides a lower fare for those who do not have to ride very often.

The circumstances leading up to the adoption by the Tacoma Street Railway & Power Company, Tacoma, Wash., of the weekly pass were outlined by G. W. Rounds. During the last few years the fares were increased from 5 cents, first to 7 cents and then to 10 cents with twenty-five tickets for $2. The public did not take unkindly to the higher fares although the riding fell off even though gross earnings increased. There was also some jitney competition. In order to make the lines more popular, to induce riding, and to still further increase revenues it was decided to introduce the pass.

Commencing one week prior to the sale of the passes they were advertised in the daily papers, by posters on the car windows, and in other ways. The use of the pass was started on July 21. Prizes of $5 and $3 had been offered to the trainmen for the largest and next largest number of passes sold. The first week's sale of 7,000 was far above expectations. Since then the pass sales have gradually increased until the number now in use has reached 10,000.

The day of greatest sale is Monday and as high as 75 per cent of the week's passes have been disposed of on that day. The fact that they are sold for an even dollar greatly facilitates their handling.

A detailed record is kept for the passes handled by each conductor. In this way dispute can be avoided with trainmen, as they are required to report the serial numbers sold daily and any discrepancy can be easily detected.

An additional clerk was needed to keep the detail record of the pass sales, but this was offset by one released as analysis of receipts and ticket counting was combined. The clerk formerly handling metal tickets had been able to devote half his time to miscellaneous work, so the company has saved half of a clerk's time in the auditing department, and increased pass sales should enable a further saving.

A few difficulties have been met in the operation of the pass, such as passing it out of the car window, the display of a card of the same color as the pass, and by partial display of a split pass. Troubles of this kind are few, however. So far as can be determined the financial results have been good. Certainly riding has been stimulated, especially during the noon hours and evenings, when more revenue passengers are being carried. The jitneys, however, are still carrying heavy loads, especially during peak hours. A large amount of short-ride traffic has been secured, however, and in many outlying districts automobile owners have given up the use of their cars except for purely pleasure purposes. Salesmen, telegraph messengers, and many other classes heretofore traveling in automobiles, on bicycles, etc., are daily making use of the pass.

The average rides per pass per week to date have been 27.59; per day, 3.94; per week-day, 4.07; per Sunday, 3.15. The apparent revenue per ride on the pass is 3.62 cents and the true average fare per ride (including allowance for transfers) is 4.71 cents.

The railroad shopmen's strike has affected the railway earnings appreciably. The total revenue passengers have increased 22 per cent since the installation of the pass, the transfers have decreased 41 per cent, and there has been less than a 2 per cent change in either the car-miles or car-hours operated. The company considers the pass to be a "winner."

The weekly pass, according to W. H. Boyce, was put into effect on the Beaver Valley System on Feb. 13, 1922. The single-zone pass was sold at 85 cents, two-zone for $1.60 and three-zone for $2, but since April 10 the three-zone pass has had no distance limit. This was done because it was found that 94 per cent of the revenue was derived from one, two and three-zone riders. The highest week's sale has been $1,359.95. In practice the actual number of rides per pass is four per day. The pass also stimulates other riding. Seventy per cent of the money received from the sale of passes is an increase in revenue.

The company also has special rates, such as books of 100 tickets for $4.50, and at least once a month and sometimes oftener round trip excursion tickets for one fare to persons attending Dollar Day or Suburban Shopping Day in Beaver Falls or Rochester, which are the largest towns. Just now a ten-day sale of six tickets for 25 cents is being considered to help meet the bond interest.

Proper credit for the receipts from sale of passes is given each day's business by splitting the amount of the weekly sale, allowing 15 per cent for week days and 10 per cent for Sunday. The method of registering pass riders is that on Tuesdays, Saturdays and Sundays the trainmen make a check on all passes presented for transportation. No abuses of the pass privilege have been noticed. Owing to the use of zone fares, the passenger must present the pass to the operator both upon entering and leaving the car; to prevent over-riding the cash or ticket rider gives up his destination fare receipt upon exit. The advertising bill for putting the pass into effect was about $300.

Walter Jackson, Mount Vernon, N. Y., said that in cases where there had been no fare troubles or jitney competition the railway companies could well make use of the pass to offset the private automobile. He urged the use of the weekly pass to eliminate the irritation caused by requiring cash fares, waiting in line for change, the issuance of transfers and the sense of expense for the individual ride.

G. T. Seely called attention to that part of the report of the committee which gives statistics as to the weekly pass in Youngstown.

J. A. Dewhurst. Oil City, Pa., stated that his company was planning to adopt the pass on one of its properties, but that the Interstate Commerce Commission had raised a question as to its legality in interstate commerce. The arguments used were that all steam road transportation is based on the sale of the tickets at a definite price for a definite service, and that if the service is not rendered the purchase price may have to be refunded on demand.

D. W. Pontius, Los Angeles, said that the California Railroad Commission had raised the same question, but had finally allowed the pass to be put into effect.

Tuesday Session

The Tuesday afternoon session of the Transportation & Traffic Association opened with a short safety talk by R. M. Reade, Quebec, P. Q. He said that thought is the basis of safety. In other words, lack of thought causes accidents.

Next, on motion of the committee on nominations, Samuel Riddle, chairman, the following were elected to the positions named: President, G. T. Seely, Youngstown, Ohio; first vice-president, J. K. Punderford, New Haven, Conn.; second vice-president, Arthur Gaboury, Montreal, P. Q.; third vice-president, T. C. Cherry, Syracuse, N. Y.; secretary-treasurer, J. W. Welsh, New York City; executive committee, G. H. Clifford, Fort Worth, Tex.; J. V. Sullivan, Chicago, Ill.; Edward Dana, Boston, Mass.; W. H. Boyce, New Brighton, Pa. (replacing Mr. Cherry).

H. B. Flowers, Baltimore, Md., then read the report of the committee on traffic regulations, of which he was chairman. This report is abstracted below:

TRAFFIC REGULATIONS

During the year the committee on traffic regulations, according to its report, followed closely the activities of the International Traffic Officers' Association, which has opened national headquarters in Washington and has commenced the publication of a national organ, known as *The Traffic Officers' Journal*. It is, however, too early to express an opinion of the probable outcome of the work of this organization.

W. H. Maltbie, of the committee, represented it at the National Highway Traffic Association meeting held in New York on May 12. At this meeting the Highway Association recommended:

1. That the United States Bureau of Standards be requested to make a study of the proper coloring for signs;
2. That railway crossing warning signs which would probably apply to all rapid transit crossings, be placed at a uniform distance from the crossings;
3. That all signs be between 5 ft. and 8 ft. from the ground.

A representative of the committee likewise attended a conference on "Standardization of Colors for Traffic Signals" which was held in New York on May 23, and at which thirty-four national organizations were represented and four others indicated interest in the matter.

A. W. Whitney, chairman of the American Engineering Standards Committee, the organization which called the conference, presided. Invitations to the conference, which had been called at the request of the Illuminating Engineering Society and the International Traffic Officers' Association, were sent to all interested organizations, including automobile, highway, railway, traffic and engineering organizations. The Canadian Engineering Standards Association represented the Canadian interests.

A. H. Rudd, on behalf of the American Railway Association, presented a paper outlining the fundamental colors used by the steam railroads, and suggested lines along which that association would like to see standardization progress. While signal systems of different railroads differ in some respects the fundamentals are largely standardized. For the operation of trains these include: red for danger (stop); yellow for caution; and green for clear. The use of yellow for tail lights of automobiles and of green for fire exits was suggested as steps toward national uniformity.

On behalf of the American Electric Railway Association a report was submitted outlining the following items:

AMERICAN ASSOCIATION SUGGESTIONS

The standard colors in use for night signals in electric railway practice are: red for "stop"; yellow for "proceed with caution"; green for "proceed at schedule speed."

Blue, purple and white, it was pointed out, are also used in a restricted way, for conveying special information or for safeguards. For example, a blue signal means that car repairmen are at work, and the cars protected by such a signal must not be moved until the workmen who placed the signal have removed it. Purple may denote a fire alarm box or a telephone station, etc.

For day signals, hooded light signals using the night colors are used to some extent. Probably in the majority of cases, however, day signal indications are given by means of semaphore arms, the position of the arm denoting whether the signal is set at "stop," "proceed with caution" or "proceed at schedule speed." The shape and the color of the arm also convey information as to operating conditions, type of signal protection, etc.

There are a number of variations from the above, the newest signals of the Pennsylvania Railroad, for example, being light position signals where hooded white lights are used against a black background utilizing the semaphore principle.

Electric railway signals are operated in various ways such as by continuous track circuits, by contactors, or other end set devices, by interlocking towers, by manually operated light switches, etc. Experiments are now being made to determine the availability of the wireless telegraph and telephones for controlling and safeguarding train movements, either by signals on the right-of-way or in the motorman's cab and for operating in emergency the train air brakes.

For grade crossing highway protection, when a train is approaching, a red signal either fixed or moving, either steady or flashing, is sometimes used, frequently augmented by moving arms, siren horns or bell signals. These signals are in addition to the ordinary painted signs posted along the road in advance of the crossing.

A red signal has been used universally as indicating danger from time immemorial, and it would be unwise to take any steps to do away with this generally accepted use of red.

All moving vehicles using the highways should carry a tail light lighted during the night hours and during hours when visibility is low. In many places a red flag is required to be attached to the rear of vehicle loads where these loads project beyond the rear of the tailboard. If this is needed during the day, it is more necessary at night, and this conference should recommend that on all such loads a red light should be displayed at its extreme rear end during the night hours.

As a general plan the accepted practice of the railroads is suggested for traffic signals, viz.: Red for "stop;" yellow for "proceed with caution," and green for "proceed at allowed speed."

A suggestion has been made in the public press recently that yellow be adopted as the color for automobile tail lights. From the viewpoint of electric railway operators this is not wise. The automobile is a free and fast-moving vehicle. It can operate on any part of a highway that its driver wishes, and as an ever-present and needed warning of danger, the committee opposed the use of yellow for such a purpose.

As a matter of sane and safe practice, an automobile driver should so operate his car that by the use of his headlights he can tell when there is any danger ahead and be governed accordingly, and the argument that has been advanced that red lights are confusing and convey conflicting information is one which, in the interests of safe operation, should not be advanced.

The dangers that are present on highways and thoroughfares under modern conditions, have increased materially since the era of the self-propelled vehicle, and nothing should be done which would tend to take away any of the existing elements of safety. On the contrary, the efforts of the electric railways should be towards throwing further safeguards around the public streets and it would be a serious backward step to attempt to change to some other color than red for automobile tail lights.

The conference of May 23 recommended that there be national uniformity in the use of colors for signals, and that their unification should include the use of colored lights on all vehicles used on the highways, on signals along the highways and at curbs that are both permanent and temporary, and on signals marking highway crossings of both steam and electric railroads. It was recommended further that there also be a co-ordinated relation of color, of all street lights, form, position, number of lights, even though flashing or moving signals are used; that there be distinguishing colors for non-luminous as well as luminous signals; that recommendations be made on the use of colors for emergency exit signals and that the methods of specifying or defining colors for signal purposes be unified.

These conclusions were referred to the American Engineering Standards Committee to be carried out in accordance with its regular procedure.

The report was signed by H. B. Flowers, chairman; T. C. Cherry, sponsor; H. O. Butler, F. R. Cogswell, F. P. Edinger, W. H. Maltbie, Fielder Sanders and Paul E. Wilson.

Mr. Flowers was followed by Lieutenant John Martin of the Chicago Police Department.

TRAFFIC OFFICER SELECTION AND TRAINING

Lieutenant Martin explained how patrolmen are selected and trained for traffic regulation in Chicago. Looking back twenty-five years or so, he said that in the early days the older patrolmen were selected for traffic work in the Loop district, their function being merely to help pedestrians get across the streets.

The advent of the automobile changed conditions. The work of the men became that of traffic regulation, the older men being retained. The result was traffic congestion, and the need for more speed became imperative. To this end, men of a different type were needed. The idea had first to be sold to the chief of police; it was hard to convince them of the need for picked men for this work. Chief Fitzmorris is one who fully appreciates the importance of this matter.

In Chicago recruits for the police force receive sixty days of schooling in general police work. A few days before the end of the period, the traffic department is given an opportunity to examine the men in groups, to select suitable ones for its work. In this selection, temperament is an important factor.

The men selected for traffic work go to a traffic school. This brings out their traffic ability, if they have any. After they have been assigned to posts their work is carefully supervised, the sergeant or lieutenant studying the men in action. Only three or four men out of ten trained in the traffic school prove satisfactory.

Experience in Chicago shows that to secure speed, promote safety, etc., the men must be drilled in every detail. Two or more weeks, for example, are needed to drill them on hand signals alone. Uniformity in signaling is absolutely essential. Tests on men who have never had experience on a beat, in Chicago, showed fine results from the schooling given them. They permitted no blockades, which were frequent with inefficient men.

Referring to the matter of parking, Lieutenant Martin said that 50 per cent of the troubles of the traffic officer are due to this. In the Chicago Loop district, 2,800 automobiles only could be parked if all of the curb space were filled. This would involve four lines of traffic and all moving traffic would be forced upon the car tracks. This would be an impossible condition. When one realizes that there are upward of 200,000 automobiles licensed in the Chicago district he will see the great possibilities of congestion in the Loop district, for a considerable portion of these enter this district daily. The question is why a small number of automobiles should be allowed to park in the Loop to the inconvenience of a much larger number. The prohibition of parking would greatly simplify the traffic problem, but it is difficult to bring about. Merchants seem to have the idea that their business would be interfered with in this case. The fact is that an unobstructed front before a store is beneficial to business. In Chicago parking is prohibited in the Loop district between 7 and 10 a.m. and 4 and 7 p.m., but this is not enough.

Electric railway men who operate properties in cities should oppose the time limit in parking; vehicles should simply be permitted to load or unload passengers or merchandise. Cities will have to come to some such regulation if the traffic problem is to be solved. Any ordinance permitting any parking time is an inducement to automobile owners to come into the congested district to park their machines. When they do not find any parking space they cruise around seeking space, and in so doing greatly increase the congestion.

In further discussion of traffic regulation, R. F. Kelker, Jr., city supervisor of transportation, Chicago, said that all large cities need to study traffic, not in generalities but in actualities. Many cities fail to have any conception of the number of people, automobiles and trolley cars that use the crossings, or even the speed with which they pass a given point. In Chicago there is a bureau to keep track of traffic and to get the facts as they exist so as to determine the amount of traffic that has to be handled at any of the important traffic points. At present there are plenty of traffic laws and ordinances, but they are not self-enforcing. What is really needed every time a new traffic ordinance is possible is to have additional policemen for its enforcement.

Mention was also made of the automatic signal. Mr. Kelker said Chicago is suffering from "signalitis trouble," and that all persons who have types of traffic signals are urging the city to buy them, holding that each will solve the traffic problem. Very few signals of this type are satisfactory. In fact, not many would be needed to handle the regular traffic if the uneducated and untrained drivers who get out only on Saturdays and Sundays could be eliminated. The regular daily driver is easily handled, for he usually follows the signals properly. Uniformity of signals is also essential, both as to signs, lights and enforcement, and every endeavor should be made to get rid of the fellow who refuses to "play the game."

G. B. Anderson, Los Angeles, was the next speaker. He said that the automatic signals, such as are used in Los Angeles, controlled from a central point, for certain fixed and predetermined time limits irrespective of the traffic, are not satisfactory as oftentimes cars are unnecessarily delayed while waiting for signals when there is no traffic passing.

The next feature of the program was the report on safety work, presented in abstract by W. H. Boyce, chairman. The report presented was in substance as follows:

SAFETY WORK

The committee had the problem of convincing those charged with providing budgets that executive disregard of the waste of preventable accidents is mismanagement, accidents can be prevented and accident costs reduced by organized effort, and organized effort means practical common sense and systematic plans.

Any electric railway official may believe that he has an efficient organization, but to sell him the idea of organized safety he must first be convinced that it is a necessity in his business, and that it is not a duty that he may delegate to some already overburdened department head to take up at his leisure. Through organized safety work we bring about safe working conditions, safe practices and safe operation, all of which make for a safe and efficient workman, a man with confidence in his employer and himself, a man who is working for the best interests of his employer because he knows that his employer is interested in his personal safety and that of his fellow workmen.

It is not efficient operation nor good management when the debit side of the ledger shows a large percentage paid out in settlements and compensation for personal injuries and damage cases among the employees and the patrons of the road.

The lack of organized safety work among the electric railway companies in the country, as developed by questionnaires, conclusively shows that the committee must direct its effort toward securing the active co-operation of the managements of all of the railways in the institution of organized safety work and that this work, once instituted, must be carried on continuously.

Since February, through the excellent co-operation of the technical press, the committee has been able to have published one or more accident prevention articles each month as well as a safety number of *Electric Railway Journal*, *Aera* and *Electric Traction*. The committee has been responsible for a display at the mid-winter meeting and at this convention of various kinds of accident prevention signs, newspaper advertising copy, car cards, dash signs, pamphlets and slogans. Circular letters and pamphlets have also been distributed. The committee has also offered advice on safety work in answer to a notice that it was willing to do so, published in the technical press.

The committee recommends and will support the National Safety Council, but out of 943 electric railways in the country only 110 are members of the council.

To be successful, safety work must be continuous and organized; haphazard, spasmodic efforts will not only fail to bring results but will discourage the management and the employee.

Properly planned, well-organized safety work carried on as a continuous program, with the executives of the company behind it, and under the direct charge of an individual who has a thorough understanding of the work, cannot fail to bring results. Every company that has tried organized safety work has succeeded, and the managements realize the tremendous waste of money and human life that had been going on with their passive consent and open negligence during the years previous.

The committtee recommends that a program of organized safety be adopted by each member company of the association; that a joint committee be appointed consisting of members of the Transportation & Traffic Association, the Claims Association, the Advertising Section and the National Safety Council being prepared at all times to give advice, furnish progressive safety bulletin board, company publications, newspapers and car card material and to aid companies in other ways in the formation of and in the carrying on of accident prevention work.

The report was accompanied by approving comments on organized safety work by prominent electric railway executives and others, a recommended plan for organization of a safety committee for various sized properties, sample newspaper ad. copy slogans, sample bulletins, car cards, and other like material, as well as by a bibliography of safety and accident prevention on electric railways.

The report carried a feature cover and was signed by W. H. Boyce, chairman; J. R. Blackhall, F. H. Hill, D. E. Parsons, E. D. Reed, C. B. Scott and C. L. Van Auken.

Methods of organization and the conditions which made it necessary for the committee on safety work to spend time in pursuading some of the member companies that such work is a necessary part of electric railway operation took the principal attention in the discussion of the committee report. Britton I. Budd, Chicago, said that it seemed as if the committee was endeavoring to advance reasons why safety work should be entered into. This he characterized as almost absurd and said that such work is an essential and vital part of railway operation. He declared that he would not operate a railway which did not include such work as a fundamental part of its operations, and took to task the men who could not see this necessity, when every industry is already giving the question serious and extensive consideration. Every company should employ such means as conditions will permit and the committee, he said, should devote its time to a comparison and study of the methods which have proved successful rather than to dawdle along wheedling members into safety work.

J. P. Barnes outlined the organization used on the property in Louisville of which he is president. This includes a general committee and division organization in which autonomy in the selection of members of the various committees is practiced. This feature he characterized as giving the best results. Men are kept on committees long enough to gain a comprehensive view of the meaning and importance of safety work, but efforts are made to get as many men as possible into active safety work. Men who have served are given a distinctive badge. Inspections of one department by another from a safety standpoint are made and, in addition to the safety features, social features are introduced. This interchange of department work results in broadening the vision of all employees and in better work. In the safety contest work the carhouse having the highest record in any one month is given a dinner the following month.

Mr. Barnes said that the twelve months' cost of these dinners, including supplementary dinners and the provision of the dining hall, had been $12,000 and the reduction in accident expense as a result of the contents totaled $150,000. In the last twelve-month period the number of fatal accidents had been nine, as against twenty in the preceding twelve months. The speaker said that men are entitled to know what becomes of the suggestions they make and operating officials or executives cannot afford to fail to acknowledge any suggestions made. If they cannot be used an explanation should be made to the employee giving the reasons. Many times, he said, the effort to write an explanation results in clarification of the executive's own ideas.

If every railroad would take up safety work and carry it out properly, H. J. Bell, secretary of the Chicago Safety Council, said, the results would be measured in the same terms as an increase in fares or a reduction of taxes. In the experience of the railroad administration during the war, the roads which secured the greatest results were those whose executives gave the greatest co-operation and whose personal attitude toward such work was right. Nothing will do so much in the improvement of relations between employer, employee and public as a real program of accident prevention, was Mr. Bell's opinion. He outlined the organization and work of the Chicago Safety Council. In the discussion a question was raised as to the advisability of using an accident bogey and particularly as to the experience with no-report accidents in this connection, Mr. Barnes said that at Louisville the discovery of a no-report accident throws out the carhouse involved for that month. The result of the contests has been a falling off of the no-report accidents and an increase in the accidents reported. The same experience was related by R. M. Reade, Quebec, P. Q.

The last item on the program was the reading, by H. H. Norris in the absence of the writer, of a communication from C. M. Talbert, president St. Louis (Mo.) Safety Council and member National Safety Council executive committee. Mr. Talbert commended the report for its direct entrance into the subject and for getting at once to the problem from the operating companies' standpoint, as well as for its emphasis upon the necessity for organized continuous safety work. He said that any appreciable reduction of accidents over a period of time is the result of a well-thought-out program, based on well-established principles.

After emphasizing and reinforcing several of the points made by the committee, Mr. Talbert said that his experience has shown the general public to be wary of every effort, even for its own good or safety, that may be made by one who may possibly have an ulterior or selfish motive. To be reached effectively, the public must be appealed to through some general community endeavor in which all may take part. The efforts of an electric railway to secure public co-operation should be along the line of forming a general public safety committee, in which the company will be one unit of twenty or more.

Mr. Talbert closed by expressing the hope that the relations between the Railway Association and the National Safety Council may be closer, and that the council, through its headquarters or its locals or both, may be of distinct help in working out the problem of reducing accidents on electric street railways.

Wednesday Session

The first thing on the program of the Wednesday afternoon session was the presentation, by C. E. Morgan, chairman, of the report of the committee on one-man car operation. An abstract of this report follows:

ONE-MAN CAR OPERATION

The committee on one-man car operation reported a marked increase in the operation of one-man cars compared with the 400 cars of this type in service Dec. 31, 1916. Today over 7,000 cars are being operated by one man, approximately 30 per cent being of the double-truck type, most of them originally designed for and operated as two-man cars, but converted to permit operation by one man. Further use of the one-man operation is being applied to the off-peak hours of travel on lines of heavy traffic by the use of large double-truck cars equipped for one-man-two-man operation, the second man or conductor working only during the peak loads.

Many novel features in car design are being used in the further development and application of one-man operation, such as the use of wider aisles, double passageways and with entrances and exits controlled by turnstiles and doors.

With a view to securing the proper car design, this committee, in co-operation with the committee on unification of car design of the Engineering Association, adopted the following resolution:

> The present car of the single-truck, light-weight, one-man type has its economical limitations. In semi-congested districts there is a demand for a car somewhat larger than the present smaller car and with either single or double passageways. There is likewise a demand for a car of still larger capacity for one-man or two-man operation as traffic conditions require. Your committee believes that in the design of such cars it is desirable to provide liberal widths of aisle and passageways so as to facilitate the movement of passengers in interchange and toward the rear of the car.

As the wide adoption of the one-man operation made a revision of the standard code of city operating rules necessary, the committee prepared and submitted for adoption certain amendments to the standard code of city operating rules adopted at the 1909 convention, and amended in 1910, 1911, 1912, 1913 and 1914 conventions.

This report was signed by C. E. Morgan, chairman; J. V. Sullivan, sponsor; F. G. Buffe, S. W. Greenland, R. B. Hull, C. W. Kellogg, Dudley Montgomery and D. A. Scanlon.

The presentation of the report was followed by the reading of a paper on "The Light-Weight Interurban Car," by J. P. Pope, general manager Kentucky Traction & Terminal Company, Lexington. A paper on "The Turnstile Car Used on the New York State Railways," by J. E. Duffy, superintendent, and H. S. Sweet, engineer of equipment, New York State Railways, Syracuse, was read by Mr. Duffy. Both of these papers are abstracted elsewhere.

Mr. Duffy, in closing the paper, said that the New York Public Service Commission had just approved the turnstile cars for operation by his company. He said that the chief engineer of the commission had stated that this type of car is as safe as any operated in the state of New York. In Rochester operation has just been commenced with this type of car on several routes.

Turnstile Car on Third Avenue Railway

The discussion of the paper by Messrs. Duffy and Sweet was opened with a written contribution by W. E. Thompson, superintendent of transportation Third Avenue Railway System, New York City, and J. S. McWhirter, superintendent of equipment of the same company. They said, in part:

After several years of satisfactory operation of single-truck one-man cars and the development of the foot-control one-man car, we began the use of double-truck cars with one man. In the operation of double-truck one-man cars, the most serious criticism has been the congestion which occurs near the forward end of the car when the passenger-loading materially exceeds the seating capacity. We were, therefore, much interested in the idea of the turnstile car as developed in Syracuse to overcome this condition.

Before seeing the Syracuse car in operation, we questioned whether it was practicable for one man to control both front and rear doors without increasing step accidents. Our observation of the Syracuse car in service convinced us that this could be done with safety, and this phase of turnstile operation has been borne out by our experience while experimenting further with the turnstile car.

We constructed a "pay-as-you-leave" experimental car somewhat along the lines of the Syracuse car, loading the passengers at the rear end through a turnstile. The car was equipped with our standard interlocking door and step control, which prevented its being started until all doors were closed. We also used an emergency brake equipment, combining all the functions of the safety car equipment. The car was operated with our standard pedal-control. We used the same rear vision mirror idea as is used in Syracuse. The design, equipment and control of this car was fully described in the *Electric Railway Journal* of Aug. 19, 1922.

With the hope of unloading passengers as rapidly as the use of the turnstile had made it possible to load them, we conceived the idea of using a double-stream front exit; one stream through an automatic coin-operated turnstile and the other by a standard fare box where the operator could make change and issue transfers. With this arrangement, the passenger who had his exact fare ready could use it to unlock the automatic turnstile so that he could pass through it and alight from the car without being obstructed by passengers desiring change or securing transfers.

Single-end cars lend themselves much more readily to the adoption of turnstiles than do double-end cars, but as all cars used on the Third Avenue System are double-end, our scheme involved the use of four turnstiles per car, thus making it necessary that they be very compact. For this purpose we availed ourselves of the folding-arm turnstile which has been used on the stations of the New York, Westchester & Boston Railway for some years.

The results attained with the rear-entrance, front-exit car were fully up to our expectations in distributing the passenger load through the car. We were able to decrease the time consumed in boarding and alighting per stop per passenger as compared with the Syracuse car about 30 per cent. But our time per stop per passenger was still 30 per cent higher than we obtained with our standard double-truck two-man car and 20 per cent higher than are obtained with our standard double-truck, double-stream-door one-man car.

We are convinced that when the novelty of the turnstile arrangement has worn off and the traveling public has become accustomed to the use of turnstiles on surface cars, boarding and alighting time on that type of car will be decreased. It may be that when the traveling public has realized the advantage of the fullest use of the automatic turnstile, with the double-stream exit, the rapidity with which passengers can be handled on turnstile cars will be determined by the speed of the single-stream entrance. We also believe that in analyzing the time element per stop per passenger careful consideration should be given to the time consumed in the door movement as well as the passenger movement.

Our experiment has shown that because of the through circulation of passengers on the turnstile car, passengers in excess of the seating capacity can be handled with greater freedom of movement and less inconvenience to the passenger than can be done against the counter current in our double-truck, double-stream-door one-man car.

To provide a double-stream, front-exit on a rear-entrance turnstile car, a turnstile must be used at each end. It follows, of course, that on a double-end car two turnstiles must be installed on each end, and the space necessary for the installation of the turnstiles and proper guide rails, or chains, can only be provided for by sacrificing seating capacity. With us, this loss of seating capacity amounted to about 25 per cent of the seating capactiy available on the same unit if this unit were arranged for double-stream-door front-entrance operation, without turnstiles. But the double-stream, front-entrance-door car, although it permits of greater seating capacity, does not provide the free circulation of passengers obtainable with the rear entrance turnstile car.

The essential data of the operation of our turnstile car are as follows:

Scheduled speed of line, m.p.h.	8
Actual speed of turnstile car, m.p.h.	7.4
Stops per mile	10.6
Average passengers per car-mile	28.3
Average duration of stop, seconds	12.02
Average time per stop per passenger, seconds	2.45

For our standard cars in similar service the average duration of stop per passengers is as follows:

Two-man, rear-entrance-and-exit, double-stream-door, with front-exit single-stream-door, seconds	1.85
One-man, front-entrance-and-exit, double-stream-door, seconds	2
One-man, front-entrance-and-exit, single-stream-door, seconds	2.50

We have tried to lay the result of our experiment before you as clearly as possible without having advanced a definite conclusion, as in our opinion the turnstile car is still in its experimental stage.

James F. Hamilton, president New York State Railways, told how at first he was not much of an enthusiast for the turnstile car but now he is convinced that it is the solution for the successful operation of the one-man car and he was confident that this type of car is here to stay. Operation would have been started earlier, in Rochester, if the company had had the money and the time. Plans now are to extend operation of the turnstile car to practically every line in that city and also on a 40-mile interurban line. He believed that the one-man type of car is the salvation of the railway industry.

H. H. Adams, Chicago, recalled his statement made at Atlantic City some years ago concerning the necessity of having a double passageway on one-man cars instead of the single combined entrance and exit as was first developed. He told how in Chicago he had developed a double-passageway one-man car to permit loading and unloading to be done under the eye of the operator. The exit in this type of car is protected by an automatic door which is opened by the passage of the passenger who steps on a treadle, and it does not close until the passenger has left the car step.

In the development of this car he had looked very carefully into the question of turnstiles, but his study of the problem showed that any barrier in the passageway only tended to slow up operation. It is essential that free movement of passengers be maintained and turnstiles, no matter of what kind, all tend to slow up operation. One car equipped with this type of automatic exit door has been in operation since last March over a line that is not in the congested part of the city. A speed of 14½ m.p.h. with six stops per mile is maintained. One of the biggest problems in connection with the operation of the automatic exit door was to have it operated by a small child.

G. H. Clifford, Fort Worth, Tex., said that the light-weight one-man car had made more frequent headway possible and that one of the fundamental ideas of using it was to improve service. He believed in giving the people the best service possible and then attempting to get them to pay a fair rate of fare. The cost of rebuilding cars for one-man operation, including the equipment, is often hardly justified.

H. H. Brown, Duluth, told how for the last two years one line had been equipped with eight turnstile cars and how by means of a railing that extended into the rear part of the body he had succeeded in eliminating congestion on the rear platform. Turnstile cars, he maintained, do not slow up the line.

At first there was some aversion on the part of the passenger to the railing installed, but none to the registering turnstile which was used to count the ticket fares collected. He believed that the turnstile type of car would not be successful unless it had a front exit.

E. A. Roberts, New York Transit Commission, said that all economies must be practiced in New York on account of the 5-cent fare in effect in that city and that the turnstile cars in operation there by two companies had not been in service long enough to draw any definite conclusion. The attitude of the commission toward such development was all encouragement.

John F. Ohmer told how ten years ago the first installation of turnstiles was made on twenty-one cars of the double-end type for operation over the Riverdale line of the People's Railway Company in Dayton. These turnstiles were successfully operated even though there were six different classes of fares that had to be registered. The equipment was in operation for three summer months and the company was delighted because the receipts were materially increased and the passengers registered their own fares. The conductors capitalized the complaints and put the matter before the city commission, which, after hearing, sustained the company in its use of the turnstile. The conductors, however, appealed the case to the State Public Service Commission and after a hearing the commission ruled that all turnstiles on cars should be removed and further refused to allow this type of equipment on any car operated in the State of Ohio.

Thursday Afternoon Session

The closing session of the Transportation & Traffic Association meeting was opened with the report of the committee on personnel and training of transportation department employees, which was read in abstract by the chairman, J. E. Wayne. An abstract of this report follows:

PERSONNEL AND TRAINING OF TRANSPORTATION DEPARTMENT EMPLOYEES

The committee devoted its attention during the year to the following topics: (1) Psychological tests for motormen and conductors, (2) training of one-man car operators, (3) standard form of application for employment as trainman and (4) standard form for physical examination. The committee had hoped to be able to retain the services of an expert on applied psychology, but funds were unavailable for the purpose.

The idea in taking up the subject of psychological tests was that some kind of mental examination might well accompany the physical examination as one factor in selecting trainmen. A number of railway properties, at home and abroad, are already using such tests on a smaller or larger scale. Some companies have used mechanical apparatus to test qualities of the mind and nervous system, but this phase of the subject required more investigation than was practicable this year. The aim of this year's committee was to outline such simple procedure as could be applied without great expense on any electric railway property, and without greatly modifying the present employment organization.

The committee first considered the mental qualities required for trainmen and agreed that they should be courteous, intelligent and mentally alert; that they should have good memories and the mental qualities of attention, concentration and perception. They should have good judgment of speed and distance, the power of prompt motor reaction in emergency and the faculty of perception in reference to possible danger at railroad crossings. Further, that motormen should show intelligence in starting and stopping an electrically propelled vehicle and in careful operation on dark streets or in dense fog. While these qualifications could be partly determined by a conversation with the applicant, it is advisable to explain to the applicant the requirements expected of employees as well as to indicate certain policies which are relied upon to furnish the best possible service to the public.

In Appendix "A" extended lists of suggested questions are given. These questions were prepared by Dr. John Leeming, who has used many of them in connection with his duties as chief medical counsel of the Chicago Surface Lines. Dr. J. A. Rowland, educational director of the Milwaukee Electric Railway & Light Company, prepared the outline of the whole subject of mental tests given as "Appendix B." The committee suggests that member companies apply as much of this material as is practicable, accumulating data which can be used by later committees in recommending the most desired standard form of procedure. It also strongly urges that some form of mental test, however simple, be used by every company.

As to the training of operators for one-man cars, the committee finds the opinion general that a combination of the training usually given to motormen and conductors is necessary. This requires but little more time than is needed for training either a motorman or conductor. The committee feels, however, due to the higher degree of responsibility imposed on one-man car operators, men of the better grade should be employed in this work, and the use of intelligence tests assumes even more importance than under two-man operation.

A form of application for employment as trainman and another for use in connection with physical examination were recommended by the committee for adoption as a "recommended form." The committee consisted of J. E. Wayne, chairman; F. L. Butler, Edward M. Graham, Dr. John Leeming, A. P. Norris, H. H. Norris and Dr. Arthur J. Rowland.

The appendices to this report were unusually extended and interesting. In the abstracts given of Appendices A and B some of the questions and comments have been omitted:

APPENDIX "A"—SUGGESTED QUESTIONS FOR USE BY EMPLOYMENT OFFICERS

Examiner to Use Only Such Questions as He Deems Necessary to Bring Out the Information from the Applicant

TESTS FOR CONDUCTORS

(To indicate general intelligence and judgment)

Have you a good memory?

Repeat the days of the week backward beginning with Saturday.

Repeat the months of the year backward starting with July.

Count backward from 19 to 10. Count backward from 30 to 20, skipping every second figure—as 8-6-4-2—beginning with 30.

Pay close attention to the five figures that I mention and repeat them backward. The figures are 3-1-8-7-9.

Do you know the meaning of the words: 1. Courtesy? 2. Civility? 3. Efficiency? 4. Politeness?

What is your idea of the value of such qualities in a conductor?

A man's salary is $20 per week—he spends $14 each week—how long would it take him to save $60, $18 or $48?

Our street car fare is —— cents. A man pays for three and gives you 50 cents—what change would you give him?

Our half-fare is —— cents. A passenger pays 1½ fares and gives you a one dollar bill, how much change would you give him?

What is your idea of the distance between the rails of a street car track?

From your observation of our cars, what is your judgment as to the seating capacity of one of the large pay-as-you-enter (or other) cars?

It is now (state time).

What time would it be if the hands of the clock were reversed?

A rifle carries perfectly for 100 yards. Is it any harder to hit a 12-in. plate at 100 yards than at 50 yards?

If a car travels a mile in five minutes, how far would it travel in half an hour? In one hour? In one and one-half hours?

Suppose there are eight blocks to a mile and a car travels at the rate of 10 miles per hour. How many minutes would it take to travel four blocks? How long would it take it to go one mile?

I see by your application that you are applying for the position of conductor. Do you understand that in that position you will be expected to help the company sell its street car service to its patrons? How do you think you can help to accomplish this purpose?

TESTS FOR MOTORMEN

(To indicate quickness of motor reaction to special sense perception, especially sight and hearing.)

How many panes of glass are there in that window?

How many fingers am I holding up?

Observe carefully the movements I make with my hands and arms and repeat the same movements.

When you hear me say square, draw a square on this paper.

When you hear me say circle, draw a circle around the square.

When I say triangle, make a triangle inside the square.

Execute quickly the following orders as soon as you receive them: Stand up, walk forward six steps, hop three times on left foot, march, halt, sit down.

To Indicate Judgment of Speed

At a good brisk gait, how many miles an hour does a man walk?

How many miles per hour does a horse go at an ordinary trot?

What would you consider fast speed in miles per hour for an automobile on a boulevard?

Are you able to estimate with reasonable accurateness when an automobile is going 25 miles per hour?

How do you make such estimate?

How fast do you think street cars run going at full speed?

To Indicate Judgment of Distance

What is the length of an ordinary city block?

How long are the large pay-as-you-enter (or other) cars?

What is the distance between the rails of a street car track?

What is the width of ——— street from curb to curb?

Suppose a wagon is driving on the track 100 ft. ahead of you at 8 m.p.h. and your car is going 16 m.p.h. about how many feet will you travel before overtaking it?

What is your estimate of the length, width and height of this room?

To Indicate General Intelligence and Judgment

Can you think of any sudden emergencies that might arise if you were running a street car?

What would you do if a child ran from the sidewalk in front of you car?

If you owned a street car and were looking for a man to run it, what qualities would you look for in such a man in the light of these possible emergencies?

Do you understand the meaning of the term "right-of-way"?

Under what circumstances would there be danger of striking a vehicle ahead on the tracks?

How would you avoid collisions at steam railroad crossings?

Would you take it for granted that a driver or pedestrian ahead of you and near your track would hear your gong?

Why is perfect vision in a motorman essential?

How much care can you count upon from a child six, eight or ten years old in avoiding being run over?

What is your idea of the cost of one of our cars?

Have you ever seen sand sprinkled on the track?

What is your idea of its purpose and use?

Appendix "B"—Report on Selection Tests

Prepared for the Committee by
Dr. A. J. Rowland

If satisfactory selection of motormen and conductors is to be made it is necessary first to have a specification of what sort of men we want. There is found later in this appendix a proposed form of specification for these two jobs. Everything in the employment procedure and selection hinges on this fundamental matter. With a satisfactory specification on hand we are in a position to establish tests which will determine whether applicants are really possessed of the necessary qualifications. Once these tests have been developed they can be applied with confidence and positive decisions be made. The requirements of a good trainman, exclusive of those cared for by the employment agent and medical officer, are:

Motorman

Must be steady and dependable.
Is not easily excited.
Is able to give concentrated attention.
Is able to make quick and proper responses especially in emergencies.
Has a good memory for instructions, places, etc.
Has good judgment.
Is loyal.
Will not take a chance.
Takes a pride in his work and skill.
Has reasonable self-confidence.
Has fair initiative.

Conductor

Must be honest.
Is alert and dependable.
Is friendly.
Is able to quickly grasp a situation.
Has good memory for instructions, places, names, faces.
Has good judgment.
Is loyal.
Is able to handle calculations quickly and correctly.
Has fair handwriting.
Has good voice qualities.

It is desirable to have procedure established such that all the work of selection is done in a systematic way and with as little waste of time as passible. Here is a suggested plan.

In filling the specification the employment agent manages the first elimination. He engages the applicant in friendly conversation and gives him a brief "sizing up." If he decides he is a candidate likely to meet the requirements he uses the job specification to show the applicant what the job is like. If the applicant believes he cannot meet these requirements he is likely to withdraw. If the man (with a knowledge of requirements) wants the job, the real selection begins. Measurement of height and weight and preliminary tests for eyesight, color vision and hearing are made and put down on Form 4. When the man has gone, the remaining data on that form are written in.

The applicant is next sent to the medical officer for examination according to a regular time schedule and after passing this examination he is sent to the person who gives the tests for mental qualities, mentioned later. The applicant then fills the regular application form and inquiries are sent out to references (Form 5). If these are satisfactory, the applicant is put on the waiting list.

Form 1—Job Specification for Motorman

Preferred Age — between — and — years. Must not be over — years if man has had no previous railway experience.

Preferred Nationality — American born. Ancestry such that he will understand and get along nicely with a majority of riders.

Educational: Fifth grade or the equivalent. Must read freely and write legibly.

Physical: Eyesight—Must not be near-sighted; must not be color blind.

Hearing—Must be at least 80 per cent. of normal in each ear.

Voice—Must be able to speak English plainly.

Body—Must have full and free use of arms, hands and shoulders at all times; must be able without fatigue to stand and sit, about half time each, through a period of — hours; must have no hernia, or functional or organic disease which would bar the applicant from securing life insurance.

Height—Not under — ft. — in.; not over — ft.

Weight—To conform to the standard weight chart with a maximum variation of 20 per cent. Underweight rather than overweight preferred.

Trade Experience: None required. A man formerly in street railway service who can show that he did not lose his job as the result of incompetence or poor ability is desired. A man who has some other skilled trade is usually undesirable.

Personal Characteristics: An applicant must be neat and of pleasing appearance; must be courteous, agreeable and even tempered: must be clean in his work and habits; must be honest, accurate, careful and known to be reliable and dependable. Men addicted to the tobacco-chewing habit are undesirable.

General: A married man is preferred to a single man. A man who knows the city is preferred to one who does not.

General Duties: Operating cars in the city system according to schedules and assignments as they may be given. Motormen report directly to division superintendents, but on the road take instructions from supervisors.

Conditions of Work: Clean, permanent: standing and sitting, about half-time each; Hours (filled according to company); pay, (according to company practice).

Advantages and Disadvantages: See supplementary sheet.

Expectations: Regular promotion in pay each year; an established seniority, etc.

Training: Ten to fourteen days of training required before regular work on the cars is begun. Rate of pay in this period ————.

Form 2—Job Specification for Conductor

Preferred Age—Same as motorman.

Preferred Nationality—Same as motorman.

Educational: Same as motorman; must be able to add, subtract, multiply and divide ordinary numbers.

Physical: Eyesight and hearing—Same as motorman.

Voice—Must have a voice of pleasant quality, strong enough to reach a car length without special effort. Must speak plain English without foreign accent and enunciate clearly.

Body—Must have free use of arms and fingers at all times to handle fares, changers, and bell and register cords expertly. Must be able without fatigue to stand through a period of — hours and have free use of legs to run ahead and signal, etc. Must have no hernia, or functional or organic disease which would bar the applicant from life insurance.

Height—Not under — ft. — in.; not over — ft.

Weight—Same as motorman.

Trade Experience: Same as motorman.

Personal Characteristics: Same as motorman and in addition must grasp situations quickly and be able to make a correct statement of any unusual occurrence.

General: Same as motorman.

General Duties: Managing passenger traffic on city cars. Taking fares, making change, issuing transfers, announcing streets and points of interest, attending to the convenience and comfort of passengers, giving desired information, co-operating with the motorman in maintaining schedules. Conductors report directly to division superintendents but on the road take instructions from supervisors.

Conditions of Work: Clean, permanent; standing nearly all the time. Out of the car for switching and signalling work at crossings; hours and pay, (according to company practice).

Advantages and Disadvantages: See supplementary sheet.

Expectations and Training: Same as motorman.

Form 3—Job Specifications for Motormen and Conductors

The following is to be carefully explained by the employment agent. That man is always preferred who wants the job without too much consideration of its advantages. Put the disadvantages first.

Disadvantages:

1. A motorman or conductor works day or night 365 days in the year. He works Saturdays, Sundays and all holidays. When others are enjoying themselves he is at work.

2. He gets up early in the morning—before 4:30, so that he can report at 5 a.m., and he does this in every kind of weather. The worse the weather the more he is needed.

3. He stands before the public as a sort of public servant, and as such is always subject to a certain amount of abuse.

4. When he takes the job he must go to training for two weeks, during which time he is paid $— a day. He must put up $— deposit as security for the return of company property. He must invest in a uniform which will cost him about — dollars.

5. Conductors must also procure a bond for which they pay — dollars per year.

6. After training a man is put on the extra list. He is assigned to work in his turn in an endless chain. His hours are very irregular. He cannot expect to get home to meals. Dinner may come at 10 a.m. or 2 p.m.

Advantages:

1. A motorman or conductor has a steady job, 365 days a year. No matter what business conditions are, what panics come along, he is sure of his job and of his pay check. He can well compare his income with the man who gets $10 a day and only works in good weather.

2. He is earning when others are spending and is likely to become thrifty.

3. He has an open-air job and clean work.

4. He is sightseeing all day long.

5. His uniform gives him the cheapest clothing he can wear.

6. He can gain promotion if he is worthy. A large per cent. of all company executives and nearly all in the transportation department have been promoted to their present positions.

7. When in uniform he has free transportation and is given unlimited pass for his personal use when not in uniform.

Form 4. Data Sheet—Applicant for Position of Motorman or Conductor

To be filled by employment agent.
Person who filled this sign here..........
Date filled..................
Name of applicant..........His home address..........
His probable age.....Age he gives.....
Give any physical defects you note.
Give height and weight from your own measurements.
Height ft. in. Weight lbs.
Has this man the appearance of good character and habits?

Did he meet your eyes in answering oral questions?

Is he reasonably quick in answering questions you asked?

Are his clothes carefully selected and neatly kept, and his shoes polished?

Does he show reasonable care in the preparation of his toilet; hair brushed, nails clean, face shaved, etc.

After each heading below check every quality or characteristic which you have observed in this man.

1. **Appearance**
   - Very attractive...
   - Makes good impression .....
   - Just ordinary....
   - Leaves poor impression .... ..
   - Stern or repelling
   - Neat ....
   - Untidy ....

2. **Voice**
   - Strong voice.....
   - Average strength.
   - Weak ....
   - Pleasant ....
   - Deep ....
   - Average pitch....
   - High ....
   - Harsh ....

3. **Language**
   - Good and without dialect or brogue ....
   - Some foreign accent ....
   - Poor English ...

4. **Physique**
   - Very erect.......
   - Erect ....
   - Round shouldered
   - Very tall........
   - Tall ....
   - Average ....
   - Short ....
   - Slender ....
   - Medium ....
   - Stout ....
   - Fat ....
   - Well proportioned
   - Dignified ....
   - Carries himself well ....

5. **Complexion**
   - Sickly ....
   - Pale ....
   - Healthy ....
   - Robust ....
   - Brawny ....
   - Fair ....
   - Medium ....
   - Brunette ....
   - Tanned or weathered .....
   - Color of hair....

Form 5. Data Sheet—Applicant for Position of Motorman or Conductor

To be sent to reference

This is sent to................

Date of mailing................

Name of applicant (*employment agent fills in here.*)

His home address (*employment agent fills in here.*)

How long have you known this man?

How do you know him? (*Employer, friend, etc.*)

Are you related to the applicant?

His probable age

Name any disease or physical defect this man has.

Give approximate height and weight of this man.

Height ft. in. Weight lbs.

After each heading below check every quality or characteristic which is true for this man. If you do not feel sufficiently acquainted with him to specify in any group, write after the heading "Do not know."

NO ONE IS PERFECT OR EVEN OF HIGH STANDING IN ALL QUALITIES

1. **Health**
   - Fine health .....
   - Rarely sick.....
   - Subject to slight sickness ......
   - Poor health.....

2. **Honesty**
   - Absolutely square
   - It good as most.
   - Easily tempted..
   - Slips sometimes..
   - Dishonest ....
   - Truthful ....
   - Exaggerates ....

3. **Personal Habits**
   - Heavy smoker...
   - Uses cigarettes .
   - Chews tobacco....
   - Uses profanity...
   - Is smutty or vulgar ....
   - Optimistic ......
   - Pessimistic .....

4. **Temper**
   - Quick tempered..
   - Moody ....
   - Irritable ....
   - Grouchy ....
   - Even tempered...
   - Phlegmatic .....
   - Good self control.

5. **Habits of Work**
   - Punctual ....
   - Tardy ....
   - Always busy.....
   - Steady and dependable ......
   - Industrious .....
   - Slow ....
   - Lazy ....
   - Systematic ......
   - Careless ....
   - Unreliable ......

6. **Disposition**
   - Nervous ....
   - Easily excited...
   - Calm in emergency ....
   - Selfish ....
   - Stubborn ....
   - Foolhardy ......
   - Self confident....
   - Self reliant......
   - Erratic ....
   - Timid ....
   - Quarrelsome ....
   - Somewhat friendly
   - A mixer........

7. **Memory**
   - Remembers everything ....
   - Remembers most things ....
   - Remembers fairly well ....
   - Memory poor....
   - Memory very poor
   - Is this true for memory of faces ——names —— places ——— instructions ———

8. **Ability to Learn**
   - Learns easily.....
   - Average ....
   - Slow ....
   - Dull ....
   - Close observer...

9. **Mechanical Ability**
   - Considerable ....
   - Average ....
   - Slight ....
   - None ....

10. **Courtesy**
    - Very courteous and obliging...
    - Courteous ......
    - Polite ....
    - Tactful ....
    - Crude ....
    - Rude and abrupt
    - Too polite.......

11. **Loyalty**
    - Staunch ....
    - Lukewarm .....
    - Indifferent .....
    - Obstinate ....
    - Troublemaker ...

12. **Judgment**
    - Good common sense ....
    - Common sense...
    - Fair judgment...
    - Poor judgment...

13. **Manner**
    - Bashful ....
    - Diffident ....
    - Easy ....
    - Breezy ....
    - Depressed ......
    - Grave ....
    - Pleasant ....
    - Cheerful ....

Remarks:

The above statement is true to the best of my knowledge and belief.

Signed ....
Address ....
Business ....

Date ....

Notes on forms 4 and 5

It is certain that information received from references is apt to be rather wide of the truth and some of it may be entirely worthless but if the inquiry is accompanied by a letter which asks that the same frankness be shown in sending a reply as would be desired by the recipient of the inquiry were the positions of the writer and the recipient reversed some result may be hoped for. Form 3 should be sent to former employers and to persons used as references.

Tests of Mental Qualities

The low grades of intelligence will be weeded out by almost any kind of test which is given. But special intelligence tests, as applied in the army, were given to "(a) aid in segregating mentally incompetent (b) classify men according to mental capacity (c) to assist in selecting competent men for responsible positions." The proposed tests which follow are chosen to help in selection work. It is very important that the right person manages the work. The same person should always do it and should be one who has been selected with special reference to a pleasant type of personality. He must maintain an interested manner and not yield to any temptation to put things through on a machine-like basis.

Test to Show That a Man Can Follow Instructions

With your pencil draw a line through the longest of the three words: SENT, RETURN, CASH and make a ring around the second of these numbers: 2, 3, 6, 7, 8. Then, if Independence Day comes in June, write NO in this space........; but, if not, just tell where the sun rises........ Make any letter except "A" after this comma, ...and then write NO if 2 times 5 is 9........ Now, if January is colder than July, make a cross here......; but, if not, make a cross here ...... or else a circle here...... Be sure to write TO between these two names of cities: Boston ....Buffalo. Notice these two numbers; 6, 4. If cork is lighter than water, write the larger number here...... but if cork is heavier than water, write the smaller number here...... Show by a cross when the nights are longer; in summer......, in winter...... Give the correct answer to this question: Will ice float in water?...... and repeat your answer here...... Do not give here the sum of 3 and 4, ... unless you skipped the preceding question, but write the first letter of your last name at the left end and the last letter of your first name at the right end of this black line:

Oral Test of Memory—For Names Figures, Etc.

The examiner repeats the numbers at the rate of one per second. Nothing is to be said except what follows:

Repeat the numbers I read to you in the same order I give them, starting immediately after I stop.

3-1-7-5-9 4-2-8-3-5 9-8-1-7-6

Repeat these the same way

3-7-4-8-5-9 5-2-1-7-4-6 8-3-4-9-2-5

Repeat the following number but in reverse order. Thus if I said 1-2-3 you say 3-2-1.

2-8-3 4-2-7 9-5-8
3-1-8-7-9 6-9-4-8-2 5-2-9-6-1

Test of Memory—of Observation—of Handwriting

Hand the applicant a piece of paper and pencil and place him where he can write easily. He must use a pencil since all his reports will be made in pencil. He must not be told that this test is to show his handwriting since his thought must be on other things and what is wanted is his ordinary writing. One of three pictures is handed the applicant which he is allowed to view for fifteen seconds after the following instructions are read to him.

"I am going to hand you a picture which you are to look at carefully for a limited time. Try to see everything in the picture so you can recall the scene very completely. Then as soon as I call time and take the picture away, write down on the paper I have given you everything you can remember there was in the picture and after than write a few sentences to tell what the story in the picture is, what it is a picture of, or what the picture is about. (The pictures suggested are the Dutch home, river scene and post office as used by Professor Terman in the Stanford revision of the Benet-Simon intelligence scale.)

Test of Judgment

Make a cross (X) on the short line before the answer which you think is best.

If your trolley car ran off the track what would you do?

——Try to run on the street.
——Call the fire department.
——Call the emergency truck.
——Try to lift the car back onto the track.

If you were a passenger and fell asleep on a train and rode past your station, what would you do?

——Pull the bell rope and stop the train instantly.
——Tell the conductor to take you back.
——Get off at the next stop and take another train back to your station.
——Jump off and walk back.

If a child started running out into the street after his ball a very short distance in front of the car what would you do?

——Notify the conductor.
——Ring the gong vigorously.
——Speed up the car.
——Make an emergency stop.

If a passenger asks you to speed up your car so that he can catch the car ahead, what would you do?

——Speed up the car so as to satisfy the passenger.
——Do nothing at all.
——Decrease the speed of the car.
——Refuse to comply with the request of the passenger.

If a passenger bawls you out when you don't deserve it what would you do?

——Call the conductor to help put him off the car.
——Shout back at him.
——Say nothing at all to the man but report the incident.
——Explain quietly to the man that he is wrong.

If you were dissatisfied with the wages being paid by this company what would you do?

——Look for another job.
——Growl about it among your friends.
——Consult your superintendent about a raise in wages.
——Urge all your fellow workers to ask for a raise.

If a man hit you without meaning to do so while you were on duty what would you do?

——Hit him back.
——Swear out a warrant for his arrest.
——Excuse the man.
——Report the matter to your superintendent.

Oral Test of Ability to do Required Calculating Work

The examiner should read each question clearly and plainly once only. The answer is then awaited for a reasonable time. If it doesn't come, go on with the next. Do not say whether an answer when given is right or wrong. Keep right on in a pleasant tone of voice to the end.

The rate of fare for an adult passenger on our lines is 7 cents (modify to suit the road) and for children it is four cents.

How much will it cost four grown people to ride?

What is it for a party of five children?

Seven children get aboard and give you a quarter. What will the change be?

A woman and child get aboard and the woman gives you a quarter. How much change do you give her?

A man and two women get on board and the man pays all the fares. He hands you a dollar bill. What change will you give him?

Test for Clear Enunciation and Voice Strength

The examiner hands to the applicant for the position of conductor a list of streets and names. He is told to read each one in turn to himself and then announce it as he would to reach all the passengers in a car as large as those used on the system.

Seventh	Linden Street
Seventeenth	Linton Street
Twenty-second	Frankford
Linnwood	Tank Road
Limmude	Rudolph

Test for Prompt Motor Reaction to External Stimulus

The examiner and applicant are seated on opposite sides of a table. The applicant holds his hands, palm down, several inches above the table and as certain commands are issued drops either the right or left hand to the table. The signal to drop the right hand is the order "stop car," that to drop the left will be "start now." The words "steady," "go," "stop car" are then repeated, though not in regular rotation. Failure to drop the proper hand, or to drop either hand at the word "steady" is considered an error.

The discussion was opened with a paper by Dr. Francis Lee Dunham, of Baltimore, Md., which was read by Secretary Welsh.

In introducing Dr. Dunham's communication, President Palmer commended the committee report as valuable in that it opens up new vistas of important and comparatively unexplored fields for further study and research. He explained that Dr. Dunham is a talented physician who has done valuable work in psychiatry, particularly with young people whose mental faculties are under normal. He is largely responsible for some of the admirable laws of Maryland concerning such persons. He is a lecturer at the Johns Hopkins University on social medicine and on probation and delinquency, and is psychiatrist to the Maryland State Bureau of Labor and Statistics, the Maryland State Industrial Schools, and other organizations. Dr. Dunham's paper is abstracted elsewhere in this issue.

THE "INTERURBAN HOUR"

One of the most lively discussions of the afternoon occurred in the round-table talk on interurban problems lead by Edward C. Spring, Allentown, Pa. The first topic, meeting highway competition, was treated fully in a paper by D. W. Pontius, Pacific Electric Railway. His discussion is treated elsewhere in this issue. Bert Weedon, Indianapolis, said that the interurbans in Indiana had not yet received full recognition from the commission. He claimed that the electric railways have nothing to fear from bus competition with the advent of proper regulation. In spite of considerable competition the Interstate Public Service Company has not met it with reduced rates, but has, in fact, upheld the high standard of its service. Mr. Weedon said he was never so enthusiastic about the prospects for the interurban roads and revealed that their real problem is to secure sufficient equipment in more favorable territories than that covered by their lines. He believes others can do still better with the freight business than they have.

Garrett T. Seely, Youngstown, Ohio, told of the peculiar conditions under which the Pennsylvania-Ohio Electric Company operates as far as commission regulation is concerned. In Pennsylvania the company has the protection of the commission while there is none in Ohio. Because of this condition the company recently opened a bus line in Ohio between two towns 15 miles apart to eliminate competition. Although the route parallels their rail line, the physical track layout prevented a better running time than seventy minutes. With De Luxe motor coaches it has been possible to make the run in about forty-five minutes and to charge 50 to 100 per cent higher rates.

The next subject, economics of operation, was treated in a written discussion by Clinton E. Morgan, Brooklyn, whose remarks are abstracted elsewhere. J. P. Barnes, Louisville, declared that economics consisted of nothing else than studying the textbook and the public. He claimed that people will always buy service.

Discussion on the problem of getting increased passenger business was then taken up.

F. L. Butler, Georgia Railway & Power Company, Atlanta, presented a paper in discussion of this subject. An abstract follows:

No generally defined course to build up interurban traffic can be followed. Local conditions must largely govern, and our actions must be controlled by the exigencies of the situation and the peculiar conditions surrounding. There is, however, one fundamental idea to be borne in mind. The service should meet, in the most convenient manner possible, the demands and necessities of our patrons and it should be attractive as well. In Atlanta, we have a transportation engineering department—separate from but auxiliary to our transportation department, whose sole duty is the checking of traffic, and the measuring and allotment of service by means of properly built schedules. I am frank to say, however, that we have given much less study along these lines to our interurban service than the situation now demands, and much less than we will be obliged to give in future, if our interurban business is not to be allowed to perish.

Assuming that this matter of service adjustment receives deserved attention, the next important step should have to do with fares. On our interurban lines out of Atlanta the principal revenue is from the commuter, to whom we sell a commutation book good for thirty-five days, containing twenty-seven round trips, at a cost ranging from $8 to $10. This sum represents a considerable outlay for the average individual, and we are now considering the sale of a weekly book, at a proportionately smaller amount, as a step in the right direction.

I believe also we should all give more attention to advertising. The man in the city gets tired of the city just as the man in the country grows stale on country life. Some town along the interurban line may have a local celebration, which to the city dweller may be reminiscent of his more care-free days. If properly informed of the event, the time, the place, and the road, he may be tempted to attend with maybe some one or more members of his family. By the same reasoning, when the city is staging an event of importance, those in the country may be induced to attend if told about it. I do not mean that advertising should be devoted exclusively to special occasions. If there are points of interest along the line they should be played up and kept before the public eye. It pays to advertise your wares in the street railway business the same as in any other business.

Having done all this, we may still have much sparsely-settled territory bordering along our tracks. What can we do to aid in its development? Is it not plain that the thing for us to do is to interest reputable realty men in our problem, and with their aid proceed toward building up the vacant territory we have? It seems to me it is—and this we are doing.

And finally it has been suggested that our publicity department be extended to embrace a sales department for the purpose of selling service. Our gas companies have salesmen; our light and power companies have high-class, high-powered sales engineers. Why is it not logical to assume the necessity for a sales manager whose time shall be devoted to selling rides—particularly on interurban lines—and making two rides take place where only one took place before? He is attached to our publicity department; he has the means of acquainting patrons with coming events and knows the best picnic grounds along the lines, the best athletic fields available, when this Sunday School will have its annual outing, etc., and he is prepared to suggest the time and the place and arrange for the service. The appointment of a sales manager, where conditions will at all justify, is worthy of much consideration. Let us all feel the necessity of stimulating and building up our interurban travel, and by an exchange of ideas covering this subject, I am confident we can meet the situation and conquer it in a satisfactory degree.

The advice of C. E. Thompson, Highwood, Ill., was not to decrease rates or increase service in order to get more business, but first to give real service and then advertise it. He emphasized the necessity, however, of keeping the service just a little ahead and not behind the amount of traffic handled.

F. D. Norviel, Anderson, Ind., opened the discussion on getting increased freight business. According to him the best ways of increasing the business are by personal solicitation, by the use of shippers' guide maps, etc., newspaper advertising and by car and station cards. In relating what the Union Traction Company of Indiana had done Mr. Norviel said that when it was decided to enter the stock-handling business an experienced livestock man was sent into the territory to meet the stock buyers and farmers and to make suggestions as to where stock pens should be placed. This man also worked out with them the shipping problems, schedules and other details. The schedules for this business were broadcasted throughout the farming districts by personal presentation and by placing them in stores and offices along the line. Mr. Norviel remarked that his company is now handling about 200 cars of livestock per month.

In treating the methods used to develop favorable public sentiment a delegate from Duluth said he always attempts to get a selling point in all announcements which the company makes. To publish merely the announcement makes dry and uninteresting reading. Until carefully studying what a railway has to talk about, he said that he did not realize that there was so much which might profitably be brought before the public. Following this method he has compiled a complete file of topics to be used in such campaigns. The amount spent for advertising by the Duluth Street Railway, he said, was one-third of a cent for every dollar of annual gross revenue.

In connection with the necessity of departmental co-operation, H. A. Nicholl, Anderson, Ind., said that nothing paid bigger dividends than co-operation. One way to interest employees is to organize a safety or efficiency committee. The work of these committees should consist largely in handling and acting upon suggestions from their own members or from other employees. Through such committee work employees learn to feel that they have a share in the operation of the property.

The wonderful work in securing co-operation on the Pacific Electric Railway was related. Following the consolidation of the system from thirty-seven small properties there existed a condition tending to tear down the unity of the organization. A Pacific Electric family has been created by the establishment of safety and employee committees, to which every man is invited to present his views and criticisms. This co-operation has resulted in a more complete understanding between management and men, a high degree of morale, and has reacted to the financial betterment of the company.

Following the round-table discussion President Palmer called the past-presidents of the Transportation & Traffic Association to the platform, after which he recited briefly the accomplishments of the association since it was founded in 1908 under the direction of C. Loomis Allen. The past-presidents present were R. I. Todd, D. A. Hegarty and H. A. Nicoll.

Engineering Association Proceedings

Outstanding Feature of Reports and Discussion Was the Increasing Extent to Which the Association Is Becoming Related in Its Work to Other Organizations — Reports Showed Great Progress in Way, Power and Other Technical Developments

C. S. KIMBALL

L. C. DATZ

A LARGE number of electric railway engineers were on hand promptly to hear the presidential address of C. S. Kimball in opening the convention of the Engineering Association on Monday.

PRESIDENT KIMBALL'S ADDRESS

President Kimball opened his address with a tribute to Chicago as a convention city. He then outlined the important features of the work of the past year, in substance as follows:

Early in the season it was decided, in order to give the different members of the executive committee certain prescribed work, to appoint them as sponsors to assist the chairmen of standing committees, and to preside at a committee meeting when the chairman or vice-chairman was absent. The plan has served to keep the officers and members of the executive committee in close touch with actual committee work.

A plan for a machine for testing rail joints and track structures was discussed thoroughly. It is hoped to secure ample financial support for this within a few months. Recently the director of the Bureau of Standards consented to the locating of the machine on the Bureau property in Washington.

The procedure in adoption of standards is gradually shaping itself into one under which, in the interests of all, proposed standards are referred to the American Engineering Standards Committee. At present many of the association's standards are before this committee, and many of its leading members serve as its representatives at the deliberations of the A.E.S.C. It is important that the Engineering Manual be revised and other standards be submitted promptly to the A.E.S.C., because after Jan. 1, 1924, the present rules for adopting standards are to be changed and the procedure will be less simple.

For many years the subject of detailed cost accounting has been a source of much trouble and controversy, especially between the accountants and the engineers. Under present methods used and prescribed by the I.C.C., the accounts are not so divided that various items may be segregated. This year the engineering accounting committee has prepared a report which suggests means for detailed cost accounting which will eliminate the duplications which now exist.

Following Mr. Kimball, G. C. Hecker read the report of the secretary, J. W. Welsh.

REPORT OF THE SECRETARY

Two features of the year's work, stated Secretary Welsh in his report, were the standardization program and the co-operative work with committees of other national associations. There were sixteen standing committees with a total personnel of 141. A total of thirty-three meetings were held at which the total attendance was 240. During the year four data sheets were sent out as follows: On design of track construction, on helical gearing, on overhead current-collecting devices and on purchased power. Thirteen standards selected from the Engineering Manual by the 1920-1921 committee, and approved by the 1921 convention for that purpose, were submitted to the American Engineering Standards Committee for approval on June 12, 1922. The committee is actively represented on the executive committee of the A. E. S. C. and is participating in the program of national standardization through representatives of nineteen sectional and special committees.

On Aug. 9 the executive committee authorized the appointment of a committee to revise the mechanical form of the Engineering Manual and to supervise future editions with revision of manual sections. This is to consist of three members of the executive committee, having terms of office arranged so that after the first year not more than two new members will be appointed in any one year. The committee appointed for the present year consists of R. C. Cram, chairman; Charles R. Harte and Daniel Durie.

The secretary reported 521 individual members in the Engineering Association and stated that G. C. Hecker, appointed on March 15 as special engineer, has given a considerable portion of his time to the work of the Engineering Association.

A committee on resolutions was next appointed, consisting of H. A. Johnson, C. R. Harte and H. H. Norris.

F. R. Phillips then read the report of the committee on reorganization.

REORGANIZATION OF ENGINEERING ASSOCIATION

The committee appointed by President Kimball to consider suggestions made by Past-President William G. Gove reported that after careful consideration and study of the aim and purpose of the Engineering Association, which fundamentally is and should be an affiliated body of the American Electric Railway Association, the conclusion was reached that the rules and principles upon which the former is founded are sound and permit unlimited latitude to the membership for the development of the electric railway as an industry and business. There appears to be nothing in the constitution and by-laws to prevent the "modernization" suggested by Mr. Gove. It appears that the principal obstacle in the way of reform is that of finance.

The committee felt that several of the conditions complained of by Mr. Gove had been corrected during the year, but the committee made the suggestion that standing committees are required to undertake too much work in a given time. Further, it was recommended that a return be made to the use of letter ballot in passing upon the adoption of recommended practices and standards.

Mr. Gove's criticism with respect to the Engineering Manual has struck a responsive chord. Efforts have been made from time to time to revise the form and subject matter of the Manual, and the committee recommended the appointment of a special committee whose sole duty it should be to modernize the Manual. Further, the committee approved Mr. Gove's suggestion with respect to the manner of adopting standards along the lines followed by the mechanical division, American Railway Association. He had suggested that standards should be determined upon a unit basis, the company voting upon rolling stock matters in accordance with the number of cars it owns; upon power generation and line distribution and affiliated matters, according to the energy output for railway purposes; and upon way and structure matters, according to the number of single-track miles operated. The committee recommended that a suitable resolution embodying this principle be prepared for presentation at the convention, due notice having been previously given to member companies that such a resolution would be presented.

In conclusion the committee expressed the belief that there is no need for a revision of the constitution or by-laws or the form of organization of the Engineering Association in any manner and that all of the criticisms of the conduct of the association can well be met by executive committee action or resolution properly placed before the membership.

This report was signed by F. R. Phillips, chairman; H. H. Adams, L. C. Datz and J. H. Hanna.

A brief discussion of the above report showed favor of the plan for more deliberate adoption of standards and the report was approved.

PAST-PRESIDENTS RECEIVE BADGES

Badges were presented to all past-presidents of the association, those who were present being asked to speak briefly. Mr. Kimball first awarded one to H. H. Adams, referring to him as the "daddy" of the association. He then asked Mr. Adams to make the other awards. Mr. Adams reviewed the history of the association from its beginning in Cleveland, on Feb. 16, 1903. The first of the seventeen presidents was Thomas Farmer. Mr. Adams spoke reminiscently of many of the past-presidents and asked the men present to rise in silence in tribute to the memory of Past-Presidents Lincoln and Baker, who had passed away. The past-presidents present, who responded briefly after the award of the medals, were W. J. Harvie and F. R. Phillips. A medal was also awarded Retiring-President C. S. Kimball. Reference was made to the three names which the association had carried. The first was "American Railway Mechanical and Electrical Association," the next "American Street and Interurban Railway Engineering Association," and the third the present one.

An interesting feature was the presence of G. W. Palmer, a former active member of the association and a vice-president, who had been kept away from the conventions by ill health for five years. He gave some personal reminiscences of the organization of the association, of which he was a charter member. Mr. Kimball paid a tribute to the great value of Mr. Palmer's work to the association.

Following the badge presentation a snappy talk on safety was given by R. M. Reade, Quebec, representing the committee on safety of the Transportation & Traffic Association. His talk was full of enthusiasm. His plea was for right human relationships in promoting safety.

After the talk on safety H. H. Adams presented the report of the committee on unification of car design.

UNIFICATION OF CAR DESIGN

The type of car considered by the committee is for city use, embodying some of the latest practices that are being incorporated in cars of recent construction, and the committee decided upon the following points relative to the design:

Transverse seats to be used with the exception of the seats adjacent to the end bulkhead.

Top sash to be in one continuous piece from corner post to corner post and fastened permanently to each post.

The lower sash to be arranged to raise.

Distance from center to center of posts 29½ in.

Width over posts 8 ft. 4 in.

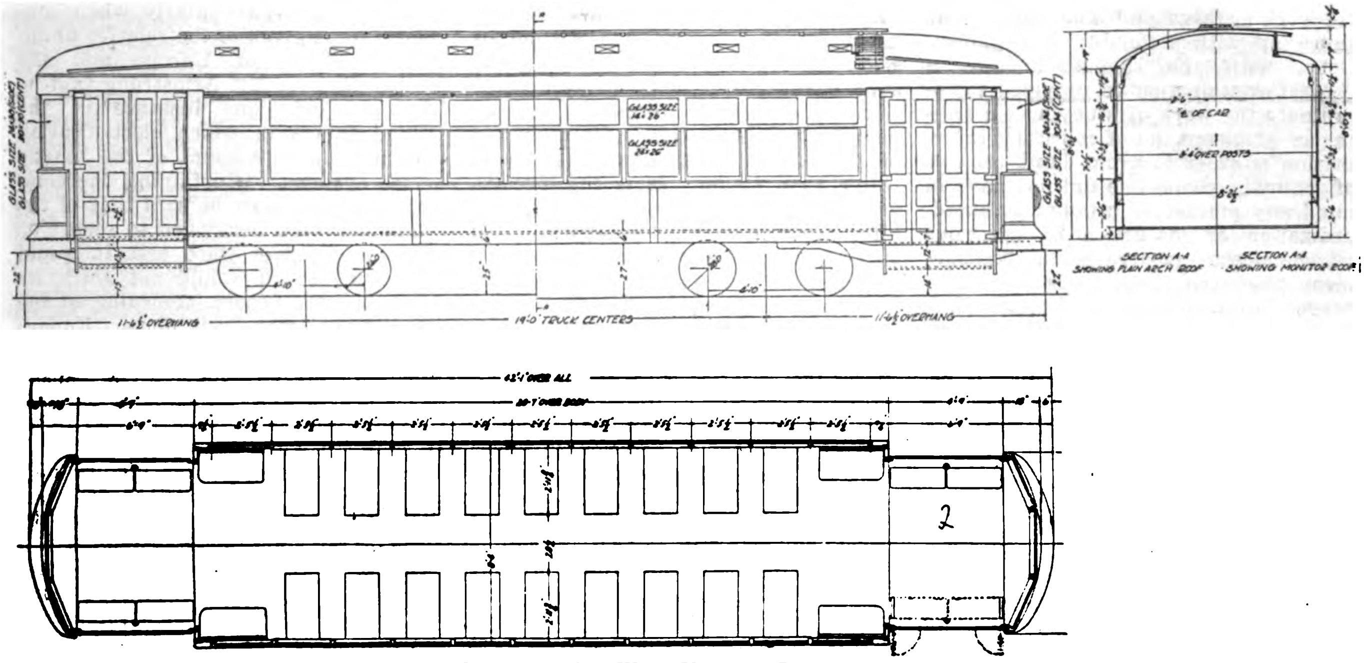
Width over all 8 ft. 6 in.

The side girder construction to consist of steel plate, the thickness to range from No. 14 to No. 12 gage.

The bottom of this side girder to be reinforced with steel angle or an equivalent member and the top of the girder plate with a flat bar. These reinforcements to have sufficient section to meet the stresses imposed upon the same.

Considerable attention given to the question of step heights by the committee, and advantage taken of the progress in the art in motor design, which permits the use of smaller diameter wheels, thus allowing the use of lower steps on cars. It is recommended that if 26-in. diameter wheels are used a ramp be inserted starting inside of the end sill of the car and extending out over the platform, and that only one step be used between the platform level and the top of the rail; the maximum height of the first step from the top of the rail to the top of the step not to exceed 15 in. With cars having a wheel diameter of 28 in. or over, a drop platform is suggested, and in this construction steps even lower than 15 in. can be obtained. It was decided to incorporate on the tentative design, platforms having a length of 6 ft. 9 in.

A design of car showing proposed unification dimensions was submitted for the consideration of the association. This shows a composite design. In the longitudinal side view, one-half of the car is shown equipped with 26-in. diameter wheels, using a ramp to the platform. The other half of the car is shown with 28-in. diameter wheels and with a drop platform. In the sectional view, one-half of the car is shown with an arch roof and the other half with the monitor deck, so as to show the possibilities of the different types of roof construction. These sections show that uniformity of construction up to the top rails can be obtained, and illustrate clearly that it is possible to design cars up to that point and then use either the arch roof or monitor deck, as may be desired. The same type of post may be used in each case. The type of ventilation has been left open, as this is in itself a subject which would require extensive study.



DESIGN OF CAR WITH UNIFORM DIMENSIONS

The design of this car shows eleven windows, with a total length of 42 ft. 1 in. over bumpers. The thirteen-window car would have a length over all of 47 ft. The seating capacity of the eleven-window car, not including the platform seats, is forty-four, and with the thirteen-window car it would be fifty-two. The design shows an arrangement of platform seats. This, however, the committee believes should be left open for the specific type of car to be used.

The design shows specifically one width of 8 ft. 4 in. over post and 8 ft. 6 in. over all at the drip rails, with an idea that this type of car would be desirable for such properties as can accommodate this width. These dimensions conform with the general average obtained as a result of the questionnaires sent out by the committee and contained in the report which was presented at the 1921 convention. The committee considered it advisable to submit a design covering this width of car with an idea of developing a discussion as to the desirability of designing cars with other widths. Standard sizes of glass are used for the windows in this car.

The committee recommended for approval the following dimensions as the preliminary step in obtaining uniformity in dimensions and design of double-truck cars for city service:

Center to center of posts........	29⅝ in.
Height of window opening from window rail to bottom of the lower rail in top sash.........	27¾ in.
Height of car from bottom of sill to top of roof................	8 ft. 8¾ in.
Height of car from bottom of sill to bottom of top plate.........	7 ft. 1¾ in.
Height of girder plate...........	30 in.

A stress diagram, giving the method of figuring the stresses in the girder of the car, also formed a part of the report. (Note: The stress diagram shows 12,000 lb. per square inch stress at the door post section. The committee is of the opinion that this is a little high and that it will be advisable to use either a heavier section of channel than called for or to reinforce the same with a plate, so as to bring this stress down to 10,000 lb. per square inch. Shortage of time did not permit the above as a correction on the diagram.)

In connection with the work of the committee on unification of car design in joint session with the committee on one-man car operation on the question of car design and the demand for the greater use of cars operated by one man, the following resolution was adopted by the joint committee:

"The present car of the single truck, light-weight, one-man type has its economical limitations. In semi-congested districts there is a demand for a car somewhat larger than the present smaller car and with either single or double passageways. There is likewise a demand for a car of still larger capacity for one-man or two-man operation as triffic conditions require. The committee believes that in the design of such cars it is desirable to provide liberal widths of aisle and passageways so as to facilitate the movement of passengers in interchange and toward the rear of the car."

The report was signed by H. H. Adams, chairman; H. A. Benedict, J. A. Brooks, J. W. Hulme, G. L. Kippenberger, John Lindall and V. R. Willoughby.

DISCUSSION

In the discussion of the report on car design Mr. Adams said that the Chicago Surface Lines had built a car along the lines as given in the report. This sample car was shown on the pier. A communication from R. C. Cram was read in which he emphasized the importance of designing car ends with due reference to the design of special trackwork. The subject should be considered jointly with track engineers.

F. R. Phillips spoke of the important bearing which this report is apt to have on the industry, and advised caution in the adoption of car standards. He said that the center-entrance car lends itself well to light-weight design. It is also effective in handling mass transportation. With a front exit it provides three effective entrances if desired. As to width of car, this is affected by conditions and it is difficult to standardize width. Further, any recommendation with respect to motive power is dangerous. The characteristics of the route should be considered. In Mr. Phillips' opinion it would be unwise to approve the report at this time.

H. G. Percie urged the importance of standardization in roof construction, particularly with reference to roof profile or contour. This would facilitate the furnishing of headlinings, etc., by manufacturers.

In rebuttal of criticisms Mr. Adams said that the committee had in mind the importance of co-operating with way engineers. This will be taken care of. As to Mr. Phillips' criticisms, Mr. Adams pointed out that the proposed design was based on a questionnaire. The committee took the double-end car as a starter, as this seemed to be in most general use. It is, of course, impossible to design a car that will meet all requirements, but many of the suggestions of the committee ought to prove useful.

On recommendation of Mr. Harte the report was accepted with thanks and with the recommendation that the work of the committee be continued.

The report of the heavy electric traction committee was presented by A. H. Armstrong in the absence of Mr. Withington, the chairman. An abstract of this report follows:

HEAVY ELECTRIC TRACTION

The report of the committee on heavy traction began with a statement of what had been done to obtain co-ordination of work with other associations interested in heavy electric traction in order to increase efficiency of committee work in this field. The subject was taken up with a number of organizations, with the suggestion that a central organization be provided to coordinate the work of studying electrification problems and of collecting information in order to avoid duplication of effort. The committee did not have in mind any premature attempt to standardization or discussion of questions which might embarrass the management of electrified railroads or of railroads contemplating electrification. Many of the organizations expressed interest in the proposal and all agreed as to the value of co-operation. It became apparent, however, that if such a movement is to be successful, it should be under the leadership of the steam railroads.

The committee reported that it is not improbable that the steam railroads will before long see the necessity for a joint committee on electrification. If this is the case, the desirability will undoubtedly soon be felt of calling upon all associations and organizations having technical knowledge of value.

The principal parts of the report were the appendices containing information on electric locomotive tonnage and mileage, details of foreign electrification, electrical operating data of the principal American railroads, and the supplementary bibliography on heavy electric traction, bringing the references up to June 30, 1922.

This report was signed by S. Withington, chairman; A. H. Armstrong, R. Beeuwkes, H. W. Cope, J. C. Davidson, J. H. Davis, J. V. B. Duer, C. H. Quereau and L. S. Wells.

DISCUSSION

C. R. Harte, in discussion, said that it was most unfortunate that the railroads prefer to go their own way. This makes it difficult to do other than has been done in this report, which is admittedly a meager report. The committee, however, is making a record not otherwise available and it is advisable to keep the committee at work until steam men can see that the A.E.R.E.A. can help them. Mr. Harte said that he thought this committee could very advantageously take up more intensively the study of heavy interurban electrification. This is surely within the province of this association.

H. H. Norris expressed disappointment that the steam railroad men thought the electric railway men were "butting in." Naturally the Engineering Association has no intention of assuming their prerogatives, but at the same time, the electrification of railroads being an electrification problem, electrical men are interested in it. It must be remembered though that this committee's principal duty is to serve the engineering association, to keep that association posted on heavy traction matters.

In a written discussion W. S. Murray strongly indorsed the work of the committee in its graphical presentation of electrification data. The principal point in Mr. Murray's discussion, however, was a plea for manufacturers to get together on some one system of electrification. Electrification is being kept back because each manufacturer damns (at least by inference) the other manufacturer's system. As a matter of fact either of the two systems is better than steam. It is the "wealth of choice" which is the very thing that kills electrification. However, Mr. Murray thinks he sees signs of a meeting of viewpoints between the manufacturers on this question.

William Arthur said the report was lacking in one respect. As an organization the A.E.R.E.A. is primarily interested in street railways, but secondarily in heavy electric traction. It is a great pity that in addition to tables there is not given a résumé of progress, understandable by one not experienced in heavy electric traction. He also urged that as engineers the committee should present an impartial engineering report free from manufacturers' influence or what might be called a political slant. The committee at least could show that there is no railroad in the country which could not be electrified by one system or another, and this should clear up the question in the minds of the steam railroad men.

N. W. Storer said he was disappointed in the report, coming as it did from men of the calibre of men such as those on the committee. The committee should at least review the literature of the year and bring out the salient points for those who naturally do not have the time to read everything.

F. E. Wynne pointed out that the data showed that roads having the least mileage showed the greatest locomotive tonnage per mile, and that the data covered such a variety of electrifications that the derived figures for tons of electric locomotives per electrified track-mile may be useful for quickly approximating locomotive tonnage required by similar proposed electrifications. Recent orders and immediate plans for additional electrified trackage coupled with existing railway conditions make it reasonable to expect further and increased activity in railroad electrification. Referring to foreign electrifications, data on which the committee should secure next year, Mr. Wynne pointed out some recent orders, commenting upon the receipt by American manufacturers of orders for some of this material.

"Apparently," said Mr. Wynne, "future extensive electrifications will employ overhead contact lines to the exclusion of the third rail." He suggested that the committee make a study of catenary lines looking towards a reasonable degree of standardization. There are two subjects on the border between heavy and light traction which the committee might consider. One of these is the electrification of branch lines and small more or less isolated steam roads. The other is the handling of freight on interurban railways. Mr. Wynne showed the logic of tackling both of these subjects.

A. H. Armstrong said it was disconcerting that Europe is outstripping the United States, particularly when consideration is given to the relative financial conditions of Europe and the United States. Mr. Armstrong said he knew of only one instance in the United States in which electrification was held up on account of the "battle of the systems." Sustaining the committee in its report he said that if the committee were instructed to report on what one system were best it would have done so—it would not shirk its duty—but the report, according to the instructions, was well done. Fundamentally electrification on a nationwide scale must be done on one system, but there is now an *impasse* because no one system has been agreed upon. It is worth while continuing the work of the committee so that history may be written as facts, and so that the decision when made may be on the basis of facts and not opinion.

H. A. Johnson in presenting a preliminary report of the subjects committee made three principal recommendations. One was that joint sub-committees be avoided and that special committees be appointed instead. The second was that since the American Engineering Standards Committee has now adopted the principle of not passing on specifications without formal section action, any specification now contemplated should be submitted to the A.E.S.C. with the recommendation that it be worked out under the sponsorship of the A.E.R.E.A. He recommended further that each committee go through its standards and submit those which should be made "American Standards" for action by the A.E.S.C. before Jan. 1, 1924, as action can be taken up to that date on present standards without referring to special sections. The third recommendation was with reference to heavy traction, largely indorsing the proposals previously voiced; that the committee revise and keep up its records; that it study branch lines, self-propelled cars and storage battery locomotives for yard service; and that it review the past three or four years work—principally from the interurban standpoint.

Tuesday Session

A joint meeting of the Engineering and Accountants' Associations was held Tuesday afternoon. This was opened by a short address on safety work by Fred M. Rosseland. The general theme of Mr. Rosseland's address was that the way to prevent accidents is to get at the cause at the original source and eliminate it. He gave examples of accidents resulting from runaway cars and showed how beneficial results were obtained as soon as the cause was determined and removed.

The report of the joint committee on engineering-accounting was then presented by C. R. Harte, co-chairman. It is abstracted below:

ENGINEERING ACCOUNTING

As the committee on engineering accounting was appointed late in the year, the committee made a preliminary report and recommended that the subject be given further consideration.

The report pointed out that cost collection and compiling, either by an engineer or an accountant, should be carried out with a view to furnishing a complete and concise statement that would be satisfactory both to the accountant for his reporting and to the engineer for many purposes. That the present method of dividing the aggregate departmental expenditures of an electric railway is unsatisfactory and insufficient for the engineer is fairly well established. The natural consequence is that the engineer compiles his expenditures along separate lines, with corresponding duplication of cost and effort. In the committee's opinion the I.C.C. division of accounts falls short of giving the engineer the desired results and fails to aid him in attaining his highest efficiency.

It would seem logical that, if the accountant were furnished with specific details of all the operations of an engineering department in such a form that the figures could be easily recorded and readily understood, it would be cheaper and more efficient for the accountant to handle the matter. To enable an engineering department to furnish these details it is necessary that all items of work be known and stated definitely, so that it will understand how to list and to describe the various items for recording.

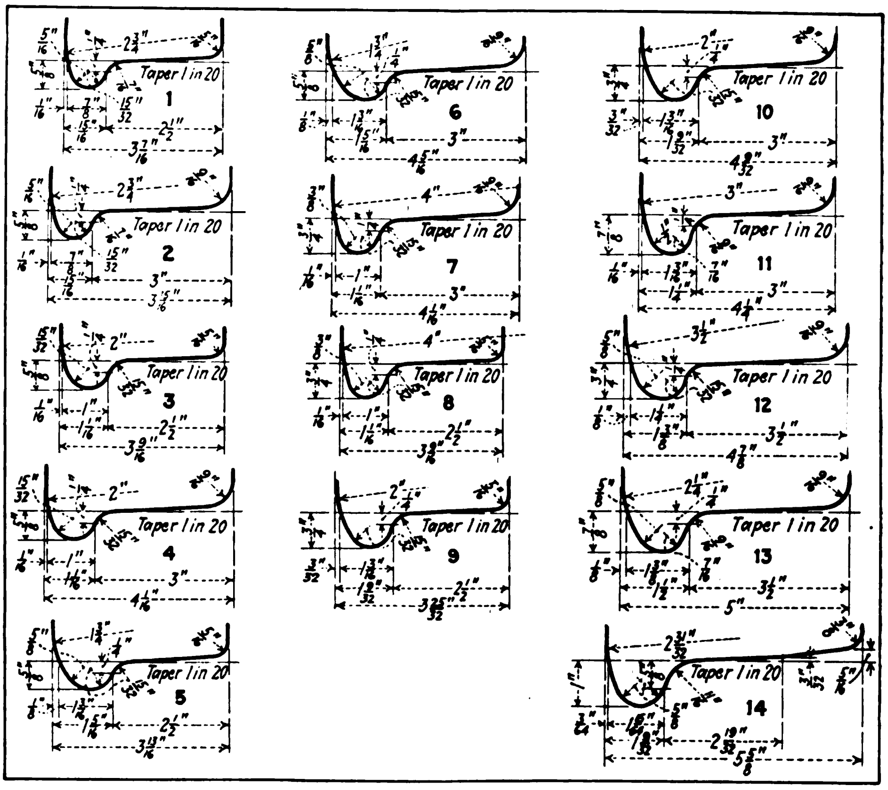
The committee made as the principal part of its report a classification of codes prepared by Herbert Jackson and used by the Washington Railway & Electric Company in reconstruction work during the past two years. This conforms to the I.C.C. classification, but is grouped according to natural divisions of the work of the way department. It has permitted the keeping of a close daily check on expenditures against major reconstruction jobs on the underground conduit tracks in Washington, D. C. Appended to the report were reproductions of a large number of forms used by the Washington company.

The report was signed by C. R. Harte and H. C. Kimball, co-chairmen, and L. R. Brown, J. C. Collins, G. F. Dinneen, H. Jackson, C. H. Lahr and F. H. Sillick.

The above report was accepted after a brief discussion of some of the important points, particular emphasis having been given to the necessity of special assistance to foremen and other field men responsible for original distributions.

E. D. Dreyfus, Pittsburgh, Pa., then presented extracts from his paper upon the general subject of the relationship between the engineering and accounting departments. This paper, which is abstracted elsewhere, was the subject of considerable discussion. It appears that there has been a feeling on the part of some of the accountants that their requirements had been somewhat subordinated in the past, and this matter was brought out rather forcibly by some quotations. It developed, however, that both branches of the industry are now manifesting a desire to co-operate, with a view to permanent coordination of work. It was the general opinion among engineers and accountants alike that considerable good had already been accomplished along these lines.

The general trend of the discussion appeared to suggest the desirability of including, among the larger organizations at least, a so-called liaison officer to act for both departments. Some of the members suggested that accountants should act with the engineering department for the purpose of verifying distributions at the source, while others mentioned the employment of engineers by the accounting departments, such employees to report direct to the auditor. There seemed to be some difference of opinion, but it appeared that some good has resulted from these discussions.



TREAD AND FLANGE CONTOURS FOR CHILLED-IRON WHEELS

Emphasis was also given to the necessity of accurate monthly analyses of charges, and the matter of cost accounting was also mentioned.

After the discussion of Mr. Dreyfus' address was concluded, the members of the Accountants' Association retired to their quarters. Their subsequent proceedings will be covered in a later issue of this paper.

After the retirement of the accountants the engineers took up the report of the committee on equipment, which was presented by R. H. Dalgleish, chairman.

EQUIPMENT

The committee reported on nine subjects as follows:

1. Continue the study of wheel contours for cast iron wheels, co-operating with committee on way matters. Fourteen contours for chilled iron wheels were submitted. These contours had been approved by the manufacturers of chilled iron wheels.

1A. Same as No. 1 except for steel wheels. Contour D2 was added to the contours submitted by the committee last year, making a total of nine contours. A table showing dimension of wheels for this contour was also submitted. Recommendation was also made that the hub diameter of 36-in. wheels be increased from 9¼ in. to 11 in.

2. Continue the study of helical gears. Replies to a questionnaire sent out by the committee showed that a majority of the helical gears now in service have 7½-deg. angle. From information available there are now about 33,000 sets of helical gears in use on electric railways. The committee considered it important that the angle and form of tooth be standardized as soon as possible, and recommended that the subject be continued.

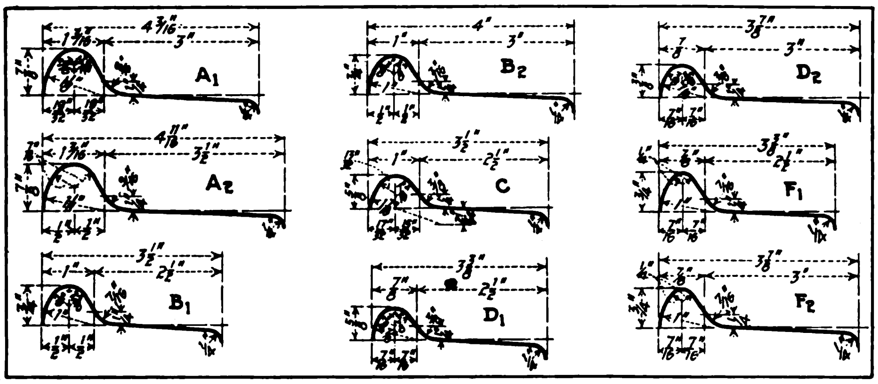
3. Representation on sectional committee of American Engineering Standards Committee engaged in preparing a specification for lightning protection. The committee's representative was not informed of any meeting of this sectional committee.

4. Continue co-operation with committee on buildings and structures on design of typical shop building and shop layout for property of moderate size. Recommendations of the committee were included in the report presented by the buildings and structures committee.

5. Investigate possible advantages of curved contours for treads of new wheels, co-operating with committee on *way matters.* The equipment committee did not approve the curved treads for new wheels. The report stated that it is difficult to turn wheels in the present lathes to a curved contour and, inasmuch as the wheels form a curved contour after about 600 miles of service, the committee considered it undesirable to turn off this metal and prefers to have it rolled in.

6. Study the various devices for trolley contact and the effect upon trolley wire, including a report on the economics of current collecting devices on overhead contact wires and with special regard to the maintenance of the collecting devices and the maintenance of the contact wires. The committee submitted an analysis of answers to a questionnaire, but no definite conclusions or recommendations were included.

7. Representation on sectional committee of American Engineering Standards Committee engaged in preparing specifications for wires and cables. The equipment committee was represented on the sectional committee and reported progress along the line of standardization.



TREAD AND FLANGE CONTOURS FOR STEEL WHEELS

8. Study National Electrical Safety Code with special attention to sections relating to car equipment. The committee reported that such a study had been made and that the sections referred to appear satisfactory.

9. Study existing standards and specifications with a view to possible revision. The committee recommended that the height of car platforms and bumpers be changed. Also that a limit-of-wear gage for ⅞-in. flange be added. A 3-in. x 6-in. journal, with journal wedge, bearing and thrust plate, was added for use with the safety-car axle. The radius of the inside and end journal bearings was changed. The committee recommended that the E1 axle be eliminated and a new axle adopted, also that the radius of fillet on the present axle be changed. A recommendation was made that the specification for cold-rolled axles be eliminated and a specification as submitted for a hammered axle be adopted. Tolerances for motor and gear seats on axles and also tolerances for gear bore were submitted.

The report was signed by R. H. Dalgleish, chairman; W. S. Adams, H. A. Benedict, A. H. Daus, L. J. Davis, Daniel Durie, J. L. Gould, Stewart Hazlewood, J. M. Hipple, Robert Long, A. J. Miller, M. O'Brien, E. D. Priest, C. F. W. Rys, P. V. C. See and C. W. Squier.

In the discussion of the report on equipment, subjects 1, 1-A and 5, relating to wheel tread and flange contours, were considered at one time. A written discussion by H. H. George was read by G. C. Hecker. In this discussion Mr. George said that he does not think it advisable to adopt as many contours as were proposed.

The resolution of the standards committee regarding these three subjects, that the incoming Engineering Association executive committee appoint a special committee, consisting of representatives of the equipment and the way committees, together with manufacturers of wheels, rails and special trackwork, to study wheel and rail contours, was approved by the association.

In discussing subject No. 2, relating to helical gears, H. H. Adams introduced a resolution that the equipment committee be instructed to study the whole subject of gearing. This was approved.

Speaking with reference to the part of the report of the committee dealing with trolley contact devices, M. B. Rosevear and C. R. Harte said that they thought that wear on trolley wire should be considered at the same time as the study of contact devices, and suggested that in the assignment of future subjects a joint study be made by the equipment and power distribution committees.

After discussion of the standards recommended by the equipment committee, the gear seat on the axle recommended by the equipment committee was increased from 1½ to 2½ in., instead of the recommended value.

The recommendations of the standards committee in regard to the various parts of the equipment committee's report were also approved and the report of the committee on equipment was accepted with thanks of the association.

The report of the committee on buildings and structures was presented by Frank H. Miller, Louisville, Ky., chairman. It comprised four subjects, and is abstracted below.

BUILDINGS AND STRUCTURES

The committee first considered the design of a typical shop building and layout, a subject continued from last year, and used the 1921 report as a basis. The two typical layouts, one for 150 cars and the other for 250 cars, submitted by last year's committee were changed in each case by the addition of a steam railroad connection to the system of tracks. Plans of several existing shops were included as additional information. The statistics of fifteen shops given are republished in the table on the opposite page.

The committee recommended that the plans of the typical layouts be adopted as recommended design for electric railway properties of moderate size.

In the portion of its report on culverts and small bridges, the committee states that the types of structures available for culverts are: Vitrified pipe, up to 36 in. diameter; cast iron, from 24 in. to 34 in. diameter; reinforced concrete, from 18 in. to 84 in. diameter, and corrugated iron, from 8 in. to 84 in. diameter. It says that the use of vitrified pipe should be avoided, as experience has shown that it does not stand up under service satisfactorily unless in shallow fills, and corrugated iron is recommended only for this kind of fill, as it has not been manufactured long enough so that its lasting qualities are definitely known. Drawings are given of different designs of culverts, bridges and trestles. In computing the stresses of the various members of bridges and trestles the report recommends that on interurban electric roads where steam railroad freight cars are hauled the calculated live load should be that of two 200,000-lb. cars, while for an electric railway handling only passenger service, a live load should be of two 100,000-lb. passenger cars fully loaded with 125 passengers each, or a total load per car of 120,000 pounds.

The committee continued the study of wood preservation, but found that not much progress has been made since the report of the 1921 committee. It sent out a questionnaire to thirty-eight of the larger companies. Of the twenty-three that replied, only four used the pressure process and eight the brush treatment, or else purchased treated lumber from wood preserving companies. The committee recommended that the study of wood preservation be continued by next year's committee and did not recommend the revision of any of the existing buildings and structures standards.

The committee was: F. H. Miller, chairman; E. H. Berry, N. E. Drexler, H. H. George, J. D. Kent, James Link, Robert Long, J. R. McKay, L. C. Mayer, L. L. Newman, J. N. Penick and S. H. Steiner.

In the discussion, the subject of shop design and layout was covered by N. E. Drexler, Hampton, Va., in a written contribution. He urged that the designer should give the fire protection and prevention phase of the layout careful study to keep the insurance rates as low as possible. With respect to the arrangement of departments, he indorsed the committee's ideas, namely, that it is extremely desirable for a

TABLE SHOWING AREAS OF SHOPS AND PERCENTAGES OCCUPIED BY DIFFERENT DEPARTMENTS

				Percentage Occupied by													
Railway	Total Shop Area, Sq.Ft.	Number Cars (a)	Sq.Ft. per Car	Overhaul and Trucks	Machine Wheels and Axles	Smithy and Welding	Air Brake	Office	Armature Room	Carpt. and Mill.	Paint Shop	Paint Mixture	Sand Blast	Store Room	Oil House	Wash Room
Montreal Tramways	112,052	770	145	17.9	11.5	4.2	0.2	1.7	5.2	18.2	26.0	0.6	...	10.2	0.6	3.7
Milwaukee Electric	284,600	1,150	247	19.0	7.8	5.7	1.5	2.8	7.4	22.5	17.4	1.0	...	13.9	....	1.0
New York State Railways, Syracuse	65,999	214	308	30.2	6.0	1.8	...	2.6	2.3	21.9	19.4	0.3	0.7	11.9	1.1	1.8
Pacific Electric, Torrance	296,880	(b) 1,937	153	14.7	8.6	4.4	0.3	1.0	5.4	24.1	24.8	0.8	1.8	12.1	0.8	1.2
Union Traction, Anderson, Ind	79,710	294	271	21.6	4.2	4.0	...	1.5	4.0	25.9	15.4	3.0	...	15.3	3.0	2.1
United Railways & Electric, Balto	243,400	1,453	167	16.2	7.4	3.8	...	4.1	6.1	26.2	16.7	2.5	...	12.5	2.5	2.0
Birmingham Railway & Light Co	48,508	307	158	18.9	15.5	3.1	...	3.3	3.6	22.0	19.1	0.7	...	8.7	2.0	3.1
Georgia Railway & Power Co	64,204	321	200	31.0	7.1	2.3	...	1.8	1.5	25.5	19.2	0.4	...	6.9	0.9	3.4
York Railways, Penna	20,324	79	257	34.2	7.1	2.8	...	2.8	2.8	19.9	14.2	2.8	...	9.5	1.1	2.8
Knoxville Railway & Light Co	16,046	76	211	33.2	8.2	5.2	...	1.6	2.5	19.6	18.1	...	....	8.1	1.0	2.5
Louisville Railway	128,210	616	208	20.2	7.7	2.3	...	0.7	2.9	29.1	22.4	0.7	...	12.7	0.3	1.1
Virginia Railway & Power Co	33,570	165	204	30.0	7.0	2.3	...	1.2	4.5	14.6	16.1	....	...	(c) 23.8	0.5	....
Dallas Railway	34,509	181	191	24.6	8.5	3.7	...	1.1	1.8	18.7	22.3	....	...	10.3	1.3	7.7
Newport News & Hampton	20,125	103	195	27.4	12.4	5.2	...	0.4	6.0	19.9	11.9	....	...	14.1	1.7	1.0
Portland Railway & Light Co	142,950	1,032	139	21.8	7.8	5.2	0.3	0.3	3.9	24.6	19.6	0.7	2.6	12.3	....	0.9
	1,591,107	8,698	3,054	360.9	126.8	56.0	2.3	26.9	59.9	333.7	282.6	13.5	5.1	182.3	16.8	34.3
Averages	....	....	203.6	24.0	8.5	3.7	0.6	1.8	4.0	22.2	18.8	1.2	1.7	12.2	1.3	2.5

(a) Number of cars for which shop was designed. (b) This includes a large number of freight cars. (c) Storeroom at Norfolk includes space for supplies for Lighting Department.

property of moderate size to have as few isolated departments as possible. Furthermore, it is important that the departments be so arranged that there will be no unnecessary handling of material. In regard to the application of the design to various sized properties, he called attention to the fact that the size and shape of the plot of ground available may prohibit the use of a typical layout, but the figures prepared by the committee can be used to determine the total space required and to distribute it among the different departments.

H. H. George, Newark, N. J., sent in a written communication, in which he said that the report of the buildings and structures committee represents the first real progress on the subject of small bridge and culvert design, and that it was to be regretted that in making its recommendations on this subject the committee was not more definite so that the standards committee could have taken appropriate action on it prior to the convention. He said it is also to be regretted that, although in assigning that subject to the buildings and structures committee for consideration instructions were given to co-operate with the way committtee, no such instructions were issued to the way committee, and consequently the latter had no sub-committee to work on this subject.

There are a few minor points to which he called attention. A statement is made in the report that the use of vitrified pipe does not give satisfactory service unless in shallow fills. It has been his observation that the use of vitrified pipe in very shallow fills has almost invariably resulted in failure due to too high live load concentration. In moderately high fill vitrified pipe has occasionally given good service, but it is not to be depended on to the same degree as cast iron or corrugated iron pipe manufactured under the specifications which insure practically pure iron and where the necessary precaution is taken to insure obtaining metal of the proper gage through the entire length of the culvert. There is no question in the case of corrugated iron pipe as to its mechanical strength, but merely its ability to resist corrosion.

One point which he emphasized strongly in connection with the use of pipe culverts of any kind was the necessity for installing adequate head walls on the upstream end of the fill. These are especially necessary where there is any liability of the pipe discharging under a head. Without the head wall washouts are almost sure to occur under this condition. Another point which should be brought out is the attention which should be given to backfilling on pipe culverts. This should preferably be of some impervious material, which will tend to prevent seepage of the water along the outer walls of the pipe. Under no circumstances should cinders be used for filling around pipe culverts, especially in the case of corrugated iron, as these cinders almost invariably contain a considerable amount of sulphur and in the presence of water is very destructive to the metal.

He also suggested that it would be very desirable to add curtain walls to the design of a concrete box culvert, shown on Fig. 22 in the same manner as was done in Figs. 23, 24 and 25 of the report.

The discussion on Subject No. 2 of this report was continued by a written contribution from R. C. Cram, Brooklyn, N. Y. Comments were made in relation to some of the designs submitted. Attention was called to the desirability of spacing these double beams, shown in Fig. 6 of the report, so that their flanges would have space enough between them to permit ready painting and inspection. Also, if the beams are kept apart the accumulation of dirt and other foreign substances will be prevented, thus aiding the wind and sun in preventing or lessening corrosive action.

Under Fig. 28 of the report it is noted that dowels are not provided for holding caps in place on piles and for holding stringers in line on caps. Dowels are essential and should be used, especially where stringers are not dapped over caps.

No data are given as to lengths of bridge ties, which should be of standard sizes and lengths. The tie spacing should be indicated also on all drawings.

In connection with the use of wooden stringers, the importance of using other than wood spacers should be noted and the open space between faces of stringers might well be indicated. This should never be less than 2 inches.

The standard spacing of timber guards and the proper spacing of inside rail guards might be indicated, although the practice or requirements of bridge authorities representing state bodies may prevent setting these out in the designs.

The importance of using creosoted timber in such framed structures should be emphasized as greatly lengthening the life of timber trestles.

There is some question as to using the loading diagram Fig. B, page 21. This is different from that used in the Massachusetts Railroad Commission Specifications prepared by Prof. G. F. Swain. The latter uses a spacing of 5-15-5 instead of 7-13-7 shown in Fig. B, and there are many cars still in city service which give the 5-15-5 spacing or very near it. This matter should be inquired into further and the requirements of the various state authorities in bridge design matters for electric railways should be made a part of the report.

While the report emphasized the fact that a strictly mathematical solution of the size of a culvert is not possible, J. R. McKay, Fort Wayne, Ind., said that it must be remembered that the lack of intelligent treatment has all too frequently resulted in openings which were too small, with ultimately one of two consequences, a washout or replacement by a larger structure upon the insistence of county or other constituted authorities. In weighing the factors which determine the required waterway, it is possible to make use of ready sources of information, as for example the weather department which has data upon the rate of rainfall covering almost every section of the country.

The inclination of the bed of a culvert has much to do with its discharging capacity, he claimed. All too frequently the opportunity to make use of a greater slope is lost sight of as evidenced by the numerous culverts in existence with a decided drop-off on the downstream side. But to incline the bed without sufficient outlet or channel below to allow the water to get away is useless.

Pipe culverts, especially vitrified, for electric or other railways, "have been weighed in the balance and are found wanting." Of course for small openings because of their relatively low initial cost, they will always find more or less favor. Well constructed head walls, cement joints, a well rammed back fill of a minimum depth of 3 ft. are some of the factors in their successful use.

In recent years reinforced concrete and corrugated pipe, of larger sizes than formerly, have been used. Their application has been more frequently open steam lines, especially the reinforced pipe, as electric railways are not as a rule equipped with cranes of sufficient capacity to handle their excessive weight economically.

Scrap boiler shells are being used in embankments which are not too wide or deep to prohibit their effective use. The cost of this type of culvert is much less than any pipe of the same capacity.

In plain and reinforced concrete box culverts the design of the ends should be made with care so as not to retard the flow. The wings of the upstream end may be flared 90 deg. or from 30 to 45 deg., while the downstream end may or may not have the wings flared.

Open box-type culverts are usable only when the foundation is very firm or where it may be necessary at some future time to lower the bottom, in which case it is at least advisable to use baffle walls in place of the solid floor. The baffle on the downstream end should be deeper than the others to prevent scour, with the consequent undermining of the footings. For this same reason it is advisable to drop the wall on the downstream end of the closed box type culvert at least 3 ft. below the balance of the floor.

Box culverts are superior to arch culverts for several reasons, all of which affect the cost materially. Among them are: (1) The space required to build a box culvert is only a few feet wider than the span; (2) it does not concentrate the load on the foundation as does the arch; (3) form work is more simple. Arches are for the most part, as indicated in the report, used where artistic design is especially desirable. They are also more economical in high fills, as under such conditions a slab of considerable thickness is required in box culverts.

Rod reinforcing is to be preferred in reinforced concrete culverts. The use of rails as reinforcing is at variance with the theory of reinforcement and they are not of the right form. When used they are considered as plain beams, the concrete serving to prevent deterioration. Because of the lack of a market and the low price of scrap rail, recently this type of culvert has been used to greater extent among electric railways.

The range in results among the details of design is about as varied as are the ideas and assumptions of the individual designers. Recent handbooks and texts on concrete treat more thoroughly upon the theory. In addition actual laboratory tests in the engineering experiment stations of our state universities furnish valuable information, notably that of Iowa on the effect of the depth of fills of various materials upon pressure on pipes.

Mr. McKay felt that the tendency is more and more toward making each culvert a special case. Electric railways are not now building culverts in any large numbers and it is therefore possible to study each one carefully. He has found that after careful consideration there is always some special problem warranting the effort and cost and that therefore a standard design is of little use except to secure some sort of uniformity in appearance, the necessity of which is more or less imaginary or to indicate the practice of others.

S. J. Steiner, Aurora, Ill., a member of the committee, explained that in considering the subject of small bridges, culverts and trestles, with a view to presenting information for good current practice, the committee's first task was to decide on an interpretation of the exact scope of the assigned subject in so far as it pertained to small bridges; in other words, what is a small bridge?

After a great deal of discussion it was decided to class as a small bridge a structure which could be built by the ordinary organization of the maintenance of way department of an electric railway without any outside help in the fabrication of the material, such as the steel required for plate girders or trusses. Accordingly it included in its report designs for pipe culverts, box culverts, timber trestles, arch culverts and short I-beam spans.

In making any design of a railway bridge, the question of live load is naturally of prime importance. Due to the great range in weight of equipment on various roads, it is known that the proper live load to be used in designing a bridge for one road may be far in excess of that suitable and adequate for another road. Based on the live loadings as derived from the equipment operated, electric railroads are divided into three classes:

1. A city street car system operating cars of from 30,000 to 60,000 lb. weight when empty.
2. An interurban system operating heavy passenger car equipment weighing up to 100,000 lb. empty, but which does not operate any steam railroad freight equipment.
3. An interurban system operating heavy passenger equipment as well as steam road freight equipment.

In designing any structure, naturally it is necessary, he said, to keep the cost down and eliminate any extra expense. It certainly is unwise to design for a loading very far in excess of what the bridge will ever be called upon to carry. However, in some cases only certain members of a structure need be increased in size for the accommodation of a heavier loading and the cost of the work is only slightly affected. The question then resolves itself into whether it is worth a small additional cost in order to take care of a probable future requirement. Each road must necessarily design its bridge openings for its own conditions. The committee believed that the two live loadings proposed by the committee are fair and representative and either one or the other should be used, depending on the type of service.

Wednesday Session

The meeting of the Engineering Association, on Wednesday afternoon was opened by a short address on safety work by H. H. Buckman, United Lead Company. Mr. Buckman stressed the importance of getting suggestions from employees as to how to prevent accidents and he said that even though these cannot be acted on immediately, frequently circumstances occur later where they will be found of great value.

The report of the committee on way matters was presented by W. F. Graves, chairman.

WAY MATTERS

The report presented by the committee on way matters was a treatise of considerable length and great detail. In spite of its volume it was easy to follow because the topics were treated in a uniform manner, the material being subdivided, in general, under these heads: Previous consideration of subjects; progress reports; conclusions; recommendations. The topics covered were so numerous that it will be convenient to refer to each under a suitable heading as below:

Standardization of Frogs and Car Clearance Easements.—As to the standardization of frogs, the committee concluded to disapprove the plan for standardization of frogs for double-track branch-offs shown in the 1921 report, but concluded that further study should be given to the subject. Car clearance easements were considered necessary as a means of facilitating car operation at congested points, and 6 in. was concluded to be a safe working distance between cars at all points in a special trackwork layout. It was pointed out that a change in the design of the inside rear and front corners of cars would make a difference in the design of special trackwork and consequently in the overhang of the curb corners as well as in the entrance clearances. It was therefore recommended that this subject be called to the attention of the committee on unification of car design, with a view to altering the design of cars to facilitate economical design of special trackwork layouts. It was recommended that the tables and drawings covering car clearance easements submitted by the 1921 committee be published in revised form and adopted as "Recommended Design"; further, that sample plans be published as information.

Proper Location of Tongue Switches in Crossovers and Turnouts—The committee presented diagrams to indicate the proper location of tongues in switches, and recommended that switches be located on the inside of the curve for lateral switches and on the right-hand side facing the switch for wye switches. Wye switches should have a straight guard at the toe of both switch and mate. The diagram submitted was recommended as a "standard design."

Curved Contours for New Wheels.—In introducing this subject the committee quoted an 1884 M.C.B. Association report as follows: "We have the curious condition of things, that forms of rail have been designed by one set of men and the wheel treads and flanges by another, apparently without any reference to each other." Up to the present time, continued the way committee report, the American Electric Railway Engineering Association has handled this subject in the same unscientific manner, and it has been difficult to turn the attention of the way men and equipment men in the same direction at the same time for a long enough period to study and experiment with various contours and arrive at any definite conclusions.

Referring to the curved-contour rail the statement was made that the change to this was for the purpose of retarding corrugation without any consideration of the effect on the life of the rail. Having realized this improvement in the initial wearing conditions of the rail, it is essential to analyze designs of wheels to forestall any evil effect on the life of rails and wheels caused by the introduction of the curved head.

From the results reported at the 1921 convention, it appears that the term "concave tread" does not convey the proper idea of the contour. The present committee considered the curved tread as meaning a compound fillet connecting the standard 1:25 cone tread and the flange.

The ideal conditions visualized by the committee comprise a design of wheel and rail so that under all normal operating conditions there would be pure rolling motion between wheel and rail. This would reduce the wear on the wheels and rail to a minimum and save power. As a practical matter the conclusion was reached that this subject cannot receive proper attention from general committees having many other subjects in hand and it was suggested that the entire subject of rail-head and wheel contours be assigned to a special committee consisting of equipment men, way men and manufacturers representing industries interested.

Revision of Girder Rail Specifications with Respect to Methods of Test.—The report recommended the substitution of the hardness test for the drop test for girder rails and gave specifications of the hardness test. Briefly, the test consists in subjecting carefully selected and cleaned specimens of rail to pressure from a hardened steel ball ¾ in. in diameter for 15 sec. and measuring the depth of the impression. The revision of standard specifications Wr 2c with respect to the method of testing girder rails by the adoption of the proposed impression test was recommended.

Design of Substitute Ties.—The questionnaire sent out by the committee brought out the fact that of sixty-four companies solicited for information, but twenty-four had used some form of substitute tie. In view of the lack of interest in substitute ties, it was considered that the design of a tie suitable for electric railway use should be given careful consideration, particular attention being paid to the duties required of the tie in this service and its capability of receiving a second or even a third renewal of rail. The possibility of its being used in various forms of track construction should also be studied. The committee considered that the subject is very important and that the study of designs suitable for electric railway use in paved streets should be continued.

Arc Welded Joints.—During the past year the committee gave much attention to this subject and was in close touch with the committee on welded rail joints of the American Bureau of Welding. Interest centered in a proposed machine for testing joints.*

On the subject of the joints themselves, the committee sent out a questionnaire to ascertain the experience of member companies with arc-welded joints and to learn what investigations the manufacturers were making. Results showed that in general users were proceeding upon their own theories, or in accordance with practices which their experience had led them to believe were best.

The principal failures were on rehabilitation work where welds were made on old rail, either with new joint plates or with old joint plates, and the percentage of failures on new work has been small. The principal ways in which joints fail are: (1) By the breaking of the rail at or near the end of the joint plate; (2) failure of the seam weld under the head side of the rail. It is seldom that a joint fails by tensile stress applied in the direction parallel with the rail.

As a result of this study it was recommended that the subject be reassigned to the ensuing committee and its scope enlarged to embrace the investigations of all forms of welded rail joints; that the development of the service test machines be continued; that co-operation with the American Bureau of Welding committee on welded rail joints, be maintained, and that the scientific and technical investigations be done through the agency of the last-named committee.

Wood Preservation.—In view of the completeness of the report of the 1921 committee on way matters and the joint committee on wood preservation, as well as the adoption of certain recommended specifications, it was not thought necessary this year to take any further action except to record advancement in the art or changes in specifications. The only change in specifications recommended was to increase from 5 lb. to 6 lb. the amount of creosote oil per cubic foot to be retained by wood treated by the empty cell process with initial air and final vacuum. Descriptions of creosoting plants of the Boston Elevated Railway and the Georgia Railway & Power Company, prepared respectively by H. M. Steward and C. A. Smith, were appended to the report. In addition supplementary information as to the treatment of ties with sodium fluoride were given, based on the experience of the Baltimore & Ohio Railroad. Satisfactory results with this preservative have been secured, while the same road reported good success with ties treated with water gas tar. Valuable data from the Chicago, Burlington & Quincy Railroad were also included.

Review of Report on Electrolysis of American Committee on Electrolysis.—The committee made no criticism of the report, which was stated to be so comprehensive that no comment is necessary. It was recommended that the subject be assigned to the ensuing committee for purpose of study and investigation of the design of track foundation which will not only answer the requirements as a track foundation but serve also as an insulation to prevent current leakage.

Specifications for Sundry Track Material.—This subject was reported to have been first assigned to the 1915 committee and reassigned in 1916, but nothing further was done until the assignment to the committee in 1921. It was determined that there was a need of specifications for sundry track materials, and electric railway and manufacturer member companies were solicited with a view to obtaining such specifications as they had covering these materials. During the year several tentative specifications for tie rods were submitted for discussion, but no agreement was reached. This item should be taken up by an ensuing committee. However, certain specifications for track bolts, track spikes and tie plates were submitted for adoption. These are identical with the A.S.T.M. specifications, but are rearranged to suit the style of the Engineering Association. The specifications cover the following: Low carbon steel track bolts, quenched alloy steel track bolts, steel track spikes, steel screw spikes, and steel tie plates. The committee gave specifications for all of these in great detail.

Tables of Dimensions of Frogs Used in Tongue and Switch Construction.—

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*See *Electric Railway Journal,* June 17, 1922, page 977.

The committee reported that the recommended specification Ws 1b, layouts for tracks, switches, mates, and frogs, was adopted in 1911 and revised in 1916. This defined four standard frogs, giving angles and lengths. The 1916 revision did not affect this portion of the specifications. The definitions never came into practical use and specifications since adopted conflicted with them. This portion of Ws 1b was therefore withdrawn in 1921. The 1921 convention adopted layouts for standard crossovers and turnouts. The association specifications for special trackwork provide for the length of frog arm by stating that there shall be at least 6¼ in. clearance between vertical webs at ends of joint plates. This year's committee, taking the above facts, prepared tables showing frog number, frog angle, toe length, heel length and total length for frogs for girder grooved and girder guard rails, and plain girder and standard section rails. A table was also presented for use where electric street railway construction approximates steam railroad construction, in which case it is highly desirable that the definitions of the A.R.E.A. be followed, especially if the structure of the frogs is to be the same as for steam railroads. This table was based on the standards of the A.R.E.A. for use with standard section rails and for M.C.B. wheels. The committee recommended that the dimensions of frogs for crossovers and turnouts as given in the table to be adopted as "standard design."

Track Construction in Paved Streets.—The committee reported having endeavored to arrange a joint meeting with the corresponding committee of the American Society for Municipal Improvements, but unsuccessfully. The committee, however, sent out early in the year a comprehensive questionnaire on the subject of track construction, and the results of this were compiled and appended to the report.

The replies indicated not only a very wide range of practice, but also wide difference of opinion as to what ideal construction would be. This is due in large measure to local conditions and shows clearly that any specifications should be broad in scope so as to permit wide latitude in selection of material and methods. Belief was expressed that it is desirable to continue co-operative work with the A.S.M.I., even though very little has resulted so far from the effort.

Study of Design of Wheel Treads and Flange Contours as Affecting Way Department—The committee stated that the proper design of wheel treads and flanges is of vital importance to the way department because the wheel treads and flanges wear out the track. The way engineer should have much to say about the kind of wheels that are to be operated on the track for which he is responsible.

For many years way men have tried to standardize track to effect economy and interchangeability. Uniform thickness of wheel flanges therefore seems logical. In favor of the thicker flange preferred by way men, also, is that, on flange bearing special trackwork, the wider the flange the longer the life of the special trackwork.

As to the tread width, the wider tread would carry the weight of equipment through special trackwork without so much punishment to the track as the narrower tread. The wider tread wheels will wear more uniformly than the narrower tread heels and are less apt to cause derailment.

The committee appreciated the importance of adopting standard flanges promptly, but did not believe that it would be wise to adopt any standard without due consideration of the track. It was believed that three different flange contours are all that should be used and that it would handicap the work of future committees to standardize a greater number than that. There has not been enough consideration given to the point of view of the way engineer in the design of wheel contours in the past. The manufacturers and equipment men have introduced changes in flanges and tread contours which materially shorten the life of the track.

Review of Existing Standards and Recommendations Originating with Committee on Way Matters.—The committee suggested a few revisions, particularly with a view to harmonizing the specifications for splice bars for girder and high tee rails of the A.S.T.M. and the Engineering Association. Comparison showed substantial agreement and it was recommended that the Engineering Association specifications be conformed to the others. The same is true with the standard specifications for carbon steel rails of standard sections, as distinct from girder grooved, girder guard and lain girder rails.

This report was signed by W. F. Graves, chairman; H. H. George, vice-chairman; R. C. Cram, sponsor, and C. A. Alden, Victor Angerer, S. Clay Baker, W. R. Dunham, E. B. Entwisle, H. Fort Flowers, C. F. Gailor, J. H. Haylow, E. P. Roundey, F. Tingley and E. M. T. Ryder.

In the following discussion, the subjects assigned to the committee for consideration this year were taken up individually and the discussion was completed on each in turn. On subjects No. 1, 1A, 3, 5 and 12 there was no discussion and the recommendations of the way committee were adopted by the association. Subject No. 2 was discussed by H. Fort Flowers, who said that the way committee favored the use of a compound fillet rather than a curved contour for the tread of wheels. When two wheels differing in diameter by $\frac{1}{32}$ in. are mounted on the same axle, if the wheels have a standard taper of one in twenty-five they would have to move endwise ⅜ in. in order to find a point of equal diameter. As there is but ⅛ in. difference between the standard wheel gage and the standard truck gage such unequal-diameter wheels will hug the rail. The report of the committee on this subject of curved wheel and tread contours was accepted with the provision that the recommendation made by the standards committee regarding it be carried out.

Subject No. 3, dealing with girder rail specifications, was discussed by H. H. George, who gave a comparison of the recommendations made by the way committee with existing specifications of the American Society for Testing Materials. Mr. George also explained and elaborated the way committee's report on subject No. 6 relating to wood preservation. The last two recommendations of the way committee in regard to this subject were adopted and the first was adopted with the provision that this subject be assigned to a special committee for consideration.

In discussing subject No. 7, H. A. Johnson reported that the subjects committee had decided that this subject should not be reassigned to the way committee for further study and the recommendation as published in the report of the way committee was withdrawn. This related to the continuation of the preparation of sundry track materials specifications, which will probably be taken up with the A.E.S.C.

The remaining recommendations of the committee were approved. Mr. George explained that Mr. Dunham and he had attended the annual convention of the American Society for Municipal Improvements, at Cleveland, earlier in the week, and that there is good prospect that way engineers will be admitted to active membership in the society. He urged that, if this comes about, as many electric railway engineers as can do so join the society, the annual dues of which are $7.50.

JOINT SESSION WITH WELDING SOCIETY

After the conclusion of the discussion on way matters, Chairman Kimball introduced C. A. McCune, president American Welding Society, who presided over a joint session of the two organizations. This meeting is reported on page 567 of this issue.

Thursday Afternoon

The Thursday afternoon session opened with the presentation of the reports of the committees on power generation and power distribution, which are abstracted below:

POWER GENERATION

The first subject assigned to this committee last fall was a study of the advance in the art of power production, with a view to placing before operating companies specific examples of improvements in design of equipment, methods of operation and economy of performance. It was suggested also that the relative merits of various types and forms of equipment and methods of operation be discussed, with supporting facts and data.

In this report the committee pointed out that this subject is completely covered in the power and light industry by annual reports of the prime movers committee of the National Electric Light Association. A movement is already on foot for co-ordinating the activities of various societies and associations along such lines of investigation. It was suggested, therefore, that work of this character should be organized and conducted along lines similar to those followed by the American Engineering Standards Committee, or the American Committee on Electrolysis, possibly as a sectional committee of the American Engineering Standards Committee. It is recognized that while the functions of such a committee might not be primarily for establishing standard specifications of design and installation for operating methods, its work should be of such nature that the results could be used as a guide in the preparation of such specifications.

In carrying out its assignment of "a study and review of the report on electrolysis issued by the American Committee on Electrolysis," the power generation committee, in co-operation with the committees on power distribution and way matters, prepared and presented a comprehensive analysis of the report. Among other things the committee stated that since much of the data available on the subject has been obtained by studies of situations where trouble has actually occurred, it is perhaps easy to obtain the idea that conditions are bad wherever there is a grounded return railway system. Such, however, is not necessarily the case, and it has been the experience in many places that care in the construction and maintenance of the track, pipe and cable systems has reduced the electrolysis problem to a considerable extent. Such results but further emphasize the desirability of member companies giving the matter careful thought and attention and attaching to the subject the importance it requires.

To have a satisfactory return system requires close co-operation between the distribution and way engineers. Good bonding is essential, which means bonds of ample capacity at each rail joint and cables of adequate size properly installed and connected through special trackwork. One open or high-resistance joint will nullify the effect of many perfectly bonded joints. Periodical bond tests, followed by prompt repairs of defective joints, are necessary to preserve the continuity of the return circuit. The method of bonding is also important. These statements are quoted simply to show the way in which the committee has performed its task. The analysis of the American Committee report on electrolysis also appears in the report of the power distribution committee.

The committee on power generation was assigned, with the committee on power distribution, the broad subject of economics of automatic, semi-automatic and remote-control substations for electric railways. An extended abstract of the result is given in connection with the report of the power distribution committee. On this subject the power generation committee recommended that in future this subject be assigned to a sub-committee on distribution only, as in general interlocking of sub-committee work proves unsatisfactory to those participating and leads to irresponsibility in the preparation of reports.

As to the National Electrical Safety Code, the committee recommended that it be adopted as a guide for working up rules and regulations by member companies and that arrangements be made for representation of the American Electric Railway Engineering Association in future revision of the code.

The final assignment of the committee was the study of standardization of wires and cables in connection with the work being done by the sectional committee of the American Engineering Standards Committee. The committee reported that the work of the American Engineering Standards Committee is still in the organization stage and has been confined so far to organization and rules of procedure and instructions to technical committees. It was recommended that the subject be continued, the appropriate sub-committee keeping in touch with developments and advising with the representative of the Engineering Association on the Standards Committee.

The above report was signed by E. H. Scofield, chairman; W. E. Bryan, H. E. Davis, F. G. Frost, C. A. Greenidge, F. C. Hanker, H. A. Kidder, G. H. Roosevelt, G. W. Saathoff, A. E. Stierly and G. W. Welsh.

POWER DISTRIBUTION

The report of the committee on power distribution reflected the increasing extent to which the Engineering Association is involved in the activity of other organizations in power distribution matters. For example, the overhead wire crossing specifications are tied in with the work of a large number of other interests. These specifications are not satisfactory, and the committee has taken part in deliberations looking toward improvements under the auspices of the American Engineering Standards Committee. Part II of the National Electrical Safety Code, which covers this subject, is under revision, and the committee recommended that the association's "recommended specifications" be suspended.

Another example of the inter-relation of association interests is furnished by the hard-drawn trolley wire specifications. The committee reported the results of co-operation with the appropriate American Society for Testing Materials committee, with a view to harmonizing the specifications of the two associations. The only point for contention is the inclusion of the torsion tests desired by the Engineering Association. As the A.S.T.M. specification is general, the committee felt that it does not make provision for the specific requirements of trolley wire. Progress in securing the desired co-operation was reported, and it was recommended that if a joint specification can be agreed upon, it should be submitted to the A.E.S.C. for approval as an "American standard." Otherwise, the Engineering Association should submit its specification for round and grooved high conductivity trolley wire for adoption as an "American standard."

The committee reported also the result of a preliminary practical study to determine ultimately the causes of trolley-wire wear. A number of companies were asked to furnish data for actual wear in selected sections, in which it would be practicable to weigh the worn wire. Valuable data were received by the committee, but too late for detailed study. They were, however, included in the report, with the recommendation that the study be continued.

In connection with the harmonizing of differences among various interests concerned in specifications, the following statement by the committee is significant: "The organization and procedure of the American Engineering Standards Committee offer a most excellent opportunity for co-operation between societies and organizations interested in standardization, and should remove the possibility of conflicting or non-uniform standards being adopted by different organizations as has happened too frequently in the past. The power distribution committee believes the American Engineering Standards Committee deserves of the whole-hearted support of this association."

An important topic covered by the committee during the past year was that of the reclamation of deteriorated poles. Good practice was described with reference to the following:

A—Wood poles—(1) Stub reinforcement. This has limited application. (2) Reinforced concrete. Although this is rather expensive, its use may be justified when there are many wires on a pole. (3) Structural steel reinforcing. This is useful in specific cases. (4) Splicing. This can be used only when there is proper guying or close pole spacing.

B—Tubular steel poles—(5) Bolted clamps. These should extend pole life several years. (6) Reinforced concrete. The use of concrete with reinforcing rods or old rail inserted was reported to be giving good results. (7) Pipe sleeve. This is successful but requires removal of fixtures. (8) Drew split sleeve. This can be installed for a fraction of the cost of a new pole. (9) Welded sleeve. This form of sleeve can be applied for about $8.

The automatic substation was one of the subjects assigned to this committee in co-operation with the committee on power generation. The committee reported that the problem which the average operator has before him today is to determine whether or not by the installation of a number of small-sized automatic substations he will be able more efficiently to supply power for the system, when increased business demands additional equipment, than is possible with a few large manual stations. Another problem is to determine whether by rearranging his present converter equipment with automatic control equipment in new stations he will be able to increase the efficiency of distribution to a point where it will be possible by reduction in operating expenses to pay a return on the cost of automatic equipment.

Further, the advent of the small automatic substation put an entirely new light on the question of reserve capacity in transmission lines, converter equipment and feeder systems. With the large manual station, due to the fact that such a station was usually served by a number of high-tension lines and equipped with a number of machines, in the event of the loss of a line or machine it was usually possible by careful operating to "get by" without seriously interfering with the service.

With automatic stations, the loss of a line or machine may mean putting out of service an entire station feeding a definite area, and consideration must be given to this possibility in laying out the system, in determing the number of high-tension lines and machines to a station and also in providing reserve feeder capacity to transfer load to adjacent stations.

The committee gave the results of an analysis of a specific system design for a congested area of a typical city where conditions are such that it is necessary to install 12,000 kw. of converting capacity on account of the abandonment of an old steam generating station, to relieve a number of manual substations which are overloaded and thus to provide for future growth and reserve capacity. Six plans were worked out with the result shown in the accompanying table.

SIX SOLUTIONS OF THE SUBSTATION PROBLEM

	Capital Investment	Annual Charges
Plan 1—12,000-kw. manual station	$593,390	$134,111
Plan 2—Four 3,000-kw. single unit automatic stations....	529,000	93,720
Plan 3—Four 3,000-kw. two-unit automatic stations......	621,000	106,520
Plan 4—Three 4,000-kw. single-unit automatic stations...	500,000	93,780
Plan 5—Three 4,000-kw. two-unit automatic stations.....	563,000	102,480
Plan 6—Six 2,000-kw. single-unit automatic stations......	605,295	97,398

One of the most important points made by the committee on the subject of automatic substations was that relating to the effect of the shutting down of a substation on the feeding area of adjacent stations with consequent increase in distribution losses in it. In one installation this has been overcome by operating the entire distribution system on a graduated voltage scheme, having the stations in the outside area operate at a higher voltage than those in the congested area. As the load drops off the station carrying the lower voltage, the adjacent stations take up the load. A remote-control system superimposed on the automatic control is desirable, as it gives to a dispatcher the means of handling machines and feeders in much the same manner as is done in manual stations.

Another point was as to the distribution of load between units operating on a system. This is accomplished by regulation of voltage, use of drooping characteristics of shunt machines and insertion of load-limiting resistance in the machine circuit.

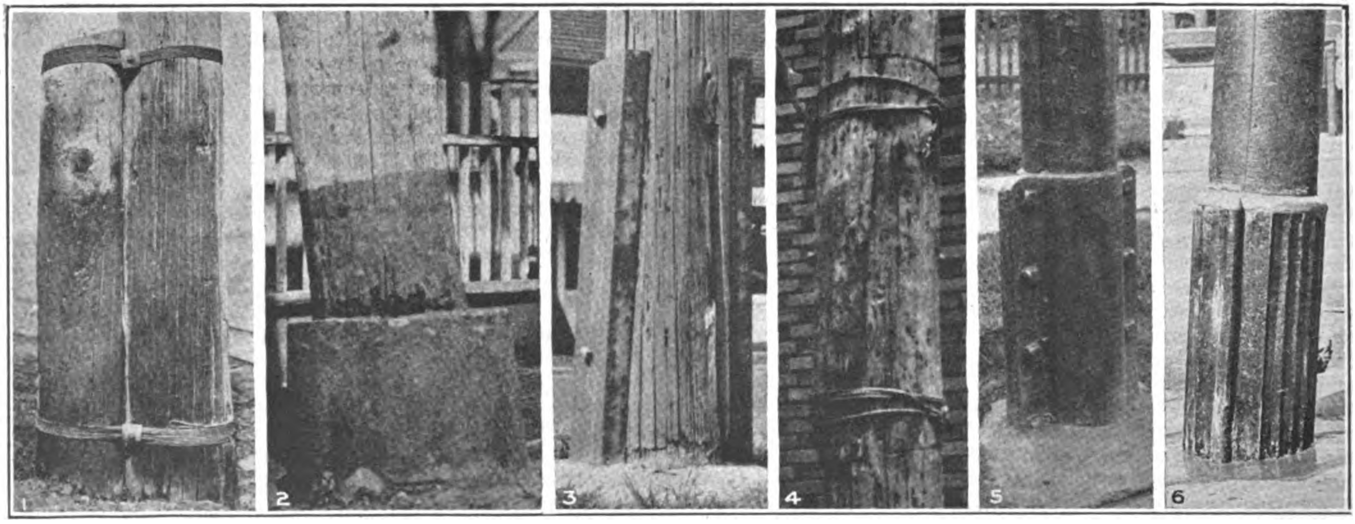
Finally, feeder protection must provide the following characteristics: The feed must be interrupted if dangerous temperatures are experienced, even though these are caused by concentration of loads resulting from blockades of cars. The feed must be interrupted as nearly instantaneously as possible in the event of short circuit. With these exceptions all useful loads should be sustained with the utmost reliability. Finally, after an interruption of any kind, the service should be resumed as soon as practicable when safe feeder conditions exist.

The last item in the committee report was a comprehensive statement regarding inductive co-ordination, that is the co-ordination of interests affected by induction from power carrying lines. This subject came up late in the year and was added to the list of assignments at the request of the committee dated April 4, 1922. The committee considered it germane to its work for the following reason: Electric railways are vitally interested in this problem on account of the close proximity of the power and communication circuits of their own and other companies, and the character of the various circuits involved and because in some instances even the direct current distribution circuits have an effect. Furthermore, the communication circuits operated by electric railways for train dispatching and other purposes may be subject to inductive effect on account of their own or foreign supply lines. The report outlined the plan recommended by a joint committee, initiated by the National Electric Light Association and the Bell Telephone System, for the solution of the inductive interference problems.

This report was signed by M. B. Rosevear, chairman; J. R. C. Armstrong, C. C. Beck, H. B. Burd, C. A. Butcher, R. W. Eaton, D. D. Ewing, L. F. Griffith, Charles R. Harte, H. D. Hawks, Adrian Hughes, Jr., Charles H. Jones, F. McVittie, H. S. Murphy, G. Hall Roosevelt and F. J. White.

DISCUSSION ON POWER GENERATION AND DISTRIBUTION

The differences of opinion as to the use of pipe drainage in electrolysis mitigation cropped out in the joint discussion of the reports of the power generation and power distribution committees on this subject. M. B. Rosevear pointed out the experience in New Jersey. The practice has been followed there for a good many years with satisfactory results, but he said his company is willing to go along with the recommended investigation of the subject because the correctness or fallacy of the practice should be brought out by experience. W. E. Bryan, St. Louis, said that thorough interconnection of all pipe and cable systems is carried out there, but only after care-



EXAMPLES OF POLE REINFORCEMENT

No. 1—Stub reinforcement. No. 2—Reinforced concrete. No. 3—Structural steel reinforcing. No. 4—Splicing. No. 5—Bolted clamps. No. 6—Drew split sleeve.

ful consideration and planning on the part of all interested parties. The gas mains are included in this inter-connection. He said there has been no experience to show that fires result from such a practice. Investigation of the subject of joint corrosion feared by many, he said, had not shown any serious results in St. Louis. That pipe drainage has been objectionable from the standpoint of some because of the large values of stray current was the assertion made by H. S. Warren, American Telephone & Telegraph Company, in a written discussion read by K. L. Wilkinson, of the same telephone company, in which he said that pipe drainage or any other method of mitigation should not be undertaken until the economic limit in the proper development of the railway distribution system had been reached. If this development is properly carried out he said that in many cases no further measures would be needed. The statement elicited objection from several sources and Mr. Rosevear detailed a conversation with Mr. Warren over the statement, in which it was made clear that Mr. Warren was laying down in this statement the fundamental engineering principle involved and did not intend to advise that such mitigative measures should be used in already established systems where the cost of following out the ideal treatment would prove an unbearable financial burden. Mr. Rosevear's view was that the problem is one for the railway companies to handle as conditions make necessary in each case. In the general discussion it was the sense of those speaking that a great deal more investigation will be necessary before agreement can be reached on the subject.

Mr. Warren in his letter also pointed out that corrosion in structures is dependent on the conditions of current flow and that apparently large current flow may not produce harmful results due to the surrounding conditions. He also said that voltage measurements alone are wholly inadequate to prove the magnitude or direction of current flow. In commenting on the idea expressed by some that it would be necessary to abandon the ground return system for railway work he said that this is not true, but that careful attention must be given to the potential drops in return systems and the control of stray currents by the proper design of power supply and return systems. The report and recommendations of the power generation committee were accepted as a whole except that the paragraphs referring to electrolysis were referred to the executive committee of the engineering associations. The recommendations of the power distribution committee as to adoption of the national electrical safety code in those parts which affect electric railway construction were accepted with the modification that manual section Ds 1c is to be withdrawn and the recommendation to members is that the safety code be followed as a minimum standard. The discussion of the composition of trolley wire developed a feeling that the torsion test is an essential in determining the wearing qualities of trolley conductors. Charles R. Harte, New Haven, brought out the condition surrounding the manufacture of wire which made a minimum manufacturing cost essential. The American Society for Testing Materials specification does not call for such a test, and the manufacturers, naturally depending on these specifications in most of their work do not use the American Railway Association specification unless required. The absence of such a test fails to reveal the slivering of wire which is the principal cause of quick wear. The situation, he said, is not a criticism of the manufacturers who are doing their utmost to co-operate, but indicates the need of careful inspection of trolley wire to see that the proper specifications are used.

Several written discussions of the automatic sub-station division of the power distribution committee report were handed in but not read, and were not available. In the discussion of inductive co-ordination, A. Schlesinger, Indianapolis, filed a modified code of principle that was submitted for adoption in Indiana and which he thought would be more acceptable. K. L. Wilkinson, of the American Telephone & Telegraph Company, in addition to his commendation of the national electric safety code, expressed pleasure that the American Electric Railway Association was joining in the co-operative study of the subject. A written discussion from W. J. Canada, engineer of the National Electric Light Association, expressed the same sentiment. Prof. D. D. Ewing, of Purdue University, urged close co-operation of all interests for the best good of the public in the final solution of the question. The entire committee report was accepted and approved. V. E. Thelin presented a motion picture of a special design of automatic substation equipment operating in the Chicago district, accompanied by some slides and an explanatory talk.

C. H. Jones, of the committee on economics of electric railway distribution, then presented the report of his committee, which was in the nature of a progress report. It was found that there was great difference of opinion among the committee members and recommendation was therefore made that study of the subject be continued next year. It was also suggested that the executive committee appoint a new committee separate from affiliation with the power generation and power distribution committees. As definite suggestions for the work of the succeeding committee it was recommended that the incoming committee be provided with an outline of the method of study of the subject to be followed. It was also recommended that the new committee study and work out a number of specific examples, comparing costs and merits of different power distribution layouts. The third recommendation was that the new committee endeavor to arrive at a result which will answer the question submitted by the American committee on electrolysis as to the economic limits to which track drop can be reduced.

Under the direction of Martin Schreiber, chairman, the convention then adopted the recommendations of the standards committee with respect to the reports of the way and equipment committees. The recommendations with respect to the power distribution committee could not be adopted as the convention had made recommendations with respect to the standard safety code, part two, which made necessary reconsideration of the matter by the standard committee in view of some confusion as to action taken on various matters in the convention, Mr. Datz made a motion which was carried that if any conflicts had been made in adopting standards committee recommendations that these matters should be automatically referred back to the standards committee.

The report of the committee on purchase and stores was received by title. An abstract follows:

PURCHASES AND STORES

The subject assigned to this committee was a study of proper methods for taking periodical inventories with a view to adopting standard forms. The committee found that the subject was rather complex and included accounting features. It was felt therefore, that it should be continued in collaboration with the committee on stores accounting of the Accountants' Association.

In regard to the inventory, the committee recommended that this should be taken on a date set by a proper official before the ending of the fiscal year, sufficiently in advance to allow for the compilation of the data before the company's books are closed for the year.

A definite method should be prepared and sent to all employees having to do with the taking of complete inventory of materials on hand, under the jurisdiction of the stores department.

The physical taking of inventory, together with the pricing and extending of same, should be done by the stores department forces under the direct supervision of the auditing department, unless the latter is keeping the stock and price records, in which case it should do the pricing and extending.

In the preparation for the inventory-taking, a card or other form should be provided for the record of the quantity of each item of material on hand, and the date this is counted, with spaces to show what is received and issued from that date until the date of closing for the fiscal year. This card is to be kept in the bins and the entries made thereon by the force handling the receipt and issuance of material, or else in the storeroom office and the entries made from the receiving and issuing records, after which these cards, or other form, should be assembled and computed to show the quantity of each item on hand the end of fiscal year.

After the quantities of all items on hand have been ascertained as shown on the inventory cards, or other form, the entries should be transferred to a form provided for the purpose, listed and classified thereon, and prices and extensions verified to arrive at the grand total as of the end of the fiscal year.

All material received and included in the inventory for which invoices have not been taken into stock account should be listed and treated as a deduction from the inventory. Likewise, all material not received, but for which invoices for discount purposes have been taken into stock account, should be listed and treated as an addition to inventory, both to apply as of the date the inventory is effective.

The committee presented as exhibits inventory stock cards and forms from the Interborough Rapid Transit Company, the Capital Traction Company and the Public Service Railway.

The report was signed by W. H. Staub, chairman; William C. Bell, J. F. Fleming, C. A. Harris, J. R. McGivney, W. G. Simonds and W. S. Stackpole.

H. A. Johnson then presented the report of the resolutions committee thanking the officers and special engineer Hecker for their good work, expressing appreciation to the manufacturers for the exhibits and recommending to the executive committtee that the sponsor system be continued and that it gives consideration to the recommendations regarding reorganization. Mr. Datz presented a resolution of regret on the death of former third vice-president Arthur B. Stitzer.

The report of the nominating committee was then presented and Secretary Hecker was instructed to cast the unanimous ballot of the association for the following officers: President, L. C. Datz, chief engineer Little Rock Railway & Electric Company, Little Rock, Ark.; First Vice-President H. A. Johnson, assistant general manager Chicago Elevated Railroads; Second Vice-President Charles H. Clark, engineer maintenance of way Cleveland Railway; Third Vice-President R. C. Cram, engineer of surface roadway Brooklyn Rapid Transit Company. The members of the executive committee are Charles R. Harte, Daniel Durie, R. H. Dalgleish and E. H. Scofield.

STANDARDS

While the report of the committee on standards was given piecemeal throughout the meeting the following abstract will serve to give a general view of the work of this committee:

The committee on standards reported the recommendations made at the meeting of Sept. 7 and the items in the report of the several committees that required such recommendations. The actions in substance were as follows:

The typical layout plans of shops prepared by the committee on buildings and structures were approved as "miscellaneous methods and practices," with the recommendation that they be published in the Engineering Manual. The suggestion of the buildings and structures committee that certain material contained in its report be considered as embodying good current practice in the design and construction of small bridges, culverts and trestles, was referred back to the committee with the request that the committee's recommendation be put in standard form.

The committee on power distribution, having recommended that the Manual specification Ds 1c be withdrawn, due to the pending revision of the wire crossing specifications of the National Electrical Safety Code, the standards committee approved this recommendation. The same action was taken with respect to the removal of section Df 1a, relating to clinch ears for round trolley wire, which has been superseded by Par. 405 of Sec. Df 4c, of the specification for overhead line material.

A number of detailed actions were taken with respect to the report of the committee on way matters, the first being the approval as "recommended design" of tables and drawings covering car clearance easements, submitted by the 1921 committee and subsequently revised. Further, the adoption as "standard design" of the diagram submitted showing the location of tongue switches in crossovers and turnouts, was approved. The same action was taken with the recommendation that the drop test be replaced by the impression test in the rail specification, Wr 2c, and Clause 16 Sec. 5 of this specification was changed to read: "The ends (of the rail) shall be milled square laterally; they should be undercut vertically not less than $\frac{1}{32}$ in. and not more than $\frac{3}{32}$ in." In the recommended specification for creosote oil, Sec. Wm 82, an increase in the amount of oil retained from 5 lb. to 6 lb. per cubic foot was approved. Six specifications for track bolts, track spikes and tie plates were approved for adoption as "recommended specifications." In order to conform the association specifications for steel splice bars to the A. S. T. M. specifications, the committee recommended that Manual section Wm 3a be withdrawn and that the A. S. T. M. specification for low carbon, extra high carbon, medium carbon and high carbon steel splice bars be arranged in standard association form and adopted. The recommendation of the way committee regarding a standard specification for carbon steel rails, intended to cover the manufacture of steel rails in standard sections as distinct from girder grooved, girder guard and plain girder rails, was approved.

SPECIAL COMMITTEE ON WHEEL AND RAIL CONTOUR

The standards committee considered proposals from the equipment committee regarding tread and flange contours for chilled and rolled steel wheels, recommended for adoption as standard. The conclusion was to recommend to the incoming Engineering Association executive committee that a special committee consisting of representatives of the equipment and way committees, and of manufacturers of wheels, rails and special trackwork, be appointed to study wheel and rail contours. The standards committee approved the recommendations of the equipment committee that certain changes be made in Manual Sec. Ec 1b, relating to dimensions of cars, etc., placing the height of platform for interurban cars from top of rails and top of platform at 51 in. and the height of bumpers at 43 in.; further, that where possible provision be made to prevent telescoping in case of collision between city and interurban cars, and that the bumper casting on city cars be designed to include a pocket casting to permit the coupling of city cars to interurban cars by means of a suitable bar. Approval was also given to recommendation of the equipment committee as to certain details of design of axles, E2 to E10 inclusive, with the corresponding changes in bearings; further, that the present standard E1 axle be eliminated and that E2 be used instead. A new axle, E12, was approved for use where E2 is not available. The same action was taken with respect to the withdrawal of the present specification for cold-rolled steel axle, a new specification for open-hearth, hammered steel axles be adopted.

This report was signed by Martin Schreiber, chairman; H. L. Andrews, E. J. Blair, J. A. Brooks, C. H. Clark, L. P. Crecelius, E. R. Hill, C. G. Keen, John Lindall, G. R. Lyman, H. H. Norris, F. R. Phillips, N. W. Storer and N. B. Trist.

Exhibits and Entertainments

THE exhibits were shown on the Municipal Pier and occupied more than 60,000 sq.ft. of space. An attractive entertainment for the delegates was provided, including a reception Monday night, a dinner followed by a playlet on traction conditions by John E. Wilkie Wednesday night and a ball Thursday night, with automobile trips and other pastime for the ladies. The attendance was about 4,200.

The *Electric Railway Journal* published a daily issue on the mornings of Tuesday, Wednesday and Thursday with accounts of the exhibits and entertainment features and a short running account of each session. These three issues had a total of 52 reading pages.

Accountants' and Claims' Elections

A REPORT of the proceedings of the Accountants' Association convention will appear in the issue of this paper for Oct. 14, and one of the proceedings of the Claims Association meeting in the issue for Oct. 21.

At the final meeting of the Accountants' Association, held Oct. 5, W. G. Nicholson, secretary Omaha & Council Bluffs Street Railway, Omaha, Neb., was elected president. On the same day the Claims Association elected as president Wallace Muir, claim agent Kentucky Traction & Terminal Company, Lexington, Ky.

American Association News

Recommendations for Subjects American Association for 1922-1923

The 1921-1922 committee on subjects and meetings of the American Association held a meeting on Monday, Oct. 2, at the Drake Hotel, Chicago, for the purpose of forming recommendations as to subjects for consideration for 1922-1923, in accordance with by-law IX of the Constitution and By-Laws. An abstract of the report follows:

We recommend for major study and discussion by the association during the ensuing year, two general subjects:

A—The upbuilding and further restoration of street railway credit.

B—Study of the trackless transportation, particularly buses and automobiles, in relation to electric railways.

Under the first topic, these headings are suggested:

1. Flexible systems of fares.
2. Relief from paving, special taxation and other unreasonable and inequitable burdens.
3. Education on valuation problems, so that valuation procedure may be simplified and standardized.
4. The use of simple indeterminate franchises subject to commission control, if operation is now under short-term franchises.
5. Certificates of convenience and necessity from regulatory bodies for additions to present transportation facilities.
6. The unification of all local transportation under one agency.

We have studied the work of the committees that were appointed the past year and feel a continuance of the work by these same committees, as previously outlined, is desirable.

We have no further suggestions other than to call the attention of committees to the necessity for being a little more diligent. In several instances, the committees have held no meetings and other committees have held only one. We feel this is an unfortunate situation, and if a committee is appointed to study a subject it should hold more than one meeting in order properly to do its work.

In addition to the standing and continuing committees, we have in mind for the continuance of work next year, committees listed as follows: Co-operation with manufacturers, valuation, electrolysis, mail pay, education, uniform motor vehicle law, trackless transportation, maintenance and construction of highways.

Concerning the question of subjects for the four affiliated associations, the Engineering Association and the Transportation & Traffic Association have committees on subjects which are making complete recommendations for next year's program for these two associations, and we presume that these subjects will be referred in due course to the policy committee in accordance with By-Law VII.

In connection with the Accountants' Association, we call attention to the value of budget control and recommend this for study by that association. It is suggested that the work of the committee on relations with other accounting associations be enlarged, and that it continue work on the standard classification of accounts and on the study of engineering accounting.

For the Claims' Association, we feel that accident prevention should receive continued emphasis and further study, suggest also a study of Hooper-Holmes and local city bureaus, which exist in a number of larger cities, to increase their efficiency and broaden their scope, to the end that fraudulent accident claims may be reduced to a minimum.

Special Reports and Compilations

THE following tangible results of the work of the Bureau of Information and Service are now available to member companies in good standing upon request:

Public Utility Laws — A summary of the laws creating the state public utility commissions, giving an analytical digest of the main provisions covering their jurisdiction and powers over transportation companies. This is the fourth installment of this compilation, which was begun in June.

Analysis of Labor Agreements — An analytical digest of the provisions appearing in the labor contracts of twelve large city companies, arranged in such a way as to make possible a ready comparison of working conditions.

Rate of Return—Extracts from public service commission decisions fixing proper rates of return for street railways. This compilation is similar to the one issued on Feb. 1, 1921, and gives decisions occurring since that date.

Railway Automatic Substations — A tabulation of the automatic equipments sold or installed, classified as to type of service. It brings down to date the tabulation shown in the 1921 report of the committee on power generation and shows for each installation the substation rating, the number of machines, the date of installation or date and type of equipment (whether control only or entire converting equipment).

Cities in Which Fares Have Been Changed—This is a complete new edition of the regular association fare bulletin and shows the city, the population, the name of the operating company, the cash fare and ticket rate, the date of the last fare change and the number of changes granted to Sept. 1, 1922.

Reclamation of Trolley Poles—Summary of the replies of seven companies to questionnaire on causes of wear, method of reclamation and results obtained.

In addition to the above, supplements to the wage bulletin and cost-of-living studies have been prepared, bringing them down to date.

News from Other Associations

Startling Statistics on Public Accidents*

Seventy-six thousand accidental deaths—a life needlessly snuffed out every six minutes—is the astounding bill charged against careless America during 1920, according to the report of the public accident statistics committee of the National Safety Council.

While the 1920 toll from all public and industrial accidents, representing the total population of the State of Nevada, is a decrease of 3,300 over 1911, there is only a balance of 400 on the credit side of the ledger over the 1919 total. Automobile accidents are held to be in part responsible for the unfavorable experience of 1920; in that year there were 1,200 more deaths from that cause than occurred in 1919. The chief reason for this, it is pointed out, was the large increase in the number of automobile users. The automobile fatality frequency for 1920 was thirty deaths a day, a total for the year of 11,000. The 1921 estimate of automobile deaths, based on figures now available from fifty of the largest cities, indicates a considerable increase over 1920. General traffic accidents in 1921, however, will show a 5 per cent decrease over 1920, it is believed.

People died from falling accidents of all kinds at the rate of thirty-four a day, a higher rate than even automobiles. Burns claimed twenty-two lives a day, a total for the year of 8,088 and an increase of 215 over 1919. Other major causes of accidental deaths are listed in order of importance as follows: Railroad accidents, 7,769; drownings, 6,066; deaths from gassing 3,618; firearms, 2,767; mine accidents, 2,660; machinery, 2,660; street cars, 2,128; other vehicles, 2,022; conflagrations, 1,277. Other general causes of deaths are crushing accidents, poisonings, sharp instruments, excessive heat or cold, injuries by animals, lightning and electricity..

The burden of accident mortality continues to fall chiefly upon children and upon the active working classes, according to the report, which is the result of exhaustive research and statistical work on the part of the committee, which is composed of Louis I. Dublin, chief statistician of the Metropolitan Life Insurance Company, chairman; Herbert P. Stellwagen, National Bureau of Casualty and Surety Underwriters,

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*Abstract of committee report presented at Eleventh Annual Safety Congress, Detroit, Mich., Aug. 28-Sept. 1.

A. W. Koehler, New York Electric Railways, and E. W. Kopf.

Fatal accidents to children under five years number 9,880, or 13 per cent of the total. Young people from fifteen to twenty-four bore 14 per cent of the burden; those from twenty-five to thirty-four, 13 per cent; thirty-five to forty-four, 12 per cent, and those from forty-five to fifty-four, 10 per cent of all the accidental deaths of the year. A majority of the children came to their deaths through fatal burns, deleterious gases and automobile accidents. One-third of all automobile deaths occur among children under fifteen years.

Accidents in industry show a general decline of 1.3 deaths per 100,000 population for each year of the ten-year period, while public accidents decreased 1.1 per 100,000. The 1920 report shows public accidents on a slight upward turn, while industrial accidents declined; this in spite of increased manufacturing activities. Total industrial fatalities in 1920 were set at 12,500. The 1921 total, so far as can be anticipated from figures collected from insurance companies and other agencies, will probably be still lower because of reduced employment.

Chief causes of industrial fatalities during the period from 1912 to 1920, as shown by figures collected by the industrial department of the Metropolitan Life Insurance Company, are railroad accidents, falls of persons, machinery accidents, mines and quarries, electricity, drownings, street cars, automobile accidents, burns, and gasings, listed in order of importance.

Railroad accidents, both public and industrial, showed no decline, as there were 7,769 such deaths; some progress has been made, however, as past records show a total of 12,178 railroad deaths in 1911.

Present and Future of Berlin Street Railways[*]

Since the City Took Over the Properties, It Has Standardized on Certain Equipment—Changes in Fares and Nature of Traffic Since the War Are Described

By Dr. L. Adler

Manager Municipal Tramway System, Berlin, Germany

In October, 1920, the city of Berlin took over the seven existing street railway companies in that city and consolidated them to make one big municipal system, known as the Berliner Strassenbahnen. This new system serves an area more than 45 km. (28 miles) in diameter, and with a trackage of more than 1,250 km. (840 miles), or about the distance from Berlin to Rome.

Many complications of a financial and technical nature resulted from this merger. The capital liabilities of these companies had to be cared for and funds for rehabilitation provided, but it is believed that there will be corresponding gains by the economies made possible through this consolidation. For example, the number of employees is now 3,000 less than in the last year of separate operation, although the number of passengers carried has not decreased.

Steps are being taken also toward standardizing equipment, an important matter in view of the fact that more than thirty different types of motors, cars, brakes, etc., must now be kept up. This difficulty was partly overcome by using only certain types of equipment on all cars operating out of individual carhouses. Regular inspection of cars every two weeks also helps materially to keep down maintenance.

All the older cars were equipped with 20 to 25-hp. motors, which are too small for the present conditions. Only the new cars are adequately equipped with motors of 50 hp. The older types of motors are therefore used now only on lines where the traffic is light, and some have been improved by the addition of openings for ventilation in the closed motor casings. In some cases ball or roller bearings have replaced the previous simple bushing bearings. In other cases a high-grade anti-friction alloy was substituted for the old bearing metal. Greater care in the selection and training of motormen has also helped to reduce the motor repair bill. With all these methods, a surprising reduction of the number of motor failures has been realized. During 1920 there was a monthly average of 561 armature repairs, but this figure fell to 80 during 1921. The result was a monthly saving of more than 2,500,000 marks.

Up to the time of the merger, there were in use the wheel trolley, the bow trolley and the underground conduit system. The latter system was entirely abandoned, because its upkeep was high and its performance was unreliable in snow and rainstorms. Carefully compiled figures, comparing the results of the wheel and bow types of trolley, showed that if properly installed their maintenance costs are about equal. The bow type seems to be more reliable and is being used now on all new lines built in Germany. In Berlin, however, it was decided, for reasons of economy, to standardize on the wheel trolley because the overhead equipment already erected in Berlin for this system was four times that which had been erected for the bow type of trolley.

Two main types of brakes had been in use on the system, namely, electric and pneumatic braking. The safety of operation is the same in either case, but the air brake has many disadvantages. If the compressor is axle driven, its wear and tear and the cost of lubrication are exceedingly high. If it is motor driven, the cost is also high and the maintenance is considerable. It was therefore decided to abandon the air brakes and to standardize on the electric brake with seven braking steps on the controller. Only for suburban lines with one or more trailers to each motor car will the air-brake system be used.

There are now in use 1,400 four-wheel cars and 1,000 eight-wheel cars. The latter ride more comfortably, but the former require 30 to 40 per cent less maintenance cost and also are better from a tractive point of view because all axles are driven. For urban lines the four-wheel car is no doubt preferable, but the old cars of this design, with their original wheelbase of 1.8 m. (5 ft.), are now being gradually rebuilt to have a wheelbase of 2.4 m. (7 ft. 10 in.). A four-wheel car, with electric brake and sufficiently wide doors, is the most desirable type.

During the war, when traffic was heavy and no repairs were made, the rails became badly worn, and it will require much labor and expense to renew them. All new tracks will be laid in stone paving, as the use of asphalt is now far too expensive. Present track rehabilitation consists principally in cutting off the worn ends of the rails and connecting together the remaining four-fifths lengths by gas or electric welding. For joints in new rail the thermit process is generally used.

During 1920, the Berlin transportation systems carried 1,455,000,000 passengers, divided as follows: 54.3 per cent on the surface cars, 38.4 per cent on the steam-operated Stadtbahn, 6.9 per cent on the rapid transit lines and 0.4 per cent on the buses. In 1921 these figures changed to: 48 per cent on surface cars, 43 per cent on the Stadtbahn, 7 per cent on the rapid transit lines and 2 per cent on the buses.

Characteristic features of Berlin traffic are: In summer the traffic on the Stadtbahn and the rapid transit lines decreases, as the people prefer to travel on the open street cars and buses. The opposite is the case in winter, due to well-heated cars on the heavier traction lines. There is little travel on Sundays, which is in great contrast to pre-war days, when far more people spent their Sundays in the suburbs. The best traffic days now are Saturdays and Mondays. Very careful statistics are being kept to determine the proper schedule requirements of the different lines.

The actual cost of operation per car-kilometer amounted in 1921 to 7.5 marks, and many lines showed receipts far below that figure. Some lines have been rerouted, other badly paying lines were combined with lines of better revenue and all schedules have been redrafted. Unfortunately, the needs of traffic and economy are frequently in opposition. The former calls for a short headway of cars with a large ratio of seats to passengers. The latter requires full or even overfilled cars to compensate for the present high costs of operation. The present problem is to find a proper compromise between traffic and economy, and until a decided betterment of the present economical situation occurs, it is impracticable to pay much more attention to the requirements of the traffic.

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[*] Abstract of paper read at a meeting of the Deutsche Maschinentechnischen Gesellschaft, Berlin, Feb. 21, 1922.

Recent Happenings in Great Britain

British Tramway Wages Again a Problem—Power Supply Being Planned for Electrified Railways—250 New Cars to Be Bought for London Electric Railways

(From our British News Representative)

LABOR trouble threatens in the British tramway world. The employers gave notice that on Sept. 21 it was proposed to terminate the existing sliding scale agreement under which wages vary in accordance with fluctuations in the index figure of the cost of living. They also announced that it was intended to reduce wages by 12s. a week by three installments of 4s. each spread over September, October and November. The employees' side of the National Joint Council for the industry rejected the proposal. The employers advanced as a reason for the reduction the fact that the tramway men's wages are higher than those paid in some of the chief industries of the country, though many of the tramways are working at a loss, and that there is a great public demand for a return to pre-war fares. The trade unions concerned organized to resist the proposed reduction.

Power Stations for Electrified Railways

An interesting indication as to how matters will go in the future in regard to the provision of power stations for railways to be electrified is contained in a statement issued by the Electricity Commissioners regarding application by the South Eastern & Chatham Railway for their consent, under Sec. 11 of the electricity (supply) act of 1919, to the establishment of a generating station at Charlton, Kent. The purpose of this station is to provide energy for working the company's suburban lines. As already announced, these are to be electrified. The West Kent Electric Company also asked for sanction to erect a power station at Erith, Kent. The commissioners held an inquiry and in the course of it offers to supply the railway with the energy required were made by one West Kent Company and by the County of London Electric Supply Company.

Section 11 of the act of 1919 provides that it shall not be lawful for any authority, company, or person to establish a new plant or extend an existing generating station without the consent of the Electricity Commissioners. It also provides that in the case of a railway using or proposing to use electricity for traction consent shall not be refused unless it is proved that a joint electricity authority or authorized undertakers are willing and in a position to give the railway a supply of electricity adequate in quantity and regularity to meet the present and prospective demands of the railway at a cost not greater than would have been incurred by the railway in supplying itself.

The Electricity Commissioners, having examined the schemes of the West Kent Company and the County of London Company, found that there were authorized undertakers willing to supply power to the railway and be in a position to do so when the electrification of the lines would be complete. There would be a substantial saving in capital expenditure and no disadvantage to the railway to take the supply from an outside source. The railway was prepared to consider doing so subject to satisfactory guarantees. The commissioners were strongly of the view that the railway ought to enter into negotiations with the authorized undertakers and discuss the actual terms of a firm contract. Pending that, the commissioners postponed their decision.

New Rolling Stock for London Line

The London Electric Railway, in order to meet extensions and increasing traffic, proposes to acquire 250 new cars. As a preliminary, five of the leading British rolling stock manufacturers have been invited to prepare designs in accordance with an outline specification and to construct demonstration vehicles. The sample cars will be trailers, but corresponding characteristics will be applicable to the motor cars when the orders come to be awarded. Double pairs of sliding doors on each side are preferred by the railway, end doors being dispensed with. Another important point is the reduction of noise. Experiments have already shown that comparative silence can be attained by filling the hollow roof of an existing car with asbestos, fitting the windows with central struts, and putting a kind of hood over the wheels.

The members of a municipal deputation from Chicago, who have been visiting a number of cities on the continent of Europe, were in London during August. One of them, Aldermen Toman, stated that London had the best method of handling the traveling public that he had ever seen. Mr. Toman also said that one result of his tour was to confirm his strong opposition to the municipal ownership of Chicago tramways. He will advocate "tube" railways for his city.

High-Speed Locomotive

The Metropolitan-Vickers Electrical Company has delivered to the North Eastern Railway an experimental high-speed electric locomotive. Its maximum speed is 90 m.p.h. The machine is intended to be able to haul a 450-ton train at more than 60 miles an hour for long distances. The ultimate aim, of course, is the use of such locomotives for express passenger trains (such as the "Flying Scotchman") on the main line between York and Newcastle.

American managers who are interested in the question of the effect of the number of stopping places on average car speed may be interested in some facts given by J. K. Bruce, traffic manager of the London County Council Tramways, as regards experience on the system. The figures must be read in light of the fact that nearly all the cars are double-deckers and that in regard to most of them they seat nearly eighty passengers each. In general there are about eight stopping places per mile, of which two are compulsory and six by request. The average length of stay at a request stop is seven seconds, so that, assuming the stops are made at every "by request" stopping place, the total stop time excluding main traffic points over a 7-mile route is less than five minutes. Observation shows that the total stop time for a journey of this distance is between three and four minutes, as even at rush hours few optional stops are made. The average car speed on the London County Council Tramways is much higher than on any other city tramway in Britain, notwithstanding the great density of the traffic.

It is proposed by the Manchester Tramways Committee that J. M. McElroy, late general manager of Manchester Tramways, shall be retained for five years at an annual fee of 150 guineas to act in an advisory capacity in connection with parliamentary, arbitration and local inquiry proceedings and other matters relating to passenger transport in Manchester and district.

Some time ago I reported the negotiations were in progress for the purchase of the Paisley Tramway Company's undertaking by Glasgow Town Council. There has been much talk, but at a meeting of the Council held some weeks ago, it was decided to offer the company £250,000 for the undertaking. A minority of the Corporation contended that Glasgow should have nothing to do with the project. The capital expenditure of the company has been over £400,000.

Edinburgh Project Opened

The first electrified section of Edinburgh Corporation Tramways was formally opened on June 20. It is a north and south line from Pilrig to Liberton, a distance of about 3 miles, and it passes through the center of the city. The other routes will be converted from the cable system as speedily as possible, and it is hoped that the work will be completed about the end of next year.

An example of the fall in the price of steel is quoted from Rotherham. The tramway committee there placed an order last year with a Sheffield firm for 400 tons of rails, half to be delivered in 1921 and half in the current year. The price of the first lot was £25 15s. per ton and of the second lot only £12 10s. per ton.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Files Damage Claim

International Railway Alleges City Failed to Furnish Adequate Protection—Representatives Ready for Negotiations

The International Railway, Buffalo, has filed with the city law department a claim for damages aggregating $3,805,250, which, it is alleged, was incurred during the strike which started July 1, through the failure of the city to furnish adequate protection to its property and employees. Of this amount, an item of $4,250 is for actual property damage. The International alleges that in addition to this damage it has sustained a loss of $1,800,000 in operating revenue and $2,000,000 in loss of good will.

Herbert G. Tulley, president of the International, in a statement accompanying the filing of the claim, states that the company used reasonable diligence in trying to prevent its property from being damaged but did not get adequate protection from the city. He says that on July 2, the second day of the strike, Mayor Frank X. Schwab was notified that threats of violence against the company had been made and he was notified that the property of the International had been damaged. It is also alleged that the Mayor and chief of police had knowledge and information from various sources of threats to damage the property of the company.

From July 2 to Sept. 30, Mr. Tulley says there have been mobs and assemblages of riotous and disorderly persons who have interfered with the business of the International and injured its property by riotous acts. It is claimed these mobs used force and violence and made threats to officers, employees and passengers of the company, have attacked crews, stoned cars, exploded dynamite, derailed cars and committed other acts that have injured property and caused a loss of income.

Immediately after the filing of the claim with the city law department, President Tulley sent a letter to Mayor Schwab saying:

> The claim of International Railway Company for losses specified therein has been filed in accordance with the law.
>
> In order to prevent any misunderstanding, I wish to state that the company in taking this step, does not wish to be understood in any way to change its policy of co-operation with the city, as evidenced in our recent correspondence, and also in my letter nominating the company's confreres.

The International Railway has nominated two of the three men who will represent it in negotiations with a committee of three members of the City Council with a view to the adoption of a plan whereby the 5-cent fare may be re-established in Buffalo. The company now charges 7 cents or four tokens for 25 cents. The company's representatives will be President Tulley, Vice-President Edgar J. Dickson and a Philadelphia official representing Mitten Management, Inc., which operates the local and interurban lines of the International Railway system. The city's representatives on the committee will be Mayor Schwab, Councilman Ross Graves and Councilman Arthur W. Kreinheder.

NO DISORDERS FROM WITHDRAWAL OF EMERGENCY PAY

No strike or other disorder resulted when the International withdrew its emergency wages of $7.50 per day to employees who have been operating the cars since the strike was called. Efforts were made by strikers and their sympathizers to create discontent among the loyal employees and have them strike when the company discontinued its emergency wages and established the regular wage scale of 55 cents an hour. A few employees resigned but their places were quickly filled and the International now has a complete new operating staff working at regular wages. The camps where trainmen are boarded and fed, if the men so desire, are being continued temporarily.

Commenting editorially upon the damage claim filed with the city law department by the International, the Buffalo *Commercial*, open shop daily newspaper which has been supporting the railway in its effort to overthrow union domination, said:

> It will be a sorry day for Mayor Schwab and the City Council if the claims of the International are sustained. The taxpayers are groaning under heavy burdens as it is. If the courts hold that the claims of the street car company are valid against the city, even in part, there will be such an uprising at the next election as was never seen in Buffalo, for we all know how deliberately and wantonly the city government failed to give that protection to life, property and individual and corporate rights that is one of its most important functions. The courts have everywhere held that the neglect of a municipality to protect its citizens makes itself liable for the amount of the injury inflicted, assuming, of course, that the citizens themselves used diligence in trying to protect their own interests.

Additional arrests are being made daily by employees of the International of jitney drivers who are defying the orders of the courts and the laws of the state and city. Sentences of $250 fines and thirty days in the penitentiary have been imposed upon many jitney drivers while others have escaped with $50 fines. International employees continue to serve injunctions restraining jitney drivers from operating unlawfully within the city and no apparent effort is made by the police to stop this illegal operation.

Normal service continues to be given in Buffalo and Niagara Falls and over all interurban lines but local service has not yet been started in the city of Lockport.

Seeks Franchise to Haul Freight —Increased Revenue May Meet Paving Expenses

Efforts are being made by the San José Railroads operating in San José and Santa Clara, Calif., to obtain a franchise over its electric line on North Seventeenth Street, San José, which would enable it to haul freight in carload lots between the hours of 6 a.m. and 9 p.m. The railroad company is confronted with paving its 22-ft. franchise right of way on the unpaved portion of North Seventeenth Street, which involves an expenditure of approximately $100,000. In view of this expenditure the San José Railroads is endeavoring to obtain more revenue out of the line in question by being able to conduct carload freight business over it.

The San José Railroads has spent more than $600,000 in paving expenses, which has not added to the company's revenue, but has given it competition with the jitneys. The company does not want to make further abandonments, but cannot obtain any more revenue for paving purposes.

	Six Months Ended June 30, 1922	Six Months Ended June 30, 1921
Way and structures	$15,859	$19,953
Equipment	15,160	15,796
Power	19,828	19,788
Conducting transportation	72,354	84,313
Traffic	1,207	1,347
General and miscellaneous	19,342	14,809
Trans. for investment	530*	......
Total	$143,221	$156,007
Depreciation	3,152	3,086
Taxes	13,206	11,649
Total—Depreciation and taxes	16,358	14,735
Grand total—Expenses	$159,580	$170,743
Operating revenues	$206,426	$198,572
Car mileage	944,221	881,897

* Credit.

Recently the situation was presented in considerable detail to the City Council by the San José Railroads and a request was made for a franchise granting the San José Railroads permission to carry freight in the territory described and under such rules as to the time of service, etc., as the City Council should deem best.

Some opposition developed, culminating in a petition signed by some of the property owners living in Seventeenth Street requesting the City Council to refuse the application. In consequence a public hearing on the matter was called recently.

In a recent statement to the public the company claimed that despite economical management the property did not earn a reasonable return.

The accompanying table shows a comparison of expenses for the six months ended June 30, 1922, and June 30, 1921.

Three Proposals for Detroit Voters

$5,000,000 Bond Issue for Extensions for Municipal Lines, Detroit United Ouster and Paving Charge Transfer Up for Consideration on Nov. 7 —City Refuses to Sign Agreement with Union

In view of the contemplated extension of the city lines, the Detroit City Council has authorized the submission of the proposition for issuing $5,000,000 in public utility bonds to the voters at the Nov. 7 election. In unfolding the plans of the Department of Street Railways, the Mayor stated that the Department of Street Railways was working out a program for extensions which will be presented to the Council early next year.

RAILWAY DEPARTMENT IN GOOD SHAPE

An authorized bond issue on which to borrow money will be needed if it is necessary to borrow for the extension work. Temporary notes backed by a bond issue may also be needed to pay for the 200 Peter Witt cars ordered by the city, the Mayor pointed out. He further explained that none of the money resulting from the bond issue could be used for development without the approval of the Council.

The Department of Street Railways is in excellent condition, the Mayor stated, cash on hand from earnings being sufficient to meet operating and maintenance costs, also to meet interest and principal on the original purchase in addition to providing a sinking fund. It should not, however, be expected to be prepared to meet cost of much-needed extensions. The proposal for a bond issue is, in the Mayor's opinion, similar to the action of any corporation preparatory to making extensions or expanding its business, issuing additional securities. Where the private corporation must go to the state for permission, the Department of Street Railways goes to the people.

In requesting authority to submit the question to the electors the Mayor accompanied his communication by a resolution passed by the Street Railway Commission giving the needs of the department. It is anticipated that the commission will be able to borrow temporary funds on the authorization of the bonds and possibly avoid issuing any bonds to pay for the cars.

TRACK USAGE

Another question to be voted on at the Nov. 7 election is the one of ousting the Detroit United Railway interurban cars from the city streets. The wording will be: "Do you favor terminating the permission to the Detroit United Railway to operate its interurban service within the city of Detroit, said service to terminate on and after Dec. 31, 1924?" The Mayor cited that in the two years and more before the order will take effect plans will be worked out whereby service to the public will be greatly improved. Although notice has already been served on the Detroit United Railway calling for termination of the use of the city trackage, the Mayor believes that the matter is one in which the people should be consulted.

One clause in the city's purchase contract provides that two years' notice must be given the company. It has been cited that the approval of the action will necessitate the erection of car houses and terminals at the city limits connecting with the municipal railway lines within the city.

Of plans that occur to him, the Mayor stated that the extension of Detroit's street railway system to cover all of the suburbs might completely solve the problem. Under the law the city has the right to extend service 10 miles from the city limits, which would include all of the territory referred to.

RELIEF FROM PAVING CHARGES

The policy of forming a big metropolitan district is mentioned as not only simplifying the transportation question but that of gas, water, light and all of the services performed by a local government for its people. The Mayor believes that it would be better for all, including Detroit and its suburban neighbors, to get together for the best possible service in all of the utilities without regard to imaginary dividing lines in these districts.

Another question which the voters of Detroit will be asked to decide at the Nov. 7 election is a charter amendment which will relieve the Detroit Department of Street Railways of paying for pavements between car tracks and transfer this item of expense to the Department of Public Works.

In his communications to the Council, asking that the amendment be submitted, the Mayor said that the cost of maintaining this pavement should not be borne by the car riders, but by the entire people. The law forcing the street car system to pay for this pavement was passed in old D. U. R. days, and the Mayor explains that the reason for it was that horses on the old horse-drawn vehicles wore out the pavement. This is done away with by the present modern type of street car, and it makes no difference to the car rider whether or not there is pavement between the tracks, the Mayor said.

CITY WILL NOT RECOGNIZE UNION

The Detroit Street Railway Commission has refused to enter into a signed agreement with the street car men's union and will not submit to arbitration the advisability of signing such agreement. The refusal was made in answer to a petition forwarded to the commission under date of Sept. 26, asking that an agreement as to working conditions on the municipal line be worked out similar to the agreement that existed between the union and the Detroit United Railway, signed shortly before the Detroit United Railway lines were taken over by the city. Judge Edward J. Jeffries was named by the union as its representative in the proposed arbitration.

In their reply the members of the Street Railway Commission suggested that while they believed action they had taken was in harmony with public policy, a definite action from the public could be obtained through a referendum.

The commissioners believe that it is against public policy to enter into formal agreement with unionized labor engaged in public employment. Likewise the question of arbitration is considered beyond the decision of any board representing only the employees and management of any single city department. The arbitration proposed is not considered to be within the limits of the city charter. In view of the fact that the stockholders and owners of the city system are the people of the city, the commission feels that it should not commit itself without an expression from the people.

Judge Jeffries told the car men that they were within their rights in stipulating conditions under which they would work, and that if they failed, organized labor in Detroit would be doomed.

MEN TO DEMAND ARBITRATION

A resolution was passed by the men citing that the request for arbitration of questions existing between the Department of Street Railways and its employees had been denied, although the city charter provides that the railway commission shall arbitrate any and all questions affecting the employees of the department. It was resolved that a committee be instructed to reply to the letter of the commissioners under date of Sept. 30, and in said reply demand arbitration as provided for in the city charter. Failing to receive a favorable reply the committee is instructed to call a special meeting of members of the union and for them to take such action as they deemed necessary.

Arbitration Award Leaves Wages Unchanged

A recent decision of the arbitration board formed to settle the wage dispute between the Berkshire (Mass.) Street Railway and its motormen and conductors leaves wages unchanged. Announcement has been made that the award was accepted by the company and the men.

The company sought a 20 per cent reduction and the employees asked for increases from 10 to 15 per cent. Both sides agreed to arbitrate when they were unable to come to a mutual agreement.

The company's arbiter was Attorney Barry of Hartford, Conn., and the employees named Attorney Vahey of Boston. Former Governor S. W. McCall was agreed upon as the third member. The award was signed by Messrs. McCall and Vahey. Mr. Barry did not sign, but both sides have agreed to accept the majority award.

Reservation Accepted

Dallas-Denton Electrification Will Be Started at Once—The Extension to Wichita Falls Now Awaited

With the acceptance by C. W. Hobson and associates of the reservation made by the city of Dallas, Tex., in its approval of the plan submitted by Mr. Hobson for the electrification of the Missouri, Kansas & Texas Railway line from Dallas to Denton and its use as an electric interurban in lieu of the second interurban which Mr. Hobson had agreed to build in return for the street car franchise granted in 1917, the final step was taken and the work of electrifying the Missouri, Kansas & Texas line will begin at once. The reservation imposed by the city in its approval of Mr. Hobson's proposal was that the $350,000 posted as a forfeit under the contract with the city should remain posted as a guarantee that the electrification plan would be carried out.

Orders to Be Placed Soon

Surveying crews will be put in the field shortly, it is announced, and as soon as surveyors show what special steel construction is needed, orders for material will be placed. The electrification should be completed and the line put in operation by the summer of 1923, Mr. Hobson says, as the work will be pushed with all possible speed.

Several routes are being considered for the new line to enter the city of Dallas. Under the contract between the Missouri, Kansas & Texas and the Texas Interurban Company, the interurban company leases the tracks of the Katy for a period of fifty years, with the right to electrify the line and operate it as an electric interurban for carrying passengers and express business.

The Katy will continue to operate the line as a steam railway for carrying freight. The Texas Interurban Company is to build a new line on which its cars will enter Dallas. This line will likely leave the present Katy tracks near Love Field, which is being developed as an industrial district for Dallas, and will enter the city from the north in such manner that a section of the city now without street car facilities will be served.

Residents of North Dallas have presented petitions to the City Commission asking that the Oak Lawn car line be extended out Cedar Springs Road, which will serve a big section of the city that is rapidly building up and is now without street car facilities. It is believed that this is a preliminary move in seeking to have the Denton line enter the city along Cedar Springs Avenue and the present Oak Lawn car line and Masten Street to the business district, thence to the Interurban Terminal Building on Young and Browder Streets. It is agreed that the Denton cars will use the interurban terminal as other interurbans running into Dallas do. The line which the Texas Interurban Company must build will be about 6 miles long.

Mr. Hobson announces that one-man cars will likely be put in operation on the Dallas-Denton line, although it has not been fully determined. The one-man cars, he says, can be operated more economically and at the same time give quicker service and a faster schedule. It is planned to maintain an hourly schedule at the start, and if business justifies, additional cars will be operated.

Electrification will cost about $1,500,000, according to estimates of engineers, the building of the 6-mile connecting link between the lines of the Dallas Railway and the steam railway near Love Field being the biggest piece of construction on the entire line. The stations at the various towns along the line will be used for joint stations, it is announced, except in Dallas and Denton. It is planned to build an extension in Denton and to build and maintain a new passenger station in the business district. The new line to be built there will be about half a mile.

While no announcement has been made, it is understood that Richard Meriwether, vice-president and general manager of the Dallas Railway and vice-president of the Texas Interurban Company, will have charge of the construction in the electrification of the line.

The Dallas-Denton line is looked upon as the beginning of the proposed interurban from Dallas to Wichita Falls, which was contemplated several years ago. The project seemed near to realization, but financial stringency on account of the war blocked the plans, after Dallas citizens had subscribed to $1,500,000 of the stock of the company and had raised funds for extensive surveys of three possible routes between the two cities. It is believed that once the interurban line is put in operation between Dallas and Denton, it will be a small matter to build the extension to Wichita Falls.

Another Part of the Katy to Be Electrified

The Oklahoma Railway, Oklahoma City, which operates in Oklahoma City and an interurban line out of Oklahoma City, is considering the proposition of taking over the railway line of the Missouri, Kansas & Texas running from Oklahoma City to Ateka, according to John Shartel, vice-president and general manager. This line of the Katy is 125 miles in length and serves thirty cities and towns in Oklahoma. Mr. Shartel announced that if negotiations now under way for the lease of this line by the interurban company are successful it will be electrified and operated as an interurban line. The electrification, it is understood, would involve an outlay of something more than $2,500,000. The franchise obtained by the interurban company would give that company the exclusive right to use the line for hauling passengers, while the railway company would continue to use the line for freight carrying purposes.

Extensions Given Consideration

Further extensions of the Boston (Mass.) Elevated Railway system are now being given serious consideration, both by the Elevated trustees and by the Massachusetts Department of Public Utilities, the latter tribunal being charged with the duty of making recommendations to the Legislature.

At a final public hearing on the subject, given by the Public Utilities Commissioners on Oct. 4, Mayor Curley of Boston complimented Chairman James Jackson of the Boston Elevated Board of Trustees for the way his board is handling the Elevated, but he argued that the establishment of a 5-cent fare or municipal ownership and operation may become the choice of the road.

There is a strong demand for the Boston Elevated to take over, by some process, the service of the Eastern Massachusetts Street Railway in Hyde Park and in Chelsea and Revere. What the attitude and plans of the Boston Elevated are toward this proposition, and the extension of the Elevated to other sections, was explained by Chairman Jackson. He said that it seemed obvious that the only way to relieve transportation conditions in the Hyde Park section was the extension of Boston Elevated service into that district. Further, that the trustees were ready to provide a service through lease or purchase upon terms that would not impose additional burdens upon those who were using the railway.

He discussed the situation north of Boston and referred to the proposed improved transportation for Chelsea and Revere.

Three Issues Settled in Franchise

A new franchise is in process of construction under which the Virginia Railway & Power Company will operate in the city of Portsmouth. An agreement has just been reached on three important points and an ordinance is now being drawn by the City Attorney covering these and minor details. The three major issues involved and upon which city and company are in accord are as follows: The company is to carry out its paving program incident to certain rerouting, after which paving obligation will be limited to $15,000 per annum; second, jitneys will be rerouted two blocks from car lines to avoid competition; third, the city recognizes the right of the Commission to regulate fares and service.

The importance of the last point in the agreement was recently emphasized in a decision of the Supreme Court of Appeals. The ruling dealt specifically with the case of Victoria vs. Victoria Light & Power Company, but affects all contracts with public utilities, companies and municipal governments. The ruling stressed the fact that no city of the State of Virginia has the right to fix fares and rates to be charged by the public utilities, but that the State Corporation Commission has the power to control fares and rates.

Rapid Transit and Water Power Made Political Issues at Albany

Both the Republican and Democratic parties in New York State have held their political conventions, nominated their candidates and adopted their platforms. One of the principal issues in the coming New York State campaign will be the matter of the Public Service Commission administration and the development of water power, both measures linked together under one common head.

The Republican platform goes squarely on issue as claiming credit to the Miller administration as an asset for all that has been accomplished in the matter of water power development and Public Service Commission achievements.

The Republican party platform adopted at Albany has the following to say in part in relation to rapid transit:

> In New York City transit conditions have for years been deplorable, and in 1921 had reached a critical stage. The transit facilities of the city were crowded beyond the point of human endurance. The equipment of many of the lines, cars and tracks alike, had been allowed to sink into a state of disrepair disgraceful to the city. With the surrender of many companies to receivership lines had been abandoned utterly; and whole systems covered by a single fare had disintegrated, with the resultant collection of double and often treble fares. Many hundreds of free transfer points had been abolished. The city was paying from taxes the interest upon its own investment in the rapid transit lines, designed by this time to have been paid from the receipts from operation. The 5-cent fare of the past had in effect disappeared. Most serious of all, in the face of enormous increases in traffic, not a new line had been provided for and even the completion of vital branches contracted for in 1913 had been delayed. The future was further complicated through the inability of the companies to borrow for construction purposes and the further fact that the constitutional borrowing power of the city had practically been exhausted.
>
> In this situation of chaos and confusion, with the local city administration either unwilling or powerless to act, Governor Miller and the state Legislature performed a great and timely service by intervening. This intervention involved no violation of the principle of home rule and no departure from precedent. From the beginning commissions having jurisdiction of rapid transit have been state commissions. This was so under the last Democratic state administration, which reorganized the commission but left it as a state appointed agency. Today by virtue of the orders of the transit commission hundreds of additional subway trains have been provided; new cars and other needed equipment have been ordered at a capital cost to the companies of more than $7,000,000 and the time brought measurably nearer when there will be a seat for every passenger in all but the peak rush hours. Inter-company leases have been or are about to be modified so as to reclaim millions for the benefit of service. Plans have been prepared for new lines and extensions and, what is of even greater practical importance, plans for raising the money to build the new lines without further use of the city's cramped credit have been devised.

The Democratic platform regarding the same subject says:

> We pledge the Democratic party to the enactment of statutes that will give the fullest measure of home rule to local communities in dealing with and regulating public utility corporations. Divided responsibility must cease and adequate power to discharge their duty given to local officials who are best fitted to solve the public utility problems of their community. We favor the delegation by the state to municipalities of power to control public utilities operating wholly within their limits. The state should retain the power to control only public service corporations whose activities are state wide.
>
> Repeal of the Miller legislation of 1921 which delegated power to the present disturbed transit commission without the consent of the elected officials of the local community, and regardless of existing contracts and franchises with public utility corporations. We confidently believe that a 5-cent fare on all street railways and lower gas, water, electric and telephone rates will then result. We endorse the vigorous opposition of the New York City administration and the officials of other cities in the encroachments authorized by these vicious laws on the rights of local communities.
>
> A law that will authorize cities, towns and villages to own and operate omnibus lines.
>
> Federal legislation which will prohibit the appointment by Federal judges of receivers for local public utility corporations or the issuance by them of injunctions restraining local authorities from administering and enforcing state laws or the provisions of franchises and contracts to which a community is a part.

The campaign will center from the standpoint of the issues raised, chiefly around the policy of the present administration in the regulation of public utilities. The Democratic program would entail fifty-seven Public Service Commissions, one for each city of the state. Legislation backing up such a program was introduced by the Democratic minority last winter but failed.

Commission Fixes Fares and Wages

The wage and fare issues in Mobile have been settled by a recent decision of the Alabama Public Service Commission. The commission had previously entered into an agreement with the Mobile Light & Railroad Company to the effect that when it acted upon the company's request for an increase in fare future wages of trainmen and other employees would be fixed at the same time.

Effective Oct. 1, 1922, the fare schedule is as follows:

City zone cash fare, 8 cents.
Tickets, four for 28 cents.
County zones, 6 cents.
School children's tickets, forty-ride books good for month of purchase at 3½ cents each, good going to or from school; not good on Sundays, Saturdays and holidays.
Transfers, 2 cents each, except between Government Street and Michigan Avenue free.

The above increase is an increase of 1 cent per fare, excepting school tickets, which remain the same as formerly. Transfers were formerly free.

The old and new wage scales in cents per hour are as follows:

Trainmen	Old	New
First year	41	39
Second year	43	41
Third year	48	46
One-man operators 4 cents per hour additional.		
Overtime at time and a half.		
Carpenters	Old	New
First class	74	69
Second class	72	67
Third class	64	59
Machinists		
First class	74	69
Second class	72	67
Blacksmiths		
First class	72	68
Mechanical utility men	47	45
Overtime at time and a quarter.		

Carhouse men, pitmen, armature winders, painters, linemen, welders, trackmen and all common labor and helpers are not members of a union, and their wages were not arbitrated, neither were the wages of the power house employees included.

Promised Type of Construction in Miniature to Win Public Votes

As a part of its advertising campaign to induce citizens to vote in favor of the proposed Sixteenth Street franchise and proposed charter amendment to relieve the company of paving obligations on new work, the San Diego (Calif.) Electric Railway has erected a booth in the city plaza at the corner of Third Street and Broadway, which attracts a great deal of attention.

The chief feature of the booth is a section of track showing the new type of construction adopted as standard by the company on all reconstruction and new work—twin steel ties, 100-lb. rails welded to the ties and with welded joints, all imbedded in solid concrete and with drain tiles on each side. A block of track has been sawed out so as to show every detail of construction, with ribbons running from the points of interest to placards on the wall explaining its superiority over the old type of construction. Photographs on the walls also give illustrations of the service the car company renders, and show some of the traffic conditions which cause accidents and delays through no fault of the company.

A man is in charge of the booth who explains the exhibits and gives out folders containing a brief argument in favor of the proposed franchise and amendment, and giving statistical information about the railway, showing that the company has already spent $400,000 in laying the new type of track ($100,000 on the Broadway line and $300,000 on the Logan Avenue line) and stating that the company is ready to spend an additional $740,000 on reconstruction if it is assured of fair play by the public, as will be indicated by the vote on Oct. 10.

The reconstruction proposed is listed as follows: University Avenue, $315,000; Adams Avenue, $200,000; Park Boulevard, $100,000; Market Street, between Sixth and Sixteenth, $50,000; Point Loma line, $75,000.

"The best street railway system in the State of California," is the mark set by General Manager Claus Spreckels in an announcement which has been made by him in the folder as issued.

All Utilities Included in Court Ruling

Full import of the recent decision of the California State Supreme Court relative to the power of the State Railroad Commission to compel utilities to cease operations has just been issued. The Supreme Court, by unanimous vote, sustained the commission. According to the legal department of the commission, the court's interpretation of the powers of the commission applies to all utilities in the State of California and not only to the case involving the Motor Transit Company, which sought a writ of review. This was dismissed by the court, which later handed down its decision.

Illinois Central Decides on 1,500 Volts D.C.

A 1,500-volt direct-current system for the electrification of the Illinois Central Railroad within the city limits of Chicago was announced Oct. 4 by President Markham. The plan was adopted as a result of recommendations made by a committee appointed in 1920 to study the subject. This committee, composed of several eminent heavy traction electrification engineers, made a thorough study of existing systems in this country and abroad before rendering the decision as to whether direct or alternating current should be used. The adoption of 1,500 volts d.c. practically determines the system to be used in all future terminal electrification work in Chicago. The announcement of the committee's decision was somewhat delayed by the loss of A. S. Baldwin, vice-president in charge of terminal electrification, who died on his way to Chicago after having made a detailed survey of European installations. His duties have fallen to D. J. Brumley.

The Illinois Central problem involves a heavy suburban passenger service, freight transfers between yards, switching in congested yards and eventually through passenger movements, all within terminal limits only. It is quite different from any electrification so far undertaken either in this country or abroad. The suburban passenger service will cover the main line from Chicago to Matteson, 28 route-miles; the Chicago branch, 4½ route-miles, and the Blue Island branch, 4.4 route-miles. The track-miles involved are 125.

In a short time after the electrifaction is completed it is estimated that 240 cars electrically equipped will be required. The number of trains per day will be about 350 and the total suburban train movement will amount to about 5,000 train-miles per day.

The freight service north of Roosevelt Road, next on the program, will cover more than 40 miles of track, and as this is mainly yard trackage it involves difficult electrification problems.

Unable to Repair Viaduct, Company Near Bankruptcy

The South New Orleans Light & Traction Company, operating from ten to fifteen cars, on a line connecting Algiers (opposite New Orleans) with McDonoghville and Gretna, in Jefferson Parish, admitted on Sept. 16 through its president, E. W. Burgis, that it was on the verge of bankruptcy. This statement was made by that official at a hearing granted the company by the Commission Council of New Orleans to show from its books why it was unable to repair the Newton Street viaduct in Algiers, closed three weeks ago by City Engineer Klorer as unsafe and a menace to life.

The franchise granted by the Commission Council of New Orleans provides for a 5-cent fare from the United States immigration station in Algiers to the Jefferson Parish line. Similar authority was granted the company by the Police Jury of Jefferson Parish for car fare from that parish line to the Court House in Gretna. Both franchises give the company the right to charge a 10-cent fare from the immigration station to the courthouse at Gretna, but this right has never been exercised and neither President Burgis nor E. Howard McCaleb, attorney for the company, would say whether they were contemplating a formal request for an increased fare rate.

The repairs needed to the viaduct, according to City Engineer Klorer, will cost $75,000 with an additional expense of $15,000 to keep it in safe condition for ten years. President Burgis claims that under present conditions his company is absolutely unable to meet this demand of the Council.

Educational Courses in Economics of Utilities Offered

Arrangements have been completed for a course in public utility economics to be offered in the Dallas School of Commerce of the Southern Methodist University at Dallas, Tex., beginning the last week in September. The course has been planned by and will be under the supervision of the Texas Public Service Information Bureau, in charge of George McQuaid, and of which C. W. Davis, vice-president and general manager of the Dallas Power & Light Company, is chairman.

The course is designed to present an orderly study of the important but not well-understood public utilities, their management and control, with adequate attention to the public relation and regulation under the laws.

Twelve lectures will be given during the fall term by men of signal ability who have made careful, practical studies of the public utilities in their several lines. Among the utility men who will deliver these lectures are G. H. Clifford, general manager Northern Texas Traction Company; C. W. Davis, general manager Dallas Power & Light Company; W. B. Tuttle, vice-president San Antonio Public Service Company, and others. The course includes the following topics: Light and power; street railways; interurban railways; the telephone; natural gas; manufactured gas; franchises; corporate set-up and financial aspects; legal aspects; customer ownership; accounting methods; service.

Sees Need of Trolley-Boys

Trolley-boys have been eliminated from the cars of the Salford (England) Tramways, although, according to the *Electric Railway and Tramway Journal*, Manchester still keeps them. District Secretary McLean of the General Workers' Union has sent a protest to the Tramways Committee urging the retention of trolley-boys on the ground of efficiency and safety. He said that the complicated overhead equipment in Salford required constant attention in order to avoid trolley difficulties.

News Notes

Railway Project in Japan.—A new route has been granted the Keehan Electric Railway, operating an interurban between Kyoto and Osaka, Japan. The capital stock of the existing company will not be increased, but instead a separate company will be established. A certain portion of stock will be raised from the general public.

Will Probe Railway.—A committee of three engineers representing the California Railroad Commission, the Bakersfield & Kern Electric Railway and the city of Bakersfield, Calif., will begin an investigation at once into the transportation problems affecting east and west Bakersfield. The committee will discuss fares and will prepare recommendations for increasing the revenue of the Bakersfield & Kern Electric Railway, now operating at a loss.

Advantage of Being Railway Employee.—For the fifth consecutive year the employees of the Indianapolis (Ind.) Street Railway are securing their domestic coal at cost. The sales are handled through the auditor's office. The men some time ago gave their orders and the coal is billed to the company. The men get the coal at exactly the cost to the company, plus what it costs to have the coal hauled from the switch to their homes. A saving of approximately $2 a ton is effected.

No Agreement on Franchise.—The East St. Louis & Suburban Railway, East St. Louis, Ill., and the city of Belleville have been unable to agree on the franchise for the operation of cars in that city. The City Council and certain civic organizations are opposed to granting the twenty-year franchise unless the company will build 1 mile of extension every five years of the time the franchise is to run and to pay for paving improvements between the rails. President Sawyer of the railway said that he could not promise improvements and that the company would be opposed to paying costs asked for by the Belleville City Council.

To Find Out What Business Men Think.—A referendum to ascertain the sentiment of the business men of Indiana regarding regulation of public utilities now is under way among members of the Indiana Bankers' Association, the Indiana Utility Association and one other organization. Approximately 4,000 business and industrial leaders in the State will be asked to express themselves before Oct. 18. In view of the attacks made on the Public Service Commission in the last year and because of the attempt to abolish the Commission by the introduction of a bill at the next session of the Indiana general assembly, the referendum is of added importance at this time.

Financial and Corporate

Valuation Hearing Resumed

Philadelphia Rapid Transit Contends Figures of City's Expert Are Inaccurate by Wide Margin.

The Philadelphia valuation hearings have been resumed. The action is the case before the Public Service Commission of Pennsylvania in an effort to fix a valuation for the property of the Philadelphia Rapid Transit Company upon which the company may be permitted to earn a return.

The figures of valuation presented by Robert M. Feustel, expert for the city, have been in the hands of the representatives of the railway for study over the summer. For purposes of review it may be said that Mr. Feustel's figures varied from $89,000.000 to $187,000,000 under several different bases of cost. The value of the property as claimed by the company is $290,000,000. It appears that the company has placed in evidence no figures based on the theory of original cost.

At the hearing on Sept. 26 Coleman J. Joyce, counsel for the company, explained that an exhaustive study of the available books and records of certified public accountants had convinced the accountants and had also convinced him that the original cost of the property of the Philadelphia Rapid Transit Company was and is absolutely impossible of determination.

NO FIGURES OFFERED ON ORIGINAL COST

For that reason and that reason alone the company offered no figures on original cost. He said that he had placed in evidence the result of the accountant's study and that he was satisfied that the record demonstrated that the conclusion he reached was sound. He contended that the city's attempt to arrive at cost on this basis—original cost—has simply served to strengthen his conviction that such a total must of necessity be utterly unreliable.

The disposition of the commission has been to conclude the case now as quickly as possible. It had fixed Oct. 15 as the date at which all testimony was to be in and had set Nov. 5 as the date for arguing the matter in Harrisburg. The hope of that body has been to hand down its findings before Jan. 1.

Mr. Joyce has disclaimed any desire on his part to delay the proceedings, but has indicated that questions have arisen in connection with the figures presented by Mr. Feustel that may make necessary extended cross-examination. He has put some of the alleged inaccuracies as ranging in amount from $1.000 to $70,000 on individual items.

Samuel Rosenbaum, assistant city solicitor, does not share with Mr. Joyce the opinion that the need may arise for protracting the hearings. In commenting on the errors alleged to have been discovered by the company in the city's valuation he is reported to have said:

> The tactics of the company are intended only for delay and to cover up the atrocities in the company's own case. If Mr. Joyce had conferred with our people with any frankness these insignificant errors would have been explained and we should have been able to finish this testimony before Oct. 1.

Mr. Rosenbaum admitted that there were certain errors in the printed statement of the city, but said that they were discovered shortly after the report had come from the printer, and that they were clerical or typographical errors that could be quickly explained and in any event would not affect materially the total as claimed by the city. He seemed to read into Mr. Joyce's remarks a disposition to inquire minutely into all the figures. This was a prospect not at all pleasing to him, for, he said, "if all of those who were engaged in preparing the city's report are to be cross-examined the proceedings will not terminate this year and maybe not for a year later."

Line Shows Profit

The Hartford & Springfield Street Railway, Hartford, Conn., operated at a profit during June and July in contrast to the losses sustained by the company for the same months a year ago. The receipts for June amounted to $20,028, with expenses totaling $17,337, or a profit of $2,691. This profit is compared with a loss of $1,777 for June, 1921. The Hartford division, however, shows receipts of $12,552, and expenses of $13,089, a loss of $537 against a gain of $3,197 for 1921.

The July report shows receipts of $22,777, and expenses of $17,977, a profit of $4,800, against a profit of $1.094 for July, 1921. The Hartford division shows receipts of $14,578, and expenses of $13,598, a profit of $980, against a profit of $4,287 for 1921.

Would Replace Demand Notes

Hugh McIndoe, a member of the Missouri Public Service Commission, has just held a hearing at Springfield, Mo., on the application of the Springfield Traction Company to issue $294,300 in second mortgage 6 per cent bonds to take up $294,300 of demand notes bearing interest at 8 per cent. These demand notes are held by the Springfield Railway & Light Company of Maine. They were given on account of advances made by the Maine corporation since 1913 for the purpose of making capital expenditures. The money was received as follows: $21,501 in 1914; $40,428 in 1915; $25,950 in 1916; $17,126 in 1917; $70,000 in 1918; $112,232 in 1920; $7,120 in 1921.

By substituting the proposed 6 per cent bonds for the 8 per cent notes there will be a saving of $5,836 in interest charges every year.

Commission Fixes Lower Valuation—Merger Refused

The fight is closed on the merger asked for by the Edison Electric Illuminating Company and the Cumberland (Md.) Electric Railway Company, in the decision of the Public Service Commission of Maryland, which sets a valuation on the properties within the merger which is far below that set in the valuation given in the application for the merger. The board, making an independent valuation, placed the total valuation at $600,000 below that given in the application, and the merger according to the decision is therefore refused and the merger fight closed for the present. The commission has set $1,700,000 as the value of the Edison Electric Illuminating Company and the Cumberland Electric Railway, which according to the application was to be merged into the Cumberland Edison Power Company. The valuation given in the application was $2,300,000.

It will be recalled that the Edison Electric Illuminating Company and the Cumberland Electric Railway sought this merger before the Utilities Board and that there was pronounced opposition represented by the minority interests in Cumberland and at Baltimore against the proposition, which was fathered by the local officers of the corporations represented.

It is felt in Cumberland that, the merger being dead, the matter of an extension of the street railway lines to the Kelly-Springfield plant should not be allowed to lapse. Under a contract entered into between the city of Cumberland, the Chamber of Commerce and the Cumberland Railway, at the time the Kelly-Springfield plant was brought here, a joint agreement was made under which the Cumberland Street Railway Company agreed to extend its lines to the Kelly plant. There is a general demand by the public and the Kelly people that this extension be made now, as conditions demand that there is a necessity for this extension. The Kelly people are known to require that this clause in the contract, a joint agreement entered into by the city and the Kelly company, be carried out. Now that a merger has been refused by the Public Service Commission, it is understood that the completion of the contract to extend the line to the Kelly plant will be demanded.

Will Abandon Point Gratiot Line

The Public Service Commission through its secretary has notified City Attorney Nugent that it will grant the application of George R. Bullock, receiver of the Buffalo & Lake Erie Traction Company, to abandon the Point Gratiot Street Railway, Dunkirk, N. Y. Besides the legal formalities the receiver will have to obtain the consent of the stockholders.

The line operated only in the summer months. A recent argument with local abutting property owners over paving resulted in the railway's petitions for abandonment.

New Corporation in New Orleans Functions

The New Orleans Public Service Corporation is now functioning and in active management of the New Orleans Railway & Light Company, which it has succeeded. A 7-cent fare went into effect on Sept. 27 at midnight.

R. S. Hecht was elected chairman of the board and was designated to act temporarily as president of the company. Seven directors of the company will have charge of its management. The personnel of the committee selected is as follows: J. P. Butler, J. D. O'Keefe, A. D. Parker, Harold W. Newman, G. M. Dahl and R. S. Hecht.

The city of New Orleans is really in control of the reorganization because fourteen of the sixteen directors are residents of New Orleans. They are J. F. Butler, president Canal-Commercial Trust & Savings Bank; Thomas F. Cunningham, president Board of Trade; D. D. Curran, vice-president Canal-Commercial Trust & Savings Bank; Lynn H. Dinkins, president Interstate Trust & Banking Company; R. S. Hecht, president Hibernia Bank & Trust Company; A. M. Lockett, president A. M. Lockett & Company; Hugh McCloskey, attorney; W. Irving Moss, president Union Indemnity Company; Harold W. Newman, president Association of Commerce; J. D. O'Keefe, vice-president Whitney Central National Bank; A. D. Parker, president Parker-Blake Company; W. S. Penick, president Penick & Ford Company; Paul H. Saunders, of Newman Saunders & Company; W. P. Simpson, president C. T. Patterson Company; Charles J. Theard, president Citizens' Bank & Trust Company; Mortimer T. Buckner, chairman of the board of the New York Trust Company; G. M. Dahl, vice-president Chase National Bank of New York.

Special Master in Chancery Chaffe, who is still in performance of these duties, is authority for the statement that such of the holders of securities who have not yet surrendered their holdings but who may yet desire to do so are privileged to communicate with him. The funds to meet payment of these securities will be obtained from the sale of the property recently effected by him.

The outstanding facts in the receivership, now about to be closed, show that out of a total bond issue of $18,500,000, there are now represented $18,200,073 in the new organization, the largest percentage, it is said, of record in a similar transaction.

Parent Company No Longer Needs to Finance Subsidiaries

The Cities Service Company, New York, N. Y., has announced that it will reduce its funded debt to the extent of $10,000,000 in the near future by a call for redemption, by conversion, or by purchase of that amount of its outstanding gold debentures of various series. The first call is now being made and involves the redemption of $3,000,000 par of the Series "B" issue.

The total amount of Cities Service Company convertible debentures outstanding in the hands of the public Aug. 31, 1922, was $32,035,091, all being of equal priority and of the same maturity date, 1966, but varying somewhat in respect to conversion privileges.

Of the total the Series "A" has been reduced through conversion to the negligible amount of $27,200, the amount of Series "B" debentures outstanding being $5,855,350, and the Series "C" and "D" making up the balance. It is understood that some of the recently issued 8 per cent debentures, Series "E," may be redeemed in connection with the refunding plan.

In retiring the $3,000,000 par of debenture "Bs," the company announced that it will call $500,000 of the issue as of Dec. 4, with similar calls from time to time until the total amount has been redeemed before Sept. 1, 1923.

In commenting on the decision of the board of directors to retire these debentures Henry L. Doherty, president, said:

> The debenture debt of Cities Service Company was created primarily for the financial assistance of subsidiaries of the company during the war period, when it was very difficult for individual operating companies—particularly the public utilities—to secure new money on their own individual credit. So much progress has been made during the last twelve months in strengthening the credit position of the subsidiary companies by the creation of open end mortgages for which there is a ready market, that the parent company may now turn its attention to a reduction of its own funded debt. In particular, the financing during the past year of the Toledo Edison Company, the Toledo street railway situation, the Ohio Public Service Company, the Denver Gas & Electric Light Company, the Empire Gas & Fuel Company and other subsidiaries has, of course, strengthened the position of Cities Service Company, which formerly was obliged to use its own credit and resources for the assistance of its subsidiaries.
>
> The improvement was by no means confined to the financial side, as operating conditions in all of the subsidiaries have equally improved in the last twelve months, and many of the companies are doing the greatest business in their history.

Key Route Reorganization Plan Now Assured

More than 91 per cent of the bonds involved in the proposed reorganization plan of the San Francisco & Oakland Terminal Railways, Oakland, Calif., have been deposited to be exchanged for securities to be issued under the new plan. Thus the success of the new plan is assured and attorneys are now preparing the necessary pleadings for foreclosure of the old mortgage. After this step a new mortgage will be created and petition will be made to the California Railroad Commission to authorize a new issue of securities. The entire reorganization of the company on a new basis can be completed, it is believed, by July 1, 1923. In anticipation of the funds to be made available by the new move, the company is contemplating the purchase of two new ferryboats and other equipment and has laid out a program for doing deferred maintenance work on rolling stock and throughout the system.

Buses Help Earnings to Achieve Record Gross and Net

The report for the year ended May 31, 1922, of the Aberdeen Corporation Tramways by William Forbes, general manager, shows a decrease from 42,953,807 passengers in the preceding fiscal year to 41,087,388 or 4.35 per cent. This was due to the depressed conditions during much of the year. At the same time the extension of the motor-bus and char-à-banc services served to achieve a new record in total earnings, viz., £196,268, compared with £195,313. This was achieved through motor-bus earnings rising from £3,842 (five months period) to £11,650, whereas tramway earnings fell from £191,471 to £184,618, or 3.58 per cent.

The net results were much better than the preceding year, owing to reductions in wages and materials that cut the operating expenses from £157,585 to £137,979, or 12.44 per cent. This left the gross profit at £46,639 or £12,754 more than the preceding year. The net after setting aside £31,550 for interest, sinking fund, depreciation, etc., was £15,089, which is the highest in Aberdeen's history. One-third of this has been paid over to the "Common Good and City Improvements" fund and the remainder of £10,059 has been placed in the reserve fund.

Motor-bus operation has been most successful. The earnings were £11,650 and the operating expenses £8,443. From the remainder of £3,207 the sum of £2,437 was deducted for interest and sinking fund. The capital expenditure for the buses is carried at £16,096. The nine buses in daily use carried 1,646,672 passengers with 157,808 bus-miles at 8 m.p.h. The average traffic revenue per bus-mile was 17.5d., and the average operating expenses, 12.8d., the operating ratio being 72 per cent.

The tramways carried 41,087,388 passengers with 2,252,889 car-miles with an average of eighty-nine cars. The traffic revenue per car-mile was 19.6d. and the operating expenses, 14.7d., the operating ratio being 71 per cent. Schedule speed was 7.6 m.p.h. While the buses carried 10.4 passengers per bus-mile, the cars averaged 18.24 passengers per car-mile. The population of Aberdeen is 158,000.

Court Orders Receiver to Pay

The case of the Columbia Trust Company, New York, N. Y., against the defunct City & Suburban Street Railway, Brunswick, Ga., sold in December, 1921, and succeeded since by the Brunswick & Interurban Railway, was settled recently when a decree was signed by Judge Barrett in the United States District Court at Savannah. Under the order Receiver Lisman is required to pay out the funds in his possession beginning with the accrued cost of the litigation and ending with the principal and interest covering any unpaid taxes in favor of the city of Brunswick and the county of Glynn. Compensation for receiver's services and premiums in receiver's hands are also included in the payments.

Discussion Renewed on Operating Consolidation of Twin Cities

Proposal of the public utilities committee of the City Planning Board of St. Paul, Minn., for an operating consolidation of the street railways of the Twin Cities bids fair to renew the discussion which has waged for years as to whether the Minneapolis Street Railway has been paying the deficit on the St. Paul City Railway. Doubt on this question promised to be settled by the recent separation of the Midway free district from both lines, so that all travel in St. Paul is credited to that city and all travel on interurban lines in Minneapolis proper is credited to that city. Now the committee proposes to present amendments at the winter legislature to the Brooks-Coleman act, a street railway supervisory measure, to permit the changes. The report says "their unification and consolidation is an absolute necessity essential to accomplish any of the objects specified. Without such consolidation the Railroad & Warehouse Commission is without power to fix uniform rates and even if it were by legislation given that power the grant, in our opinion, would be invalid."

Zurich Returning to Better Days Despite Depression

The report of the Zurich City Tramways for the calendar year 1921 notes that despite more liberal government concessions to workmen it was possible to cut operating expenses, particularly in reducing non-platform time. An energy-saving campaign also proved effective in cutting power from 0.927 kw.-hr. to 0.866 kw.-hr. per car-mile, an achievement which indicates the lighter weight of Zurich cars compared to anything but American safety cars. The preciseness of the Swiss temperament peeps out in the statistics of people employed and free baths given to the same, the ratio being 1,140 to 3,300. Free tea, amounting to 46,196 liters (a liter equals 1.056 quart), was another feature of the welfare work.

The number of passengers carried compared with 1920 shows a decrease from 47,562,187 to 46,660,218, or 1.89 per cent. Of the latter number, 50 per cent were carried as cash riders at fares of 20, 30 or 40 rappen (approximately 2, 3 and 4 cents), and the rest on a great variety of annual to monthly passes, limited-ride weekly cards, etc. The gross traffic revenue declined by 0.6 per cent, namely, from 11,806,147 francs to 11,716,327 francs (Swiss franc is at par). The total revenue was 11,913,368 francs and the operating expenses 9,697,837 francs, leaving 2,215,532 francs. In 1920 the operating expenses were 10,359,009 francs and the remainder only 1,626,511 francs. Part of the greater difference was due to a cut of 3.67 per cent in car-miles from the usual standard of five-minute headways. This made it possible to meet the same fixed charges as the preceding year while adding 637,554 francs to a special renewal fund for wiping off war-time losses. The operating ratio was practically 80 per cent. The undertaking ran 11,484,299 vehicle-kilometers (7,120,266 miles), of which 3,009,282 were trail-car kilometers.

Rehabilitation of Ohio Property Reported Progressing

Although official confirmation was lacking, it is reported in usually authentic circles in Springfield, Ohio, that J. L. Taylor and others interested in the rehabilitation of the Springfield, Troy & Piqua Railway, Springfield, Ohio, operating between Springfield and Troy, had obtained ample financial backing and are now prepared to go ahead with development of their line. Several persons who had subscribed for stock in the new company, which will take over the properties of the Springfield, Troy & Piqua Railway, have been approached in the last few days to ascertain whether or not their subscription was still considered valid by them.

H. H. Durr, Springfield, chairman of the citizens' committee on reorganization, said that he had not been informed as to the progress of the negotiations, inasmuch as the financial arrangements were being made with Chicago and Cincinnati bankers. Mr. Durr, however, believed that the rehabilitation project would be a success.

The line has not been operated for about two years, beyond switching service in Springfield and a shuttle car operated between the city and the plant of the Victor Rubber Company at Maitland, but the revenue from this source, interested parties said, was sufficient to cover upkeep of the road during the negotiations.

Financial News Notes

Reports Profit.—The gross earnings of the Havana Electric Railway, Light & Power Company, Havana, Cuba, for the period from Jan. 1 to July 31, 1922, were $7,537,006. The net profit amounted to $1,336,573.

Will Sell Road.—Ivor O. Wingren, special master, will sell the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Colo., on Oct. 16 at the upset price of $200,000. The intangible property, claims, etc., will not be included in the sale offer.

Merger Approved.—Merger and consolidation of the underlying companies of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., into the Trenton & Princeton Traction Company has been approved by the Public Utilities Commission. The consolidated company includes the line operating into Trenton, Lawrenceville and Princeton.

Spurs to Be Abandoned.—In the reorganization of the Syracuse & Suburban Railroad, Syracuse, N. Y., two spurs will be abandoned. They lead from Croly Street near the city line to Seeley Road and from Jamesville to the Onondaga County penitentiary. Plans for the reorganization of this property have been under way for some time.

Weaverville Line to Be Sold.—Preparatory to a receiver's report to the Superior Court an appraisal will be made of the property of the Asheville & East Tennessee Railroad, Asheville, N. C. The Weaverville line of the company will be sold at public auction on Oct. 23 and bids will be confirmed on the opening of Superior Court on Nov. 1.

Gold Bonds Offered.—Best & Company, Philadelphia, Pa., are offering at 96½ and interest to yield about 6.35 per cent $1,374,000 first and refunding mortgage twenty-year 5 per cent 1917 gold bonds of the Columbus, Delaware & Marion Electric Company, Columbus, Ohio. The bonds are due July 1, 1937. The interest is payable in January and July.

Receiver Hearing Postponed.—Judge Julius M. Mayer in the United States District Court has again adjourned the hearing until Oct. 10 in the proceedings for the appointment of a receiver for the Interborough Rapid Transit Company, New York, N. Y. This action was taken by Judge Mayer because of stipulations entered into by the attorneys representing all the parties to this litigation.

Earnings Decrease.—The gross and net earnings of the Capital Traction Company, Washington, D. C., for August, 1922, show a decrease compared with August, 1921. In the month of August, 1921, the gross income amounted to $121,709, against $92,071 for the same month this year. The net income decreased from $98,097 in August, 1921, to $68,522 in August of this year.

Bonds Called for Payment.—All the outstanding 6 per cent six-year bonds of the Barcelona Traction, Light & Power Company, Barcelona, Spain, dated Dec. 1, 1918, have been called for payment Dec. 1 at par and interest at the Sociedad Anonima Arnus Gari, Paseo de Gracia, I, Barcelona. More than 75 per cent of these bonds have been exchanged par for par into 7 per cent thirty-year bonds.

Gives Mortgage for Bond Issue. — The Cincinnati, Newport & Covington Railway, Covington, Ky., has given a first and refunding mortgage to the Central Trust Company, Cincinnati, as trustee for the stockholders to secure a bond issue of $7,500,000. The mortgages to the Farmers' Loan & Trust Company, New York, for $2,850,000 and $859,000 respectively will be canceled and the outstanding bonds of the Licking River Bridge Company for $185,000 will be discharged, as well as the $150,000 mortgage held by the Cincinnati Safe Deposit & Trust Company. The mortgage covers all the real and personal property of the mortgager and was authorized some time ago, in anticipation of the falling due of these obligations.

Traffic and Transportation

Discrimination Charged

New Haven Association Demands that Connecticut Company Reduce Fares —Storrs Makes Comment

Fares charged by the Connecticut Company have again become the talk of the hour. The company is charged with unjustly discriminating against New Haven, piling excessive fares on the residents of that city while Bridgeport and Norwalk ride on a 5-cent fare. This claim is made by the Grand Avenue Business Men's Association, whose executive committee has framed a set of resolutions outlining its complaints and demanding a square deal. The committee has decided to make a political issue of the matter and it is resolved "that the committee be empowered to present a questionnaire to the nominees for Governor and the Legislature of the State of Connecticut in such manner that the voters will know just how much effort will be put forth by these candidates if elected in remedying these conditions."

The association based its charges on figures submitted by the Public Utilities Commission, although the commission in releasing the figures stated that they were "without proper allowance for fixed charges, depreciation of physical property, or fair return upon the value of the plant and equipment."

According to the commission's figures the company's income for 1920, in the New Haven division, was $3,804,569; for 1921, $4,120,025. The operating expenses and taxes in the same periods were: 1920, $3,397,281; 1921, $3,099,548.

Figures for the Bridgeport division show: income, 1920, $1,506,112; income, 1921, $1,801,148. Operating expenses and taxes: 1920, $1,976,685; 1921, $1.896,148.

For four months ended Dec. 31, 1921, New Haven yielded an income of $1,435,734, while for four months ended Dec. 31, 1920, New Haven's income was $1,328,820.

Bridgeport, for the last four months of 1920, yielded an income of $476,363, and for the same period in 1921 the income was $508,959.

Charles E. Griffiths, president of the association, made a report to the committee in which he referred to the commission's refusal to lower the fare in New Haven and a subsequent refusal to reroute some of the company's lines in the same city. He charged the Connecticut Company with making up its losses in other cities at the expense of the New Haven rider. Further, that an immediate reduction in New Haven is justified in view of elimination of jitney competition and a continuous reduction in operating expenses. After hearing Mr. Griffith's report the committee adopted the set of resolutions.

In conclusion it was resolved that the questionnaire should be presented to the nominees.

In answer to the claims of the association President Storrs of the Connecticut Company stated that Bridgeport has not a 5-cent fare, but has a radial fare system under which 5 cents is charged all passengers on each side of the city or 10 cents across the city center with no reduced rate tokens. Also, that this is a special rate for a certain time.

Mr. Storrs further reiterated the comments of the commission that the figures were without proper allowance for fixed charges, depreciation, etc.

98,404,550 More Passengers in New York City in 1922

According to figures recently made public by the New York Transit Commission the total traffic, 2,590,313,728, on the surface, subway and elevated lines of New York City for the fiscal year ended June 30, 1922, represent an increase of 98,404,550 over 1921. Approximately 60 per cent of this volume of traffic was handled by the subway and elevated lines with 40 per cent being cared for by the surface lines. Still, the surface lines showed the biggest increase with respect to paying passengers—75,316,859 more passengers being transported on these lines than in 1921. This is compared with an increase of 23,087,691 carried by the rapid transit lines. The small increase on the subway and elevated lines has been attributed to the falling off of traffic on the Manhattan Elevated line of the Interborough. These figures were based on monthly reports filed with the commission.

Year ended	Number of Revenue Passengers	Annual Increase
June 30, 1903	1,000,767,483	61,777,519
June 30, 1906	1,251,841,173	120,838,479
June 30, 1910	1,531,262,914	128,845,272
June 30, 1913	1,709,876,508	88,962,573
June 30, 1916	1,898,735,615	91,102,889
June 30, 1918	1,975,482,316	56,670,087
June 30, 1919	2,079,944,297	104,461,981
June 30, 1920	2,365,587,369	285,643,072
June 30, 1921	2,491,909,178	126,321,809
June 30, 1922	2,590,313,728	98,404,550

The accompanying table, recently furnished by the commission, shows the enormous increase in traffic in New York City.

Passes Increase in Tacoma.—According to figures compiled by Richard T. Sullivan, manager of the Tacoma Railway & Power Company, Tacoma, Wash., the ninth week of the weekly pass system in use on the Tacoma railway shows a larger number of passes issued than for any previous week. There were 9,314 passes sold, in comparison with 9,177 for the eighth week, 8,247 for the seventh week and 8,686 for the sixth week.

Franchise Extension Sought

Pacific Electric Proposes to Spend $100,000 for Freight Service for Twenty-one Years

The Pacific Electric Railway filed with the City Council and the Board of Public Utilities of Los Angeles on Sept. 23 an application for an extension of the company's existing franchise for operation of freight service on the municipally owned tracks of the city of Los Angeles on San Pedro Street, which is a culmination of plans and negotiations that have been under consideration for more than a year by the Chamber of Commerce, the Pacific Electric and the city department. The object is the creation of a close-in wholesale, jobbing and light-manufacturing district, which would afford the city freight advantages at least approximating those similarly enjoyed by the wholesale districts of San Francisco.

The city of Los Angeles some eight years ago constructed the first unit of its proposed municipal line from Los Angeles to San Pedro Harbor, this first unit being on San Pedro Street in the city of Los Angeles from First to Ninth Streets, but the project was given up and the line was not continued for the remaining distance of approximately 21 miles to the Harbor at San Pedro. Under an operating franchise the Pacific Electric Railway has been operating its northern and southern division interurban cars over the municipal tracks on San Pedro Street as an artery for shortening the running time between Los Angeles and suburbs served by the company's lines.

The matter of freight service on San Pedro Street over the municipal line originated when the Westinghouse Company commenced negotiations for a site to erect its Pacific Coast plant at San Pedro and Fifth Streets and requested direct freight connections to serve same. Negotiations seeming favorable, the Westinghouse Company proceeded with the construction of its building. Being completed and ready for occupancy, freight connections are required and the Pacific Electric franchise application is for the purpose of guaranteeing permanence of operation sufficient to warrant an expenditure of $100,000 by the railway in widening San Pedro Street corners at two locations, in addition to easing up the present curves at these two locations sufficiently to permit of the passage of freight cars.

The franchise asks for a term of twenty-one years, and reserves to the city its rights in the trackage, either for its own use or for other freight carriers, and leaves other terms of payment as under the existing contract, also putting the entire expense of the improvement upon the railway company and limiting operation of freight cars on trains to the hours between 7 p.m. and 7 a.m.

The State Railroad Commission has already passed favorably on the operation of night freight service.

City Bus Service Must Cease

One of the most significant decisions as regards New York City transportation agencies was rendered on Oct. 4 by Justice George V. Mullan of the Supreme Court. His order enjoins the city authorities from "appropriating municipal funds for the purchase and operation of municipal motor buses and from operating or assisting in or supervising the operation of privately owned buses that are now being operated without franchise but with official sanction."

The ruling appears to kill the present city administration's plan to continue to permit private lines to operate without a license, and will prevent the Board of Estimate and Apportionment from expending any funds for the proposed bus system to be operated by the Department of Plant and Structures.

The decision rendered on the application of Edward Schafer as a taxpayer against the City of New York is in line with one recently made in Brooklyn by Justice Blackmar. Justice Mullan recognizes in his decision the noteworthy service that some of these buses have given, and the subsequent hardships that their discontinuance will work upon a patient public who have had to forbear inadequate transit conditions. "But," he said, "as Mr. Justice Blackmar has pointed out, the city authorities must, if they would better these conditions that so loudly cry for betterment, avail of the legal machinery that the people through the legislature have provided."

Seeks to Regain Patronage

The Oregon Electric Company, Salem, Ore., a subsidiary of the Spokane, Portland & Seattle Railway, has announced a decrease in its fares into Willamette Valley points from Portland, amounting to about 20 per cent, in an effort to regain a portion of the transportation business which had been lost to the automobile stages in operation along the routes. W. D. Skinner, traffic manager, announces that a fair trial will be given the new rates and if they do not help to make the line pay the plan will be abandoned. He said that the company showed a net loss of $84,219 during the first seven months of 1922, while the loss for the similar period of 1921 was $44,764.

The new tariff being prepared for the rail lines provides for a fare of $3.85 to Eugene, as against $4.41 at present, the proposed round trip being $6.65. To Salem the present fare of $1.84 will be cut to $1.50, with round trip rate of $2.50. Other reductions will be in proportion to all valley points touched by the bus lines. In all cases the new reduced fares are equal to those now charged by the automobile stages, and in addition, it is proposed to extend the limit of return tickets to fifteen days, instead of eight days, as at present.

The bus companies operating through the district outlined have agreed that no attempt will be made to cut under the rates to Willamette Valley, the bus operators expressing themselves as confident that the reduction in electric railway rates will in no way influence the volume of their business.

Appeal Set for September

Appeal of the Minneapolis (Minn.) Street Railway to the Supreme Court of the state from an order of the District Court to produce records showing disposition of $227,000 which it had had on deposit in Eastern banks has been placed on the December calendar. The order was issued by Judge F. M. Nye on July 25 requiring the company to produce certain records asked for by the city in its preparation of showing a valuation of the company's physical property before the State Railroad & Warehouse Commission as a basis of determining a permanent rate of fare. The company produced some, but appealed as to others. The company had until Oct. 8 to file its brief, but got an extension of thirty days. After Nov. 8 the city will have thirty days to file its brief and the company ten days for its rejoinder. W. D. Dwyer, the chief counsel for the company, said the delay is due to the absence of one of the counsel, Pierce Butler, in Toronto.

Lower Railway Fares Announced

Improved service at a decreased cost to the public is the intention of the Olean, Bradford & Salamanca Railway, Bradford, Pa., in meeting the rates of steam roads and offering inducements to commuters. A fare reduction is to be established whereby rates of fare on the interurban divisions will be reduced between 10 and 15 per cent when paying train cash fares and reduced in greater amounts when tickets are purchased at the ticket offices. The ticket fares will be reduced to those of the competing steam railway lines.

The general manager states that commutation tickets are to be issued between any two points on the road at approximately one-half fare for each of the fifty-four rides. These commutation tickets will apply for any purposes, such as business or school uses. A mileage book will be sold at 3 cents per mile good on any of the interurban divisions.

On the city divisions children's reduced rate tickets will be sold at the rate of five rides for 25 cents. Business and working people's commutation tickets on city divisions will be issued at twenty rides for one dollar, good between the hours of 6 and 8 in the morning and between the hours of 4:15 and 6:15 in the evening.

May Eliminate Skip-Stop Plan

In an effort to eliminate the skip-stop system now in vogue on the Fort Wayne, Ind., city car lines, an ordinance requiring street cars to stop at all street intersections along the lines if signaled by persons desiring to enter the cars was introduced at a recent meeting of the Fort Wayne City Council. The ordinance was referred to the committee on rules, regulations and ordinances. The skip-stop system has been in vogue on these car lines for the past five years. If the ordinance is passed an appeal to the Public Service Commission on the part of the Indiana Service Corporation is likely.

An ordinance is also contemplated by the Council requiring that transfers be given to all street car patrons as they enter the cars. If such an ordinance is put into effect there is a possibility of the weekly pass system now in effect being discontinued, street car officials state.

Transportation News Notes

Extends Hours for School Tickets.—The Virginia Railway & Power Company, Richmond, Va., will accept school tickets every day except Saturday and Sunday between 7:30 a.m. and 5 p.m. This means that the school children can use the special school tickets earlier in the morning and later in the afternoon than they have had the privilege of doing heretofore.

Company Has Ambitions.—Ride "Behind the Plow" and you will see all the good service seeds the Capital Traction Company, Washington, D. C., is sowing. The blossoming fruit will be the good will of the patron who will say "That's What I Call Service." At least that is the ambition of the railway according to the new pamphlet which it has recently started to issue entitled "Behind the Plow." Besides the usual run of jokes the sheet purports to tell the limitations and possibilities of the company in the matter of providing service.

Hearing on Fares Postponed.—The Public Utilities Commission has announced that the public hearing on the rates of fare charged by the Capital Traction Company, Washington, D. C., has been postponed from Oct. 9 to Oct. 16. It is said that when the commission takes up the application of the Federation of Citizens' Associations for a reduction in fare on the Capital Traction lines it is practically certain that the Washington Railway & Electric Company will renew its objection to different rates for the two systems.

One Man Car Issue Closed.—In view of the fact that a clause in the city ordinance of Salt Lake City, Utah, prohibits the use of one-man cars, the industrial commission of Utah has decided that it has no jurisdiction over the question of one-man car operation on the lines of the Utah Light & Traction Company's lines. The case was therefore dismissed by that body, before which the railway employees had brought the issue. The commission had referred the question to the Attorney-General's office and was advised that the city ordinance was controlling.

Personal Mention

Attends Twenty-one Conventions

C. D. Emmons, the New President of the American Association, Is a Consistent Progressive

C. D. Emmons, the new president of the American Electric Railway Association, who is president of the United Railways & Electric Company, Baltimore, Md., was elected to the highest position in the association on the year of his attaining his majority in attendance at the conventions. This is his twenty-first convention, for be it known that Mr. Emmons has been as faithful in attendance since becoming an electric railway man as he is in everything he does.

CIVIL ENGINEER BY PROFESSION

The new president is a Hoosier by birth. He studied civil engineering at the University of Pittsburgh, where he was graduated in 1892. His first railroading was in the steam field with the Pennsylvania Railroad. He remained with this company nine years, finally becoming supervisor of signals on the division which includes the Broad Street Station in Philadelphia

Mr. Emmons next went to Lafayette, Ind., where he operated the Lafayette Street Railway, and also did some construction work for the company. From Lafayette he went to Fort Wayne as general manager, and from there in 1911 to South Bend, where he was associated with the Chicago, South Bend & Northern Indiana Railway.

The next change took Mr. Emmons to the Boston & Worcester Railway in 1916 as vice-president and general manager. Two years later he went to the Boston Elevated Railway, but in August, 1919, left for his present position as president of the Baltimore company.

The association is deeply indebted to Mr. Emmons for the tireless and conscientious work he has done as the chairman of the meetings and papers committee this year. To him is due much of the success also of the midyear conference and of the program of the present convention.

Mr. Emmons has always been active in association work, and in his early days devoted much of his time to the Transportation & Traffic Association. He was also an active member of the Central Electric Railway Association when he was in Indiana. Mr. Emmons is one of the soundly progressive executives of the industry. He has sold the Baltimore people on his company and on the dependability and the completeness of its service to suit their every need.

Mr. Emmons is a member of almost every civic and other similar organization in Baltimore. He keeps in touch with his public, and he has as loyal a crowd of officials in his company as can be found in the whole country. The association may safely look forward to a year of real accomplishment and progress with Mr. Emmons on the job.

G. T. Seely Heads Transportation Association

Garrett T. Seely, vice-president and general manager of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, was elected president of the Transportation & Traffic Association at the Chicago convention. Mr. Seely graduated from the University of Illinois in civil engineering in 1899 and began his transportation work in the steam road field. He was connected with the engineering department of the Santa Fé Railroad while still in college and for a short time thereafter.

In 1900 he went to Chicago and was engaged in track elevation work for the Chicago & Western Indiana Railroad. The following year he became engineer maintenance of way of the South Side Elevated Railroad and was subsequently advanced to the position of vice-president and general manager. In 1911, when the four elevated railways in Chicago were consolidated as to operation and management, he was made assistant general manager of the combined system. He remained in this capacity until 1919, when he went to Youngstown to take charge of the operation of the railway and electric light properties in this vicinity. He is also president of the Youngstown Municipal Railway.

Mr. Seely has been active and interested in sectional and national association work and has held important offices in the Illinois Electric Railways Association, Central Electric Railway Association, National Electric Light Association and American Electric Railway Association. Mr. Seely is one of the outstanding and aggressive executives of the present day and he is esteemed very highly by his business associates and colleagues in the utility field, both for his ability and affability.

L. A. Lovell Oversees Financial Work

The board of directors of the Pacific Electric Railway, Los Angeles, Cal., has elected L. A. Lovell as auditor and secretary, according to announcement by D. W. Pontius, vice-president and general manager. Mr. Lovell will succeed H. A. Culloden, who is leaving the company to become auditor of the Minarette & Western Railway and its subsidiary companies at Fresno.

L. B. Denton has been appointed assistant to the chief engineer of the Pacific Electric Railway, Los Angeles, Cal.

L. C. Datz to Guide Engineering Association

L. C. Datz was elected president of the Engineering Association at the Chicago convention. He is at present acting as chief engineer of the Memphis Gas & Electric Company, Memphis, Tenn., and of the Little Rock Railway & Electric Company, Little Rock, Ark., now under supervision of the Electric Bond & Share Company, with his headquarters at Memphis. Mr. Datz comes to his present honorable post in the Engineering Association after a long and active term of service for the electric railway industry.

He is a graduate of Tulane University of Louisiana, where he completed a course in mechanical and electrical engineering in 1901. For a short time thereafter he was associated with a local contractor in New Orleans, designing and building dredge boats and dredging machinery. Not being able to pull himself away from New Orleans, he next took a position as chief draftsman and assistant engineer of the New Orleans Railway & Light Company, which he held for more than seven years. He rounded out his first decade of practical experience with a few months of service as secretary of Tulane University.

Taking up now the second decade, the first fourteen months of this he spent as engineer with Ford, Bacon & Davis, but returned as engineer for the New Orleans Railway & Light Company in May, 1912. With the beginning of the following year he became engineer of Southern properties, United Gas & Electric Engineering Corporation, which supervised the properties of the American Cities Company, also acting as vice-president of Southern properties of this corporation for the last two months of this period.

In April, 1919, he became chief engineer of the American Cities Company, taking his present position in April, 1922.

There is an interesting thing about Mr. Datz's career, namely, that since he left the university as secretary he has been with practically the same financial and engineering interests, although a number of different names of employers appear.

H. M. Atkinson Returns

Hugh M. Atkinson, chairman of the board of directors of the Georgia Railway & Power Company, Atlanta, returned to Atlanta the latter part of September after a trip of three months in France, Switzerland, Italy and Austria. Mr. Atkinson was accompanied by his wife, and the primary purpose of their trip was to visit the grave of their son, Captain Harry Atkinson, Jr., who was killed in action during the World War, and whose body is interred in a cemetery in France. Mr. Atkinson spent a large part of his time during the trip in making a study of economic and financial conditions in the countries visited.

Street Railway Pioneers Honored in Brazil

Electric railway and other engineers, including North Americans who have assisted in the development of Brazil's commercial development, are held in high esteem in that country. These and other interesting facts were brought out in an address at Rio to Secretary Charles E. Hughes on Sept. 9, when a delegation from the Engineering Club of Rio de Janeiro was received in audience by Mr. Hughes.

In a speech on that occasion, Sr. Getulio das Neves, the president of the Engineering Club of Rio, made this declaration and mentioned notable services of several American engineers who have worked in Brazil in times past, including Charles B. Greenough, who was instrumental in establishing the first street railway system in Rio, and F. S. Pearson, the noted electric railway engineer who at one time was connected with the Boston (Mass.) Elevated Railway and Metropolitan Street Railway of New York, and later was largely interested in the Rio de Janeiro tramways.

In speaking of Mr. Greenough, Sr. Getulio said: "A recent ordinance of the municipal administration of this city has just recognized the merit of Greenough by decreeing, at the request of the Engineering Club, that one of the public places in the capital city of Rio shall be given the name of this notable American administrator." Further on Sr. Getulio said: "Desiring to recognize in a concrete manner the progressive spirit of North America in the southern part of our continent, the Engineering Club has placed in its hall of fame a bust of Pearson, victim of the torpedoing of the Lusitania. This bust, Mr. Minister, is placed in the salon where is placed also the bust of Don Pedro II, the wise and magnanimous ruler, who, in his fifty years of governing, did so much for engineering and industry in Brazil."

R. J. McElravy Resigns as General Manager

R. J. McElravy, general manager of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, has resigned. This will terminate an association of twenty-five years with C. A. Smith, president of the company. Mr. McElravy plans to rest for two or three months before engaging in other business.

His association with the East Liverpool property started in 1915 when Mr. McElravy was appointed general superintendent of transportation and purchasing agent. At that time Mr. Smith was general manager of the company. The two men had been in various business enterprises together during the previous eighteen years, and Mr. McElravy had acted as manager of the real estate interests of Mr. Smith.

In 1917 when Mr. Smith became president Mr. McElravy was appointed his successor as general manager.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Governor's Price for Coal Not Yet Effective

The advent of cold weather and the usual seasonal household demand will increase the need for domestic fuels. According to *Coal Age* this market is not yet in full swing, but domestic quotations for Oct. 4 have all the earmarks of further increases as the short supply will be accentuated by orders placed as a substitute for hard coal. This demand will fall largely on producing districts not usually called upon to furnish coal for domestic use, but will doubtless also lead to emergency shipments eastward of high-grade domestic from fields west of the Alleghenies.

The steam consumer is purposely staying out of the market and is taking little coal aside from current needs. In the Middle West he is able to obtain this tonnage by picking up bargain lots which are still sent in on consignment, often being sold under pressure of heavy demurrage. Screenings have been selling on a par with mine-run, but with the apathetic steam market and the better domestic call more operators are screening their output, and this is fast softening the resultant sizes.

Normal production of anthracite is being retarded by the same conditions that hamper the soft-coal industry—lack of cars and poor transportation. There also is a dearth of labor. The effect of the car shortage is only just now being felt.

W. B. Potter Points Out Important Railway Development

A representative of the *Electric Railway Journal* asked W. B. Potter, chief engineer railway department, General Electric Company, what he considered the most important feature shown in the exhibits of this convention. Mr. Potter said probably the most important single engineering feature was represented by the devices for the automatic control of substations, hydraulic power stations and centers of power distribution. The substitution of automatic operation, either wholly or in part, through remote control of the apparatus in place of the several shifts of personal attendants required for direct operation means a material saving in the operating expense as well as insurance against mistakes in handling the machines. The economic results of automatic control will unquestionably have a favorable influence on all electrical development for lighting industries and electric railways. It will contribute an important feature advantageous to steam railway electrification.

ELECTRIC RAILWAY MATERIAL PRICES—OCT. 3, 1922

Metals—New York

Copper, electrolytic, cents per lb	14.00
Lead, cents per lb	6.425
Nickel, cents per lb	36.00
Zinc, cents per lb	7.225
Tin, Straits, cents per lb	33.00
Aluminum, 98 to 99 per cent, cents per lb	21.00
Babbitt metal, warehouse, cents per lb.:	
Fair grade	25.00
Commercial	15.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$8.05
Somerset mine run, Boston	4.625
Pittsburgh mine run, Pittsburgh	4.25
Franklin, Ill., screenings, Chicago	3.875
Central, Ill., screenings, Chicago	3.375
Kansas Screenings, Kansas City	....

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb	2.80
Tie plates (flat type), cents per lb	2.425
Angle bars, cents per lb	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb	1.95
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	1.40

Hardware—Pittsburgh

Wire nails, base per keg	2.70
Sheet iron, (24 gage), cents per lb	4.55
Sheet iron, galvanized, (24 gage), cents per lb	5.25
Galvanized barbed wire, cents per lb	3.35
Galvanized wire, ordinary, cents per lb	2.45

Waste—New York

Waste, wool, cents per lb	15.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	14.00
Colored	12.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	91.50
White lead, (100 lb. keg), cents per lb	11.625
Turpentine, (bbl. lots), per gal	$1.36
Car window glass, (single strength), first three brackets, A quality, discount*	85.5%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength, all sizes, A quality), discount*	86.0%
Putty, 5 lb. tins, cents per lb	6.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	15.625
Rubber-covered wire, No. 14, per 1,000 ft	6.50
Weatherproof wire base, cents per lb	16.00

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd	$3.35
Common, per sq.yd	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.29
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	50.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	2.675
Gravel, ¾-in., cu.yd., N. Y	1.75
Sand, cu.yd., N. Y	1.00

Old Metals—New York

Heavy copper, cents per lb	12.00
Light copper, cents per lb	10.25
Heavy brass, cents per lb	6.787
Zinc, old scrap, cents per lb	3.687
Yellow brass, cents per lb (heavy)	6.25
Lead, heavy, cents per lb	5.00
Steel car axles, Chicago, net ton	$19.75
Old car wheels, Chicago, gross ton	23.50
Rails (short), Chicago, gross ton	20.75
Rails (relaying), Chicago, gross ton	30.00
Machine turnings, Chicago, net ton	11.25

Klein Talks on Americanizing American Exporting

A real old-fashioned housecleaning to eliminate the "fly-by-night" trader, the non-American "hanger on" and the unscrupulous and insincere element generally from the American export field was advocated on Oct. 3 by Dr. Julius Klein, Director of the Bureau of Foreign and Domestic Commerce of the Department of Commerce, speaking before the Export Managers' Club in New York.

According to Director Klein, our exports are now moving out at the impressive rate of nearly $4,000,000,000 a year—a formidable figure which is vital to the stability of our whole industrial and commercial edifice. It must not be jeopardized by the dealings of "irresponsible opportunists."

The function of the Bureau of Foreign and Domestic Commerce, Director Klein explained, is to promote American commerce abroad. Whether the manufacturer or merchant requesting aid is large or small makes no difference. The biggest corporations and banks in the country make constant use of the bureau. It is also being called upon every day by thousands of small factories and dealers whose individual export interests amount to less than $10,000 a year. In the week ended Sept. 23 the bureau's New York office handled foreign trade problems for no less than 10,200 inquirers whose transactions were of all sizes and descriptions.

Director Klein predicted a gradual but sound rebuilding of our export trade and said that the Department of Commerce is making every effort to bring the profits from it into every small manufacturing village in the country.

Track and Roadway

Hydro-Electric Power Commission of Ontario will construct a hydro-radial line from Port Credit to St. Catherines in Burlington, Ont. This improvement has been approved by the Town Council.

Olean, Bradford & Salamanca Railway, Olean, N. Y., proposes to build a spur switch in Salamanca from its main line into the Erie station grounds. This step is part of an improvement plan for the relief of traffic.

The Northeast Oklahoma Railroad, Miami, Okla., has extended its line past the plant of the B. L. Crose Mining Company at Treece, Kan. Railroad cars can now be loaded with ore adjacent to the mine.

Schenectady (N. Y.) Railway has practically completed laying its tracks for the new belt line. When the Aqueduct-Rexford bridge is completed the line will operate to Aqueduct across the Mohawk River to Rexford and back to Schenectady.

New York, N. Y.—The Transit Commission has approved a contract between the Brooklyn Rapid Transit Company and the Harris H. Uris Iron Works for the lengthening of platforms on all stations of the Brighton Beach Line, Brooklyn, south of Gates Avenue station. The cost of the work will be $180,710.

Los Angeles (Calif.) Railway has completed track reconstruction on North Main Street and on West Thirty-ninth Street. Two new track improvements are now under way. Track will be reconstructed and the surface paved on Florence Avenue between Pacific Boulevard and Seville. At Manchester and Vermont the grade has to be lowered 2½ ft. to conform with the new grade of Manchester Street which is being paved by the city.

Portland Railway, Light & Power Company, Portland, Ore., has been granted a twenty-five year franchise, by unanimous vote of the City Council, for the operation of its cars on Foster Roadway. No opposition against the franchise developed. The railway company held a private right-of-way on Foster Road, which was relinquished in order that the road might be improved, the railway taking a franchise for the tracks in the center of the road.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has begun excavating in Edmond Street, between Second and Third Streets, preparatory to laying new heating pipes from Edmond Street is repaved from Second to Eighth Streets. Company officials said that as fast as the pipes are laid another force, working behind the pipe-laying job, will begin tearing up the old asphalt between the car tracks. All the material is on hand and the single track, which is to replace the old double track, will be laid without delay.

Power Houses, Shops and Buildings

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has placed in operation a new 10,000-kw. turbine at the Water Street power plant. The turbine weighs 360,000 lb. Twelve freight cars were required to handle the shipment.

Chicago, Aurora & Elgin Railroad, Aurora, Ill., has purchased equipment from the General Electric Company for two new automatic substations, each to be equipped with a 1,000-kw. unit. These stations will be located at Bellwood and Wheaton. This company has one automatic substation in operation. A supervisory control will also be installed to include all three stations.

The Indiana Service Corporation, Fort Wayne, Ind., has purchased a plot of ground 400x600 ft. on Spyrun Avenue, Fort Wayne, adjoining the company's property for the purpose of building a new carhouse and car storage yard. As soon as building conditions are favorable a contract will be let for the construction of a three-bay building comprising two inspection houses and one wash house. Later light repair buildings will be constructed. There will be open storage capacity in addition to that in the houses so that the total facilities will take care of 200 city cars and seventy-five interurbans. The cost of this layout will be approximately $500,000.

Rolling Stock

Cleveland (Ohio) Railway has ordered fifty Peter Witt motor cars and fifty trailers from the Kuhlman Car Company, Cleveland. It was announced in the Aug. 5 issue of the *Electric Railway Journal* that the directors had approved such purchase.

Indiana Service Corporation, Fort Wayne, Ind., has ordered fifteen new safety cars of the double-door type, as used heretofore in this city, from the St. Louis Car Company for delivery around Nov. 30. These cars and eighty of the company's present safety cars are to be equipped with National Pneumatic Company door engines to relieve the operators. This company is also equipping all of its ninety-five cars with Nichols-Lintern signals and is equipping eight of its interurban cars with multiple unit control to eliminate the operation of trains in two sections and avoid the use of trailers.

Trade Notes

General Electric Company, Schenectady, N. Y., through President Swope has announced that a bonus of 5 per cent in cash or in securities redeemable in cash, will be paid to each employee receiving compensation of $4,000 or less annually, who has completed five years or more of continuous service on Jan. 1 or July 1 of each year.

M. F. King, formerly of the Kings Refractories Company, has joined the sales and service department of the Quigley Furnace Specialties Company. Mr. King brings to the Quigley organization the benefit of his wide experience in the application of refractories and high temperature cements, and will devote his attention to service and sales work in New York City.

New Advertising Literature

The English Electric Company, London, England, has issued publication No. 368 on cable spans by E. Parry, B.Sc., M.I.C.E., M.I.E.E.

Roller Smith Company, New York, N. Y., has issued Bulletin No. B-820. This bulletin describes the direct current P. V. ammeters and voltmeters and C. O. D. indicators for automotive vehicles, farm lighting plants, battery charging outfits, etc.

Gould Coupler Company, New York, N. Y., Gould Coupler Company, Chicago, Ill., have just issued their second edition catalogue on Gould Universal automatic slack adjusters (Sauvage patents). This edition contains cuts, photos, and descriptive matter of the different electric railway type slack adjusters manufactured. The steam railroad types are not in this issue.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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The Accountants' and Claims Associations' Programs Compared

THE Chicago convention programs of the Accountants' and Claims Associations are interesting by contrast. The one contained few papers or reports, the other many; the one was strong on co-operative features with other associations, the other practically independent; the one involved a few long papers, the other many short ones. Which plan was better? Which proved more stimulating and informing?

These questions are asked with a view to bringing out suggestions for improvement, for it would be a rare program that would not stand some betterment. The general impression conveyed to those who viewed all the meetings from the outside, so to speak, was that the accountants had too light a program while that of the claims men was overcrowded. The former had some excellent papers, but the opportunity for discussion was not fully utilized. This was partly due to the noise in the meeting room on the first two days. On the other hand, the claims men had so much to say that they couldn't say it all. An average of the two programs would seem to have been about right.

This is all entirely aside from the quality of the material brought out in the papers and discussions, which was excellent in both associations. And after all, the question is one of the good of the industry generally, rather than that of the few, comparatively, who were fortunate enough to get to Chicago. In the long run the best program is that which produces the most helpful information for all the people who do the everyday work of the railway business. It is by this standard that the sessions will finally be judged.

Association Reorganization Has Proved Effective

AT THE 1921 convention of the American Electric Railway Association, a revised constitution was adopted, which put into operation several new provisions for the administration of the association's activities and operations. There was question at the time as to whether these changes in words would result in any actual change in operation and any benefit to the association and its members. The past year has shown, however, that the modifications were good ones and that the officers and committee members have made most of them really effective.

It would not serve any great advantage to trace each change. But surely the association may thank President Gadsden and his reorganization committee for insisting upon regular and frequent executive committee meetings. That, perhaps more than any other one thing, has served to keep the association's "governors" in close contact with association affairs. Its worth has been fully appreciated even by those who were most skeptical a year ago, and while this year the majority felt that nine regular meetings were more practicable than twelve, no one wanted to return to the old order. Another valuable feature has been the six standing committees with their monthly reports. Particularly should be mentioned the finance committee which has placed and kept the business of the association on a secure and unquestionable basis; the public policy committee which has always been ready to advise on questions of policy as they arose, and the publications committee, which in addition to supervising the publication of *Aera* has also dealt with all other publishing problems of the association. These three were all new committees.

There has, it is believed, been a general feeling of more earnest endeavor in, and more careful attention to association duties in most of the other committees as well. This was what was most desired, of course. The constitutional changes made have helped this materially. The association should continue to reap the benefits for years to come.

Increasing Attention Given to Relations with the Public

THE proceedings at Chicago of the American and T. & T. Associations illustrate in a striking way the tendency of the electric railway industry more and more to occupy itself with important sociological topics connected with electric railroading. Ten years ago the papers and reports related largely to technical subjects. This year such subjects were of course considered by these two associations, but probably more effort was given than ever before to viewing these matters from the public side. Such, for instance, was the purpose of the symposium on public relations, conducted by Mr. Brush on Tuesday morning before the American Association, and the discussion on merchandising transportation in the T. & T. meeting on Monday afternoon, with the address by Mr. Hungerford. The other speakers from outside of the industry at the meetings of the American Association, notably Mr. Wheeler and Mr. Jackson, also laid great stress on the effect which good public relations has on traffic, while Judge Warwick spoke particularly of this matter in its relation to the financing of the property at home.

The symposium conducted by Mr. Brush was perhaps the most directly instructive of these events because it brought out the opinions of ten astute railway men, based on their personal experience in improving public relations and keeping them improved. These addresses represented all ways of solving this problem, such as public speaking, newspaper advertising, use of company publications, public utility information committees, etc., and some of the doctrines laid down, particularly by Messrs. Sawyer and Storrs in regard to the relations with the press, would have been considered almost revolutionary at a railway convention two decades, or even one decade, ago. Railway managers in those days used to complain bitterly that their purposes and policies were misunderstood by the newspapers. This may have been so, but it is also true that the purposes and policies of the newspapers were equally misunderstood by the railway managers of that day and are still misunderstood by some of them today. To understand how far this misunderstanding went (and still exists) one need only read the address before the T. & T. Association by Mr. Hungerford, who was once a newspaper man, then was connected with a railway company for seven years, and is now back in the field of periodical literature.

Claim Agents to Have the Floor Next Week

THERE will be a shift of one week this month in the publication date of the "Monthly Mechanical and Engineering Edition" of the *Electric Railway Journal*, to permit the prompt publication of the proceedings of the Claims Association.

As readers of this paper know, the "Monthly Mechanical and Engineering Edition" is usually published on the third Saturday of the month. In that issue the editors of the *Electric Railway Journal* aim to include an especially large number of articles of particular interest to the engineering departments of electric railways. This month, however, the need for completing the reports of the various Chicago conventions promptly will make it desirable to change the date from Oct. 21 to Oct. 28. Instead, the issue of Oct. 21 will be devoted largely to a report of the proceedings of the American Electric Railway Claims Association convention at Chicago, including the papers and reports presented at that convention. It is hoped that the engineers will not object to this shift, as it permits the claim agents to receive their reports one week earlier than would otherwise be possible.

With the publication of the Claims proceedings in the issue of Oct. 21, this paper will have provided its readers with a complete report of the convention.

Engineers Must Now Make Good on Rail-Joint Tests

THE American Association's executive committee has shown its confidence in the engineers of the electric railway industry, and in the American Electric Railway Engineering Association, by the action taken last Friday on the request from the latter association for an appropriation of funds to finance certain tests to be made on welded rail joints. By granting the sum of $10,000 outright and making provision for raising an additional equal amount by a special canvass, the association makes possible an ambitious and promising program of research. If this program is carried out in the same spirit of foresight and persistence that has been manifested up to this point, the result will be of great money value to the industry and will enhance the reputation of the Engineering Association among engineers and executives.

The financial plan adopted is an equitable one because it provides, first, for the general distribution of part of the cost of the tests over practically the entire industry. The remainder of the cost is to be provided by the companies, railway and manufacturing, which will most directly and most largely benefit from the work. The plan is a wise one, further, because it will give the maximum of stimulus to the achievement of practical results. That is to say, the association management plus each individual contributor will constitute an informal committee to insure the prompt completion of the work. The spirit of the engineers who are back of the movement is such as to guarantee an active and intelligent pushing of the program, but these men are human, and it will do them no harm to have as a spur the expectancy of results on the part of those who have put up the money.

The Engineering Association and its committee on way matters have shouldered a considerable responsibility in asking for financial support for their tests, and in assuring the American Association's executive committee that the tests will be worth while. It is now up to them to "deliver the goods." This, of course, will take time. No one will expect worth-while results in a few weeks or even months. It will take years to complete the research. On the other hand, the big "merry-go-round" joint-testing machine should be available for use next spring, and some interesting data should be available for discussion at the 1923 convention of the Engineering Association.

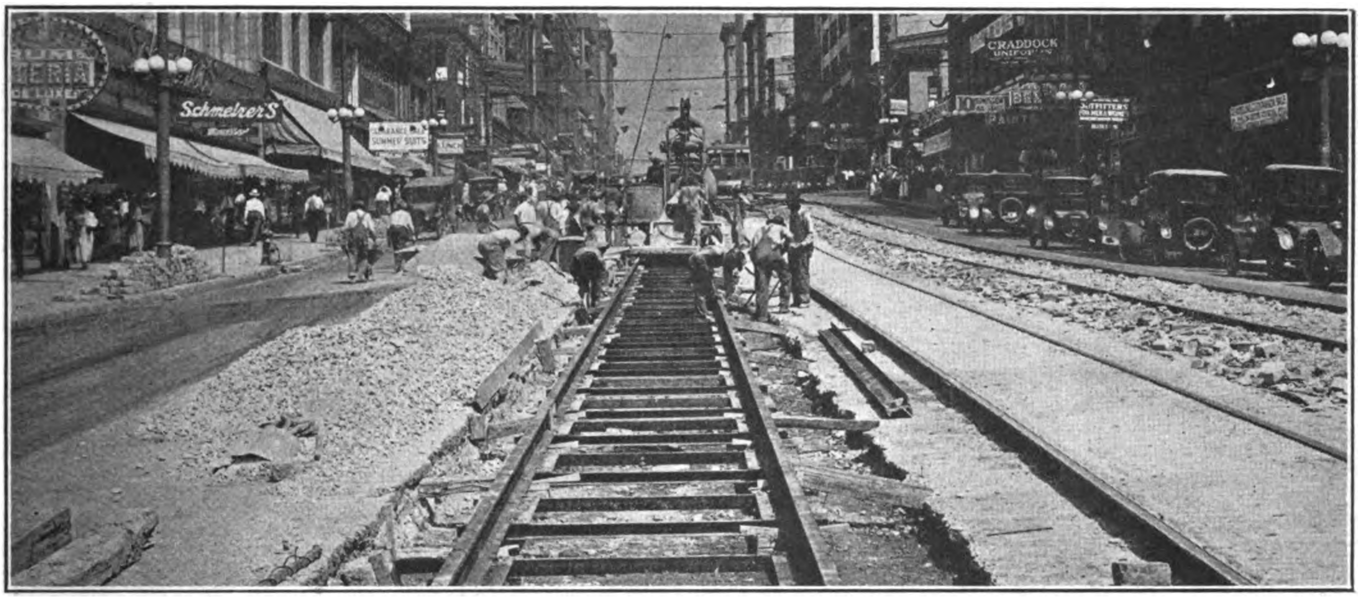
Co-operation with Welding Society Is Commendable

THE joint meeting between the American Welding Society and the Engineering Association in Chicago was a good thing as far as it went. Unfortunately it did not go far enough. There was a symposium of six good papers, covering as many phases of the subject, but they elicited no discussion on this extremely active and interesting topic. It must be admitted that circumstances were not conducive to discussion. The weather was uncomfortably hot, the meeting room was noisy due to sounds drifting in from outside, and the symposium came at the end of a busy session. Moreover, there was such a wealth of material presented that it was difficult to pick out the high spots for discussion. The papers were not available for members in advance, although copies of the *Journal* of the American Welding Society, containing all of them, were distributed at the meeting.

In spite of the meager results of the meeting, however, as judged by the lack of discussion, the joint session was an excellent start in the right direction. It augurs well for pleasant and profitable future relations between the two organizations. Welding has come to be such an important adjunct in electric railway maintenance work that electric railway engineers ought to have the best available information on the subject. This they can undoubtedly get by affiliation with the American Welding Society.

Relations with the Welding Society are bound to become more intimate as the rail-joint tests develop. These have been promulgated by the American Bureau of Welding committee on welded rail joints, and the American Association is going to back them up financially. Through this affiliation the Engineering Association not only gets the benefit of the experience of the welding experts, but it comes in touch with the National Research Council, a national organization of high scientific and practical standing. Hence, while the initial meeting of the "welders" and the railway engineers at Chicago was something of a disappointment, this can be overlooked when it is viewed as the beginning of a larger and larger co-operation.

When the American Welding Society and the Engineering Association meet again, it might be well to devote a whole session to their mutual interests.



GENERAL VIEW OF THE TRACK LINED AND SURFACED AND WORK OF CONCRETING IN PROGRESS, ALSO SHOWING THE FINISHED TRACK ON THE RIGHT

Track Built on Concrete Base in Kansas City

By the Use of Steel Ties and Solid Concrete Construction a Track Has Been Built Which Should Last for Many Years With a Minimum of Maintenance—Details of Method of Pouring Slab Are Given

BY A. E. HARVEY
Superintendent of Way and Structures Kansas City (Mo.) Railways

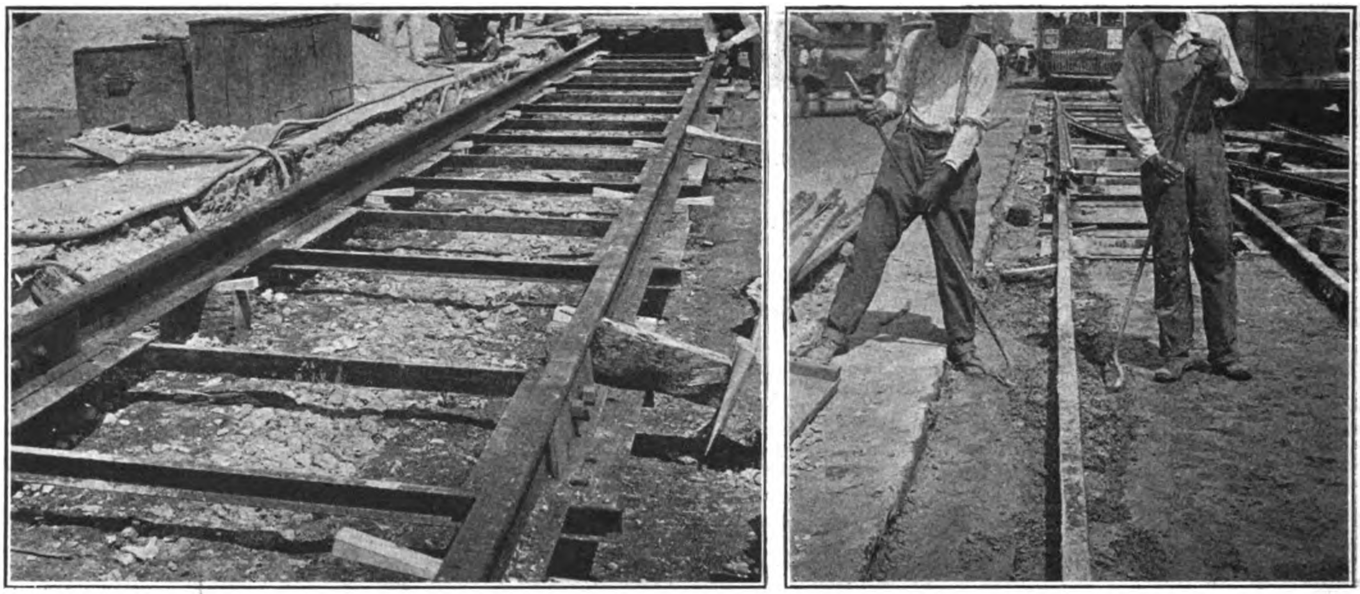
OWING to the conditions that have existed for several years, both as pertain locally and as have affected traction companies throughout the country, track rehabilitation in Kansas City had been postponed, and only the most necessary things have been done in order to maintain the property. But work has been resumed this year, and the most important piece of track rehabilitation in the city has been begun—that is, of the tracks on Grand Avenue to the downtown district.

Naturally, as this was one of our most important traffic arteries, care was taken to select that type of construction which we knew from experience would give the best satisfaction and be of the highest possible grade of track construction. Some years ago the company experimented with steel ties as well as with other types of construction, and two years ago built 1 mile of track on Eighth Street with International steel ties. The results obtained in this construction have been so satisfactory that the same methods were adopted for the tracks in Grand Avenue. In general, this type of construction consists of 7-in. A.E.R.A. rail, Lorain Section 91-375, International ties placed 6-ft. centers, and a solid concrete slab from a point 4 in. below the bottom of the channels to 1 in. above the plates. This gives a total depth of 9 in. for the concrete. The pavement consists of Wisconsin granite, laid upon a bed of mixture of sand and cement, with the joints grouted.

As this is the main line in the downtown district, it is necessary to maintain car service throughout the work of construction. A temporary track was therefore laid at one side upon the asphalt pavement, after which the middle track was jacked up, the pavement broken out and the track completed. Then the south-bound cars were diverted to the new track, and the north-bound cars still used the temporary track while the old south-bound track was reconstructed. These diversions were made by means of portable crossovers.

After the excavation had been completed and the drain tile put in place, the International steel ties and rail were distributed. The facility with which this track construction proceeds at this point is remarkable. As against our ordinary estimates for assembling track of this kind at a cost of 50 to 60 cents per linear foot, we found that with the rails joined to the steel ties and lined and surfaced, the cost was something like 15 cents per linear foot of track. The rails were not only attached to the steel ties in the ordinary way by drop-forged clips, but these clips were also spot-welded to the ties and to the rail, thus effectually preventing any possibility of loosening or any movement and making the entire track one solid and rigid structure of steel. The track was then carefully lined and surfaced and wedged in place by means of wooden blocks and wedges, after which the concrete slab was poured.

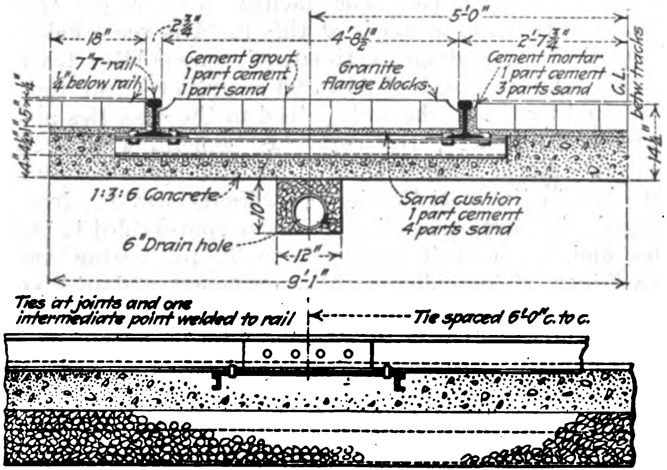
The detail of the pouring of this slab involves several special features which are most important if the best results are to be obtained. The mixer used was of the type that moves on flanged wheels upon the track that is under construction, and it is hauled back upon this rail as concreting proceeds. An ordinary mix of 1-3-6 concrete was made as stiff as was practicable to handle and thoroughly tamped under the plates and rails and leveled up to the required height, but our past experience shows that no matter how well concrete of this type is placed there is bound to be a slight shrinkage which will result in pockets forming under the plates. The concrete in many such places shrinks away from $\frac{1}{16}$ in. to $\frac{1}{8}$ in. It is only with the utmost care at the time this slab is poured that such trouble



BEFORE AND AFTER POURING CONCRETE, KANSAS CITY TRACK CONSTRUCTION

At left, showing track assembled and surfaced ready for the pouring of concrete. Note holes through base plates which provide vents and facilitate thorough tamping of the concrete under the ties. At right, track after the concrete slab has been poured and concrete has just taken its initial set. Tampers are at work tamping concrete solidly under plates and rail.

can be avoided. This point must be watched, because after the concrete has set and the track is completed, pockets of this kind, or any space through which the water can work, will become filled with foreign material. Then the jarring of the rail and the plate above the tie which is bound to take place will eventually cause a slight movement and breaking of the pavement. The remedy for this, and a simple one, is care while the concrete is setting. Not only should the concrete be thoroughly tamped with bars underneath the plates at the time it is poured but again, twenty or thirty minutes later, it should have another thorough tamping at the time that it is taking its initial set. The reason for this is that concrete shrinks between the time of its pouring and of its initial setting. Hence, at this time, the concrete should again be thoroughly tamped, not only under the plates but also under the base of the rail. In this way, all water and air pockets are driven out from under the plates and rail, leaving as firm concrete as possible at that time.



Cross and Longitudinal Sections of Solid Concrete Track Used in Kansas City

It will be observed that this working of the concrete leaves outside of the plates a very considerable void which must be refilled with concrete. Hence, the entire surface, after this final tamping, is flushed with the grout, which will fill up all crevices or space that may have been left around the steel ties, thoroughly seal the surface right up to the rail and prevent any seepage which may pass through the pavement from getting into or below this track structure.

The joints used upon this reconstruction are of the Gailor arc-weld type made with the Lincoln welder. After the concrete is set, all the concrete around the joints is removed and the rail is then thoroughly cleaned and welds made. This is done simultaneously with the paving, so no trouble may arise from the expansion and contraction of the rail.

The paving is No. 1 Wisconsin granite 5 in. in depth, laid upon a bed of sand and cement and thoroughly grouted. Proper care was taken in the laying of these blocks so that a very smooth surface was obtained. By ordinary care, with blocks of this grade and a proper grouting, a pavement as smooth as asphalt is the result. Granite block was selected for this work, as it is found to be the highest possible grade of suitable paving and its cost fully justifies its use.

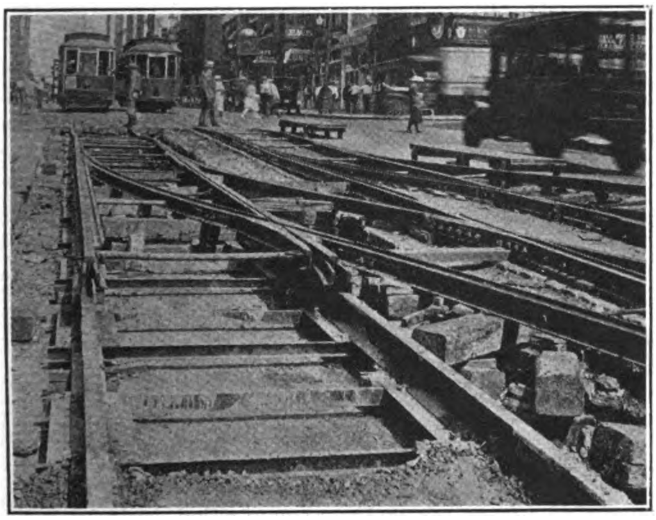
A SUBSTANTIAL FOUNDATION IS PROVIDED

In a construction of this type where every joint, both horizontally and vertically, is sealed with concrete, we have a slab consisting of concrete and granite 15 in. in depth, reinforced in all directions with the steel of the International ties and the rails, and the entire mass both below and above the base of the rail contributing its part to the carrying of the load. One cannot conceive of any kind of load that would be carried upon the public streets, either on a truck or on flanged wheels, that could not be supported and carried by reinforced slabs 15 in. in depth. Failures which have occurred in the past on tracks laid in solid concrete may be attributed to one of several causes. Thus, in some types of construction, the solid concrete base is not integral with the paving and track, and it acts only as a slab and that of not sufficient depth. Wherever conditions of this kind exist, the water gets into and below the paving, and as soon as the paving begins to break up the entire structure is weakened. Other types of solid concrete construction have not had the advantage of the reinforcing that comes through the use of the steel ties. One of the great advantages in this type of construction is that both the paving and the base are so firmly bound together by proper grouting and the reinforcing of the slab by means of the rails and ties that the entire depth of both paving and base contributes to the carrying of the load.

This type of track construction as described has been developed as a result of our experience in the Kansas City Railways over a period of many years, and has been adopted only after the most careful consideration of past experience, good and bad, which other types of construction have developed.

That the 7-in. rail has many advantages over the many eccentric sections that are used is beyond question; that the use of the International steel tie has every advantage over all other types of construction has been demonstrated. For instance, by its use, we have eliminated 4 in. of excavation and concrete, as compared with what would have been required if we had used a standard wooden tie in its place; it is placed with greater facility and less cost; it acts as a reinforcing steel within the concrete slab and gives as permanent a piece of construction as one obtains from reinforced concrete buildings or bridges, and it furnishes a type of track with a minimum of concrete and excavation and insures a uniform distribution of the load over the subgrade.

It is confidently expected that this type of construction will furnish a track that will be good for from twenty to thirty years, practically without repairs or rehabilitation of any kind. This is based upon our experience upon similar work that has been done in Kansas City in the past ten years, where such construction has been carried out with some modifications but where no maintenance of any kind has been required under heavy traffic. In fact, the track is still apparently as good as it was the day it was put down and undoubtedly can be used for many years to come without the least expenditure for maintenance.



SHOWING RECONSTRUCTED TRACK UNDER THE PORTABLE CROSSOVER

This piece of track must be completed under traffic. A concrete slab has been poured below the level of these ties upon which the track will be solidly blocked when the balance of the slab is poured after the removal of the crossover.

Swiss Choice of Single Phase Justified

Consulting Engineer of Bernese Subsidized Railways Shows by Careful Analysis Why the Standard System Used for Heavy Traction in Switzerland Is Well Suited to the Electrification of Steam Railroads

IN A SERIES of articles recently published,* L. Thormann, consulting engineer to the Bernese Subsidized Railways, compares point by point the several systems available for electrification of railroads. His conclusion is that under no circumstances can the continuous-current system be declared superior to the single-phase system. From a purely technical standpoint, both systems can satisfy the requirements of main-line traffic, and the differences between them are unimportant. On the other hand, with continuous current, the capital costs will be considerably higher in consequence of the less favorable conditions of distribution. This disadvantage would remain in the event of the development of the mercury rectifier, by which the lower efficiency of the continuous-current system could be improved. Thus the choice of the single-phase system for Swiss Railways cannot in any way be regarded as a failure, but as a result of present-day experience it remains the proper solution from every point of view.

Ten years ago, said Mr. Thormann, the question of the most suitable system for electric traction on main line railways appeared to be settled, at least for European conditions. The answer was the single-phase system. The war brought railway electrification to a standstill, except in Switzerland, where the effect of the coal shortage produced an opposite result. After much delay the Swiss Railway Administration ultimately adopted single phase officially. Later, however, commissions from several European countries studied almost simultaneously the more important installations in service or under construction. As a result the continuous-current system at 1,500 volts was favored by some.

Mr. Thormann began his analysis with the overhead conductor voltage, regarding which he said that as the current involved would be too heavy to permit electrification with 600 to 800 volts, no matter how desirable that would be, the voltage problem reduces itself to a solution of the purely technical question of sufficient insulation for the different parts of the installation. Since personal contact with a 1,500-volt line may be fatal, it is immaterial from the standpoint of safety whether this or a higher pressure is used. It is not more difficult to obtain a safely insulated overhead system with 15,000 volts than with one-tenth this pressure. Further, experience has shown that with 15,000-volt single-phase systems, properly protected by ample, quick-acting, maximum-current cutouts, it is very rare that serious damage, such as destruction of the conductors, occurs on short circuit.

As to high-tension rolling stock, the magnitude of the overhead pressure has more effect on the locomotive than on the overhead conductors.

Owing to the necessity for a transformer on the locomotive, it would seem that the alternating-current system is inferior to the continuous-current system. However, as the transformer is of the greatest importance for obtaining speed regulation, it may be questionable whether it should really be regarded as a disadvantage. There is very little high-tension apparatus besides the transformer on the locomotive, so that the voltage has but little effect on the safety of working.

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*See *Engineering*, London, issues for July 7, 14 and 21, 1922.

From a technical point of view it is possible to build locomotives and motor coaches with direct current, single phase or three phase to meet the traction requirements of the heaviest and fastest trains. Experience shows that there is not much difference in efficiency of the locomotives with the several systems.

Where traffic conditions demand the extensive use of motor coaches, it is desirable to use a lower pressure in the overhead conductor to obtain rational conditions for the motor coaches, on which only about one-half of the space for the equipment is available as compared with a locomotive of equal weight.

As to costs of the different types of locomotives, the cost per unit weight is practically unaffected by system; hence a comparison of weights affords an insight into relative costs. At the same time the motor capacity and speed must be taken into account when locomotives for similar duty are compared. Three-phase locomotives with no transformers are lightest, requiring from 65 to 85 lb. per horsepower, based on one-hour rating. For single phase up to 15,000 volts and continuous current up to 3,000 volts the weights of recent large locomotives vary from 90 to 130 lb. For similar conditions, European single-phase locomotives for 15 to 16⅔ cycles are somewhat lighter than American 3,000-volt continuous-current locomotives.

As to upkeep this may be assumed to be proportional to the weight of the locomotive, hence should be lower for the three-phase locomotive and about equal for the other two.

Experience on the Bernese Alpine Railways shows that the cost of maintenance of electric locomotives is much lower than that of steam locomotives. The maintenance costs of the locomotives of a well-managed high-voltage single-phase railway should be about the same as those of a high-tension continuous-current railway working under the same conditions.

Single Phase With Direct Distribution Is Most Efficient

As to efficiency of the direct current at 3,000 volts produced from three-phase as compared with single-phase at 15,000 volts produced direct and from three-phase, Mr. Thormann gives average values from generator shaft to wheel rim of locomotive respectively as follows: 37½ per cent, 60 per cent and 48 per cent. With rotary converters or mercury rectifiers used in place of motor generators for converting three phase into continuous current, the over-all efficiency of the latter would be about the same as that of the single-phase system with single-phase generation.

As to energy distribution, apart from the disadvantages of a lower efficiency of distribution, those systems in which the energy is converted further suffer from installation costs which are largely unnecessary in other systems. An extensive 3,000-volt continuous-current system needs three to four times as many feeding points as a 15,000-volt single-phase system.

Referring to the Bernese Railways, using single-phase current at 15,000 volts, Mr. Thormann states that this line is fed at Kandergrund and Spiez with single-phase current direct from generators without transformation. If 3,000 volts direct current were used, there would be in addition four substations, at Berne, Zweisimmen, Kandersteg and Ausserberg respectively. The continuous-current system would need about 51,000 kw. additional converting machinery, 340 tons of extra copper for overhead conductors, and 45 miles of additional transmission lines. In this case, the additional cost of energy with continuous-current traction would amount to 83 per cent.

Summarizing, it can be said that the distributing installation for the single-phase system shows much lower capital costs, both in the case when the energy is generated and transmitted in the form of single-phase current and in the case where three-phase energy has to be converted into single-phase energy, though in the latter case the saving is not so considerable.

In conclusion Mr. Thormann takes up the subjects of generation and transmission and inductive interference. In regard to the former he states that where a station must furnish power for traction and for the general three-phase network, the problem is not as simple with single-phase as with direct current. However, while a uniform system for generation and transmission is a theoretical desideratum, no regret need be felt when it is not feasible.

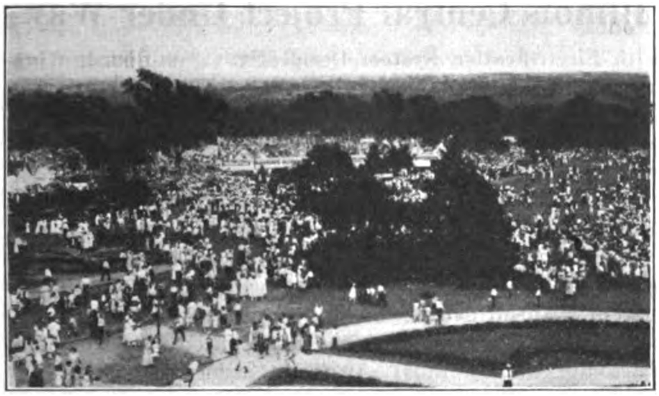
As to inductive interference, after comparing the various methods which are used for mitigating this, he said that with both continuous current and single-phase current the communication lines have to be cleared away from the tracks in order to make room for the overhead conductors. If the circuits cannot be moved more than about 200 ft. away, shorter distances are permissible, in which case a comparatively cheap compensating wire is necessary with the single-phase system to neutralize static induction. Re-erecting the communication lines will cost about the same with either system.

As regards the devices to be used in the power circuit, the cost only becomes appreciable when with single-phase traction the three-wire system with auto-transformers is used, and to a lesser extent suction transformers, to reduce dynamic induction. With present-day experience it is not permissible to conclude that the single-phase system will be more costly than the continuous-current system on account of interference with communication circuits to such an extent as to outbalance the other advantages of the high pressure.

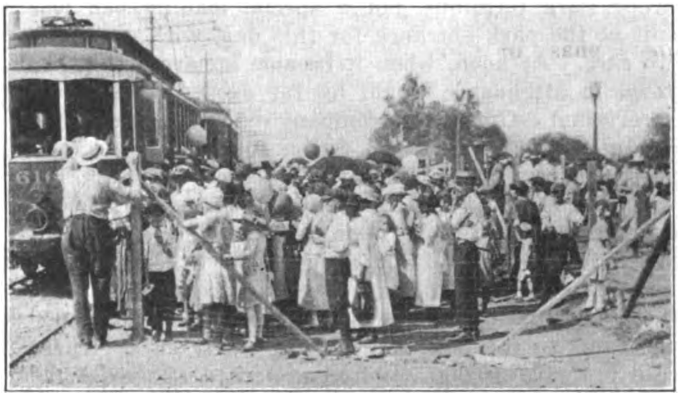
Power Supply for British Electrification

An INTERESTING question which has recently been argued before the British Electricity Commissioners has to do with the power supply for the approaching electrification of the South-Eastern & Chatham Railway. This railway will form a part of an electrified group consisting also of the London & South-Western and the London, Brighton & South Coast Railways. The South-Eastern & Chatham electrification will be direct current, and the first stage of the electrification is expected to be completed by June 30, 1925. Arrangements have been made with the government treasury for a guaranteed loan of about $30,000,000, most of which is to be expended on electrification.

On the matter of power supply, the railway applied for permission to construct immediately a 60,000-kw. generating plant, which it was contended could later be extended to produce 150,000 kw. After having made exhaustive inquiry, particularly as to the ability of central stations to furnish a reliable and ample supply of power to the railway, the commissioners concluded that it would be a gain to the public interests concerned if the railway company were to take its supply from an outside source. The commissioners also recommended that the railway immediately take up with the central stations the terms of the contract, including a guarantee to indemnify the railway in case the central station fails to furnish the supply by the required time.



KIDDIES' PICNIC AT SWOPE PARK



STARTING THE HOMEWARD JOURNEY

Making Friends of the Children

Railway Enters Into Spirit of Civic Movement by Supplying Free Transportation to Swope Park to Children of City

THE Kansas City (Mo.) Railways performed a task recently that while remarkable in itself was in fact only one feature of a remarkable occasion. The occasion was "Mayor Cromwell's Kiddies' Picnic," a picnic for all the children of Kansas City, Mo., "everything free" to children, held at Swope Park, the 1,300-acre public park at the edge of the city. While possible danger had been predicted because of the presence of so many children in the park, the chief anxiety seemed to be concerning their transportation. As it turned out there were no grounds for these fears.

The date was set for Sept. 2—school to begin on Sept. 5. The receivers for the railway entered heartily into the program for the picnic. As its contribution, the company distributed free tickets for all children under twelve years of age. Posters announcing this offer were displayed in the cars several days before the picnic, as shown in the next column.

The special tickets prepared for the children were in two sections, one for the trip to the park, another for return. They were good only until 6 p.m. of the day of the picnic. The receivers prepared 85,000 of these. Committee members, mostly women, distributed the tickets over the city, direct to the homes.

The tickets served one especially useful purpose: they provided a concrete means of showing, beforehand, the willingness of the company to participate in the plan and to co-operate in carrying it out. As a matter of fact, tickets were not required for the day, since the children would have been carried free. Indeed, many children were carried without having to show tickets. But the cards were a useful and welcome means whereby the women working for the picnic were able to be sure that the children were going to have transportation. Hundreds of children might not have gone, had there been any doubt of the free ride.

To the Children of Kansas City

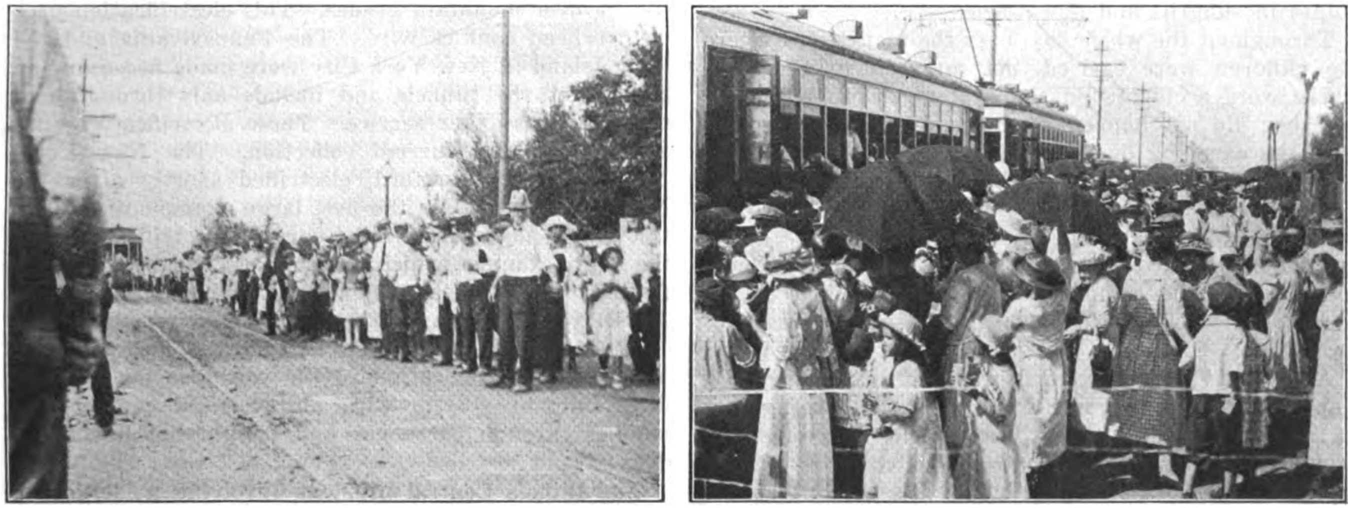
Our contribution to childhood joys at Mayor Cromwell's Picnic, Sept. 2, is complimentary tickets for the children to Swope Park and return. We wish every child a happy and joyous day.

FRED W. FLEMING }
FRANCIS M. WILSON } Receivers.

STATEMENT MADE TO CHILDREN BY RECEIVERS

The crowds began arriving at Swope Park as early as 7:30 o'clock in the morning; in numbers increasing toward noon. The exodus from the park began about noon, and continued until nearly 9 o'clock. All told, there probably were considerably more than 100,000 persons, including men, women and children, in the park during the day; for not only did the children come, but most of them were accompanied by mothers and older sisters, and there were literally thousands of babies in arms.

The Kansas City Railways has a "loading pen" at the



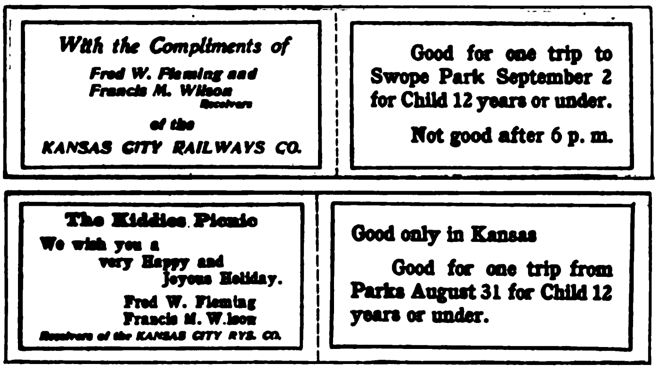
LOADING SCENES AT THE KIDDIES' PICNIC, KANSAS CITY, MO.

Swope Park terminus, but a special loading pen was built at the park entrance for this day, with space for two cars. At noon, when it became apparent that the crowd in attendance would by far exceed in numbers the original estimate, the company quickly extended the pen to inclose seven cars. Seven turnstiles were provided for permitting admission to the stockade. Between 12:30 and 7 o'clock Saturday afternoon, 50,000 passengers with tickets were registered by the turnstiles. It is estimated that about 10,000 others boarded cars before or after the cars were in these loading pens. There were people to the number of 25,000 to 50,000 who came to the park and left in motor cars. There were probably 10,000 children less than six years old who rode from the park and were not counted at all.

The company had men in the park to sell tokens, ten men standing near the loading pens for this purpose. There were thirty other employees around the loading place, facilitating the movement of passengers.

TEMPORARY REROUTING A FEATURE

The company routed through to the park many of its lines that ordinarily transfer passengers to a special Swope Park line. A total of 1,025 cars carried passengers to the park. For several hours as many as sixty cars entered the park in an hour. At one time in the afternoon cars were being dispatched at the rate of eighty an hour—this being possible because of the seven-car loading pen, the prepayment of fare, and the efficient work of the extra men who facilitated the loading.



With the Compliments of

Fred W. Fleming and
Francis M. Wilson
Receivers
of the
KANSAS CITY RAILWAYS CO.

Good for one trip to Swope Park September 2 for Child 12 years or under.

Not good after 6 p. m.

The Kiddies Picnic

We wish you a
very Happy and
Joyous Holiday.

Fred W. Fleming
Francis M. Wilson
Receivers of the KANSAS CITY RYS. CO.

Good only in Kansas

Good for one trip from Parks August 31 for Child 12 years or under.

SPECIAL TICKETS USED IN CONNECTION WITH KIDDIES' PICNIC

In addition to the forty extra men at the park, there were also thirty-five additional men serving at transfer points in suburbs and downtown.

Throughout the whole day, over the many lines where the children were carried, not an accident occurred. There were accidents on the system, as on any day; but they did not happen at the park, or in connection with the carrying or transfer of the children and the picnic crowd.

Despite the burden of carrying the thousands of children, the maintenance of the extraordinary headway, and the obvious withdrawal of part of the normal downtown traffic, the company's receipts from passengers were considerably above $3,000 in excess of corresponding days.

A similar "Mayor's Picnic" was held in Kansas City, Kan., on Aug. 31, Mayor Burton of that city being host to the city's children. The Kansas City Railways also provided free transportation for those children—12,000 tickets similar to those used in the Missouri city being distributed.

Illinois Central Project Under Way

With Electrification System Decided, I. C. Will Push Work Involving Detail Electrical Design, Construction of New Terminals, Rearrangement of Tracks and Installation of New Signal System

THE report of the commission appointed to consider the electrification of the Chicago terminals of the Illinois Central Railroad has not yet been released for publication. However, as mentioned last week, the commission recommended the adoption of the 1,500-volt d.c. system with an overhead contact system of current collection. This commission was appointed by President Markham in December, 1920, in accordance with the requirements contained in the Lake Front ordinance of July 21, 1919. The members of the commission are D. J. Brumley, chief engineer Chicago Terminal Improvement, chairman; Hugh Pattison, Bion J. Arnold, George Gibbs, Cary T. Hutchinson and W. M. Vandersluis.

The ordinance, to which the city of Chicago, the Illinois Central Railroad and the South Park Commission were parties, settled the common boundary lines so long under discussion, provided for additional subways and viaducts across the railroad north of Fiftieth Street and bound the Illinois Central to extensive improvements, including a new station at East Roosevelt Road and the electrification of certain services.

The electrification requirements are as follows: (a) The entire suburban passenger service on or before 1927. (b) The entire freight service north of East Roosevelt Road on or before 1930. (c) The entire freight service within the city limits on or before 1935. (d) The through passenger service within the city limits may, with certain provisions, be electrified by 1940.

In analyzing present electrifications the commission found, according to the statement issued by the Illinois Central, that most of the installations in this country had been for some particular type of service or to meet some special operating requirement but have not included freight, through and heavy suburban passenger service.

The New York Central was primarily electrified on account of the Park Avenue tunnel and covers through and suburban passenger service. This is a low-voltage direct-current system with a third rail. The Norfolk & Western, an 11,000-volt single-phase alternating-current electrification, is principally for heavy freight service over mountain grades. This electrification uses an overhead contact wire. The Pennsylvania and the Long Island at New York City were made necessary on account of the tunnels and include only through and suburban passenger service. These electrifications use a third rail for current collection. The New York, New Haven & Hartford, electrified shortly after the New York Central, is the first large example of 11,000-volt single-phase alternating-current electrification and the only example which handles electrically through-freight, through-passenger and suburban-passenger service. It uses an overhead contact wire. The Chicago, Milwaukee & St. Paul, with the largest route mileage of electrification in the world, is a 3,000-volt direct-current system with an overhead contact and handles through passenger and freight but has not a dense traffic.

The Illinois Central problem, involving as it does a heavy suburban passenger service, freight transfers between yards, switching in congested yards and eventually through passenger movements, all within terminal limits only, is quite different from any electrification so far undertaken either in this country or abroad.

The commission considered but early eliminated from the discussion three possible schemes. These were the three-phase alternating-current system, which requires a double overhead contact and which was eliminated on account of complications in construction without any advantages over the single-phase alternating-current system; the storage battery locomotive, which had to be eliminated on account of prohibitive operating charges; the Diesel engine locomotive or some other form of self-contained unit to meet the ordinance requirements as to noxious gases and noises. Some form of the latter type of unit may be developed for freight and through passenger movements, but the development is in such a stage that it could not be depended upon for the Illinois Central.

This investigation left four systems for consideration: 750 volts direct current with third rail; 1,500 volts direct current with overhead contact; 3,000 volts direct current with overhead contact, and 11,000 volts alternating current with overhead contact.

Estimates of first cost and maintenance and operation estimates covering these four systems were made. Although the 750-volt system did not differ materially in first cost and annual cost from some of the other systems considered, yet it was eliminated on account of the large amount of freight yard tracks involved where the third rail was considered undesirable, and also on account of the track location where Chicago climatic conditions would seriously hamper operation with third rail.

Of the three systems using an overhead contact, the 1,500-volt system seemed best to the commission for this particular problem, the electrification of the Chicago terminal, as no main line divisions were involved.

Before actual electrification construction work can be started a large amount of preliminary trackwork must be done. At the present time work totaling about $1,000,000 is under contract and in progress. This consists of track depression work between Twenty-fifth and Forty-fourth Streets, which involves the moving of more than 600,000 cu.yd. of earth; elevation work between Forty-fourth and Fifty-first Streets; the construction of the Rhodes Avenue and Woodland Park Sewers; a dam at Twenty-third Street to allow filling of the property north of the dam, and a new breakwater between Twenty-ninth and Thirty-first Streets.

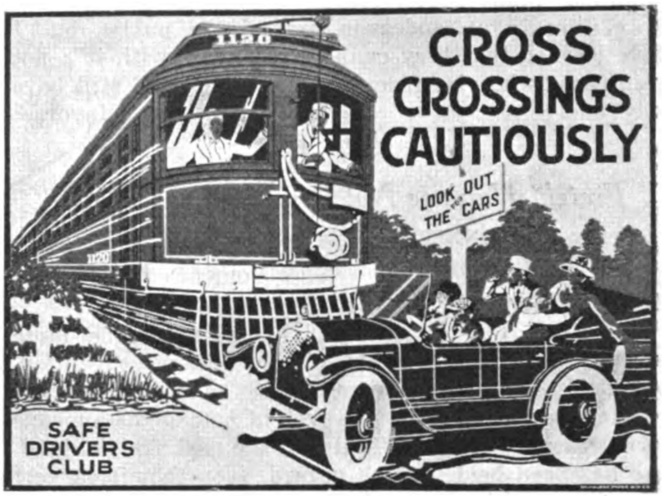
This will be followed by the rearrangement of tracks, as the suburban tracks will be consolidated on the west part of the right-of-way; the erection of the new through passenger terminal at Randolph Street; changes and additions to present suburban stations and platforms with entrance and exit subways where needed; and the elimination of grade crossings with other railroads.

In the meantime the design of the new electrification work will be carried forth. This includes a power house, with a proposed location on the Calumet River near Riverdale, substations to be located at various points on the terminal property and extensive overhead construction work for contact and transmission wires. At the same time the selection of the electrical equipment for the 240 multiple-unit cars will be made. These cars will be similar in design to the twenty new all-steel suburban coaches purchased in 1921 and now in use in steam service. They were built with the electrification plans in mind, and can be converted for multiple-unit operation by the application of motors and other necessary electrical equipment.

The changes in tracks and electrification of tracks, amounting to 125 miles, will require several new interlocking plants and a complete new signal system, as the present one is not adapted to tracks where electric propulsion is used. Furthermore extensive improvements must be made in the telephone and telegraph system, involving several miles of underground conduit construction, to suit the new physical and operating conditions.

Emphasizing Safety in Milwaukee

AT THE RECENT meeting of the National Safety Council in Detroit the Milwaukee Electric Railway & Light Company placed on exhibit one of its "cross crossings cautiously" posters, which was commented upon favorably by a number of the delegates. The reproduction herewith does not do justice to the original, which is impressive and has high visibility because of the vivid colors used. These posters, which are printed on ⅛-in. cardboard, are mounted upon a wood backing. This is placed on a regular fence post at a location between 100 and 200 ft. from the intersection with the interurban line. In order that they may be visible from the headlight of the automobile the height from the top is from 4 to 5 ft. above the road surface and they are turned at an angle of 60 deg. from the line of travel. The posts are usually set about 4 ft. from the concrete, depending upon the width of the road shoulder at that point.



A SAFETY POSTER WHICH IS USED AS A CROSSING WARNING SIGN

It is the belief of the safety committee of the Milwaukee company that this poster carries a lesson which will make it more effective to drivers than is the standard railroad crossing sign which is located about 300 ft. back from the crossing. Even though the driver of a car may not take in the details of the horror expressed on the faces of the passengers in the ill-fated auto depicted, it is expected that he will have this thought brought to his mind because of having seen the American Railway Association posters, which are so widely distributed.

These posters are expected to stand up for at least two seasons. The oil colors are protected by a coat of varnish. The poster itself measures about 19x26 in.

Letters to the Editors

Mayor Couzens Is Not Perturbed

OFFICE OF THE MAYOR

DETROIT, MICH., Sept. 28, 1922.

To the Editors:

In your issue of Sept. 16, 1922, there is an editorial, which has been drawn to my attention, entitled "Mayor Couzens Scents a Conspiracy."

Yes, the Mayor did come up from the ranks, even though he always wore two suspenders.

No, I have not learned that labor by and large is ungrateful, because I cannot learn what is not so.

No, I am not perturbed, because I trust the men if they are honestly informed.

No, I do not see labor turning against me. I have no idea that they will do so.

No, the men of the Amalgamated do not threaten to turn on me and bite my hand. These same men did not bite the hand of the Detroit United.

One great thing I have learned is that the people in the pay of the electric railway corporations cannot fool the public by writing such material as this article contains. Many subterranean methods have been used by editors in an endeavor to fool the public, but I have learned that they cannot "get away with it"; not even those who rise from one suspender, and still have only one. JAMES COUZENS, Mayor.

Freight Haulage Not Discussed at Chicago

BONNER RAILWAGON SYSTEM

NEW YORK, Oct. 9, 1922.

To the Editors:

Glancing over the eighty-eight pages of the issue of Oct. 7, I find the report of the Chicago convention, but little if anything is recorded in the addresses, symposiums or formal papers on freight haulage as a means of increasing receipts. Truly, in the past freight haulage has been held in high regard, even though largely misunderstood in many minds as to its great value under proper nourishment and better encouragement.

I am going to tell you something that might have been interesting reading, at least to some who attended the convention, and who think along similar lines.

I have been privileged to read a letter from one of the largest urban electric railroad systems, whose name I withhold pending its consent, under date of Sept. 20, 1922, which in part says:

"The company has recently withdrawn entirely from the freight trolley business."

Such a quoted statement might ordinarily pass without notice, but because the announcement comes from the largest urban trolley system, operating as it does some 600 miles of tracks and in the year 1919 did move 65,224 gross tons of freight, it is vital to measure the underlying condition which decided the company, as its action bears upon freight haulage on electric railroads generally.

I have before me a bound copy of a study covering the freight department operations of the same system. It is for the year 1919. The expense thereof was provided jointly by a leading utility equipment corporation and by the transit company. The study was directed by a transportation expert engineer of broad experience and covered continuous research for a period of fourteen months. This report is unusually comprehensive; probably none of the character ever equaled it. It contains 167 typed pages, besides many maps, blueprints, recapitulations, which show the company's investments, physical and mobile, the earnings and expenses of freight operations. There is study to show what facilities are necessary, in the judgment of the engineer, to improve efficiency. The report includes all the transportation lines centering at the port, and to co-ordinate therewith the facilities in the metropolitan industrial district. The report says in part:

> The future possibilities for a greatly increased freight operation are without limit, in that the traffic is waiting more extensive developments making possible the transportation of commodities for from 80 to 100 miles outside of the city. The great industrial center which this commonwealth forms is contributory through very heavy traffic possibilities; also owing to the large number of firms distributing their products from the city, a heavy traffic in merchandise, which always pays a good revenue, is waiting development.
>
> A study of the compilations made by correspondents in the Middle West regarding the terminal and road haul costs proved remarkably interesting and showed a surprising difference in operating cost as between interurban railways and steam railroads. It is manifestly clear to us that terminal costs remain constant for all distance, while the road cost increases in ratio of the distance moved. The six mid-west exhibits submitted show the average terminal cost per ton is $0.7108, while the average of the ton-mile cost for haulage is $0.0316. After study of the evidence touching these exhibits, we are convinced that the average terminal cost is in excess of the average shown by the exhibits, while the average of the ton-mile cost as submitted is approximately fair and reasonable.

It seems plain enough what decided the drastic action of abandoning all freight haulage by the transit company when one reads into the report and finds that the average net revenue from freight haulage per car-mile was $0.076, while the station handling cost was total $88,146.39; or, averaging as deduction from otherwise available income revenue amounted to $0.484 per car-mile. The average hauling expense was 40 cents per car-mile. Total car-mile expense was $0.884.

That the commercial and shipping interests of the city in question have not taken kindly to the determined movement by this electric railway system is reported in recently broadcasted press dispatches. The Chamber of Commerce of one of the large outlying cities, and a terminal of one of the lines of electric railways which also connects with the system that has tabooed freight haulage, gives publicity to the fact that it strongly protests the abandonment of freight haulage since the result means not only the diverting of freight and freight revenue benefits from all connecting cities within the state, but has diverted such benefit to an outside state; further, that an appeal from such action had been taken to the State Public Utility Commission.

It would appear, therefore, that the only hope for successful freight haulage by the trolley lines lies in the minimizing, even to a partial elimination, of the terminal handling cost, since I have shown that this station expense exceeds the hauling cost; otherwise, what can all the other electric railroads finally do than to follow the policy as laid down by the transit company in defense of their invested capital. Moreover, the question naturally arises, why should there be further support of the policy of freight haulage on electric railroads, as it must be conducted under present heavy terminal cost handicap, with the haulage equipment and tools that are today in general use. JOSEPH C. BONNER.

Lubrication Data from Lexington

KENTUCKY TRACTION & TERMINAL COMPANY

LEXINGTON, KY., Sept. 27, 1922.

To the Editors:

Replying to the request by A. B. Creelman, master mechanic Youngstown Municipal Railway, Ohio, for further information relative to method of car lubrication and costs of the Kentucky Traction & Terminal Company, described in a communication from me on page 138 of your July 22 issue, I submit the following:

ROLLING STOCK—APRIL 1 TO AUG. 31, 1922

No. Cars	Type	Light Weight lb.	Service
37	Single truck	26,000	City
10	Double truck	25,000	Interurban (New, Feb., 1922)

Equipment	General Electric			WH	Total
Motors	58	67	264	92	
No. in service	46	6	40	22	114
Air compressor			CP-27		
No. in service			10		10

LUBRICATION DATA—PERIOD OF TIME COVERED—APRIL 1 TO AUG. 31, 1922

	Mileage	Gal. Car Oil	Lb. Gear Grease	Total Cost	Cost per 1,000 Miles Cents	Miles per Gal. Car Oil	Miles per Lb. Gear Grease
City	414,175	166.5	242	$49.31	11.9	2,487	1,711
New interurban	358,121	68	107	20.94	5.8	5,266	3,347
Total average	772,296	234½	349	$70.25	9.09	3,294	2,213
Wool waste used	50 lbs.			$10.20	1.32		
Total cost per 1,000 miles (inc. waste)					10.42		

LUBRICATION COSTS—NINE MONTHS ENDED MARCH 31 1922

	Miles	Cost	Cents per 1,000 Car-miles
City	716,169	121.46	16.96
Interurban	544,694	126.53	23.
Total	1,260,863	247.99	19.

Hot Bearings—April 1 to Aug. 30, 1922

	Journal	Armature	Miles per Hot Bearing
City	6	0	82,835
Interurban	0	0	358,121*
July 1, 1921, to March 31, 1922			
City	10	0	71,616
Interurban	16	0	34,043

Method of Lubrication

Kind of lubricant—Galena Signal Oil Company Products
One (1) gill oil per oiling—Armature—motor axle bearings and journals
One (1) lb. gear grease each gear—except GE-264-½ lb.

*This mileage was covered without any bearing trouble.

	City Service			Interurban Service
Type motor	GE-58	67	WH-92	GE-264
	Days Between Oiling			
Armature bearing	7	7	15	10
Motor axle bearing	14	14	15	20
Journals	60	60	60	60
Gears	60	60	60	30
Average miles per day	102	92	98	234

On the old grease-box type of motors (namely, the GE-58 and 67) we use felt in the bottom of the grease box. This felt touches a piece of felt fitted in the bearing sleeve. The grease box is packed with wool waste. The oil well in the lower half of the bearing housing has a felt oil-feeder with a flat spring to hold the oil feeder in contact with the shaft. This applies to both armature and motor axle bearings. The waste in the journal bearings is livened up with a packing hook every thirty days. The oil feeders are inspected every four months.

All oiling is done by a schedule which is made out the first of each month and specifies the car number and particular type of bearing to be oiled each day. The type of bearing to be oiled is designated by the figures 1-2-3-4 opposite the car number.

1 Designates armature bearing only
2 Designates armature and motor axle bearings only
3 Designates armature motor axle bearings and journals
4 Designates all bearings and gears.

An allowance is made of one day before or after date specified if the car is not in the shop on the date scheduled. This is to prevent cars being taken out of service for the purpose of oiling. All oiling is done in the daytime. A daily report is made by the shop foreman and a record made of each car oiled.

In explanation of the cost of 4.3 cents per 1,000 car-miles for lubrication referred to in my communication in the issue of July 22, this covered only new lightweight interurban cars for the month of June, 1922.

I trust I have made my practice in lubrication clear. I cordially invite comments or criticisms from any fellow craftsman.

W. G. STUCK,
Master Mechanic.

Is a Ferris Wheel Ride Worth More Than a Trolley Ride?

CHARLOTTESVILLE & ALBEMARLE RAILWAY

CHARLOTTESVILLE, VA., Oct. 4, 1922.

To the Editors:

I have just finished reading in a monthly paper devoted to certain branches of the amusement business an editorial on the relative advantages of charging 10 cents, 15 cents or 20 cents for a ride on a ferris wheel. This prompts me to ask: What are the psychological processes which lead men and women to fight for an opportunity to pay the ferris-wheel man 15 cents and 20 cents for a ride and begrudge the street car men 7, 8 or 10 cents?

This query of mine is not the outgrowth of disappointment because our travel has fallen off with increased rates. You will remember that the Charlottesville & Albemarle has not only never increased its fare above 5 cents, but it has been showing gratifying gains in patronage each month.

But I have seen it in almost every walk of life, and I have wondered if it is a psychological application of the inverse of the proposition that we like to get something for nothing. I have noticed a decided willingness to grudge the necessities of life, but a greater willingness to pay dearly for the luxuries. Should you not class a 15-cent or 20-cent ferris-wheel ride as a luxury? And have we not come to regard a street car ride as a necessity? Or is it all mixed up with the "great unrest" —the doubtful cause for every vice and extravagance uncurbed since the war?

JOHN L. LIVERS, President.

Outing of Monongahela Divisions

WITH fair weather prevailing the day forces of the Fairmont and Clarksburg divisions of the Monongahela Power & Railway Company enjoyed a great outing at Norwood Park, Clarksburg. The night forces had their outing the day following. Nearly 2,000 people attended the picnic the first day and more than half that number the second day. Mr. and Mrs. W. M. Bostick and Vice-President C. P. Billings were the West Penn Company representatives at the gathering. George M. Alexander presented badges to veterans who had been in the service of the company for twenty years or more. A program of dancing and sports featured both days.

Among recent effective epigrams put out in the posters of the Ontario Safety League, the following attract attention: "The man on the job knows best what is safe and what is unsafe." "Whether you are a safety committee member or not, it's up to you!" "Take no chances—If you have to mourn the death of a mule, mourn at his head." "Blind men seldom pay an income tax—Wear your goggles!"

Accountants' Association Proceedings

The Three Outstanding Subjects Considered by the Accountants' Association This Year Were Present-Day Responsibilities, Engineering and Stores Accounting and the Budget—This Article Gives a Report of the Proceedings at Chicago

F. E. WEBSTER
Retiring President

W. G. NICHOLSON
Incoming President

THE meeting of the Accountants' Association in Chicago on Oct. 2 to 5 was especially interesting because it marked the completion of twenty-five years of activity on the part of the association.

The meeting on Monday was opened by an address by the president, F. E. Webster, who spoke briefly of the progress which has been made by both the association and the industry during the past twenty-five years and the need for a larger membership. He then explained that during the past year there had been no joint committee with the T. & T. Association on economics of schedules, as the purpose for which this committee had originally been created had been satisfied. For a similar reason there had been no joint Claims-Accountants' committee. He then referred to changes which had been made in the personnel of the committee on standard classification of accounts and on stores accounting, and stated that the association would have a representative at the meeting of the National Association of Railway & Utility Commissioners in Detroit on Nov. 14. Continuing, he said in part:

"During this convention we shall have a report, unfortunately short, because of circumstances, from a committee that has lately come into existence, but which is destined to be a very important one. It has long been my belief that we could profit by the experience of others, referring particularly to the accounting sections of the National Electric Light Association and the American Gas Association. A criticism has been made that we do not get the larger ideas of the nation, at least so far as they affect the work of an accountant, and I consider it immaterial whether he be an accountant connected with a railway or utility property or engaged with an industrial corporation. Be this criticism just or unjust it matters little, but it is a fact that all business men can profit by exchange of ideas with fellow workers—each accountant, or each accountants' association, can learn lessons from other accountants or other associations. It is realized that national accounting uniformity can only prevail along broad lines and accounting departments can better function if their practices are, as far as may be, along comparable channels.

"Many of our members are associated with utility properties, as well as railway interests, and those of us who are thus associated well realize the difficulties which arise, from time to time, through variations in classification requirements and other pursuits of our duties. With this in mind your president took the initiative of soliciting the affiliation of our accounting section with similar sections of the electric and gas associations in that full measure of up-to-date conclusions might be made available.

"It is a pleasure to convey to the members of this association the spirit of co-operation which was promptly made manifest by each of our allied associations, both of whom have indicated their acceptance of the establishment of inter-association relations. Personally, I wish to take this occasion to thank those officers who were responsible in making the relationship possible. Our meetings will be open to the representatives of the National Electric Light Association and American Gas Association and I trust those representatives will feel perfect freedom in participating in any talks or discussions that take place."

The report of the executive committee was then read. It consisted of minutes of the meetings of the executive committee during the year.

Then followed a four-minute address on safety by E. D. Reed, general superintendent Chattanooga Railway & Light Company. The report of F. J. Davis, secretary and treasurer, was then read by Mr. Davis. It showed, on Sept. 15, forty-nine individual members and an estimated number of 122 company section members. The expenses of the association during the ten months ended Aug. 31 were $1,065, mostly for printing.

The report of the committee on standard classification of accounts was then presented. It is abstracted below:

STANDARD CLASSIFICATION OF ACCOUNTS

During the past year the committee has been less active than at any time during its twenty-six years of existence. This must not be construed, however, that it has ceased to function properly or that it has in any way neglected its duties. Very few questions have been submitted to it for decision. This in a way is quite gratifying as it may be assumed that the system has proved to be well adapted to its purpose, and while the original text in the light of many years of somewhat changed operating practices might now be modified and somewhat improved upon, it, together with the several hundred cases upon which rulings have been given, generally covers the subject. It may be of interest to state that the Railway Accounting Officers' Association, which is the committee which covers steam railroad accounting, has recently been going over its text and proposes to eliminate some of its accounts. This will bring them more nearly in accord with the practice of the electric railways than they are at present.

One thing that the committee now feels should be considered is the question of providing suitable accounts to cover the operation of buses, which is a growing business and with some roads is assuming considerable importance. The committee will be much pleased if members of the association who have had experience in the operation of buses will express their views of how best to provide for this accounting.

The committee's last report called attention to the act of Congress which made it mandatory that the Interstate Commerce Commission shall prescribe in what manner and to what extent carriers must provide for depreciation and that the commission had created a department whose duties were to be devoted exclusively to the consideration of matters pertaining to depreciation and that the committee had submitted a brief on the subject at the request of Frank S. Fowler, chief of the depreciation section of the Interstate Commerce Commission. Since that time the executive committee of the American Electric Railway Association has requested that the accountants' committee follow the matter under the general guidance of the committee on national relations and we have replied that we are perfectly willing to coöperate with that committee.

During the year W. H. Forse, Jr., having given up his connection with the Indiana Union Traction Company, resigned as a member of this committee and President Webster appointed in his place M. W. Glover of the West Penn Railways. Mr. Forse had been a member of this committee since 1907 and those of us who have been associated with him in committee work feel that we and the association have met with a distinct loss in no longer having his assistance and advice. The longer we were associated with him the more we appreciated his devotion to the work, his good fellowship and his consideration for his fellow members and we wish him every success in his new undertaking. The committee again takes this opportunity to express its appreciation of the courtesies extended to it by the Interstate Commerce Commission's representatives.

The report was submitted by Henry L. Wilson, chairman; W. F. Ham, P. S. Young, M. W. Glover and Robert Wallace.

There was no discussion on this report.

President Webster then introduced as the speaker of the afternoon Walter H. Timm, secretary Public Service Commission of New Hampshire. Mr. Timm then presented the paper which is published in abstract on page 563 of the issue of this paper for Oct. 7.

At the conclusion of his address Mr. Timm received a rising vote of thanks by the members and guests present. After an informal introduction of the members and guests to each other, the meeting adjourned.

Tuesday Session

The first part of the Tuesday afternoon session was taken up with a joint meeting of the Engineering and Accountants' Associations. The report of the joint committee on engineering-accounting was presented by C. R. Harte, co-chairman. This was followed by a paper on "Related Functions of the Engineer and Accountant in Public Utility Development" read by the author, E. D. Dreyfus, engineer West Penn Railways. This joint session was covered in the Oct. 7 issue of the *Electric Railway Journal*.

At the conclusion of the discussion of Mr. Dreyfus' paper the accountants adjourned to their own room, where the first order of business was the appointment of a committee on nominations. This comprised T. P. Kilfoyle, chairman; M. R. Boylan, T. H. McRae, G. W. Kalweit and J. M. Joel.

Next the report of the committee on stores accounting was read by Secretary Davis. An abstract of this report follows:

STORES ACCOUNTING

The committee on stores accounting in its report began by going back a year or two, and calling attention to the fact that at the convention of 1921 no action was taken on certain recommendations for standard practices which it was thought should be adopted by electric railways in connection with stores accounting. These recommendations were urged for favorable action this year. They were as follows:

1. That a materials classification, recommended by the committee, be printed in pamphlet form and distributed to all member companies with recommendations that it be adopted and used as a standard practice.
2. That monthly statements, on forms set forth, be made by electric railways, reflecting the operation of the stores department.
3. That it be the practice to maintain stock books, in the form substantially as shown, in all storehouses or stock rooms where stocks of material are maintained, as the most helpful way of regulating and controlling investments in stocks of material.
4. That so-called working stocks of material, meaning thereby stocks withdrawn from the general stockroom in excess of the day's working requirements and carried in the care of some department foreman, be set up in the general stores account at inventory time and inventoried each year, thereby maintaining this asset on the books; and that stock books be carried for such materials to assist in adjusting such stocks to the consumption requirements.

This year's committee added two recommendations as follows:

5. That handling of purchase invoices, adoption of a standard form of invoice, number of copies to be made, purposes and disposition of same, certification, recording, vouchering, etc., be carried out as set forth in detail in an appendix to this report.
6. That there be adopted a system whereby containers, such as drums, reels, cement sacks, carboys, etc., can be kept track of with a view to insuring the return for proper credit and accounting for the same in a correct manner as particularly described in an appendix entitled "Accounting for Containers."

In its report, the committee also refered to discussion with the committee on purchases and stores of the Engineering Association, which went to show the need of collaboration between the two associations in this important matter.

As is suggested above, the committee appended to its report a number of concrete suggestions. They included a set of instructions covering the use of stock books, a system for handling purchase invoices, and a system for accounting for containers.

The suggested system for handling purchase invoices involves the adoption of a standard form on which the electric railway would receive its purchase invoices. After the invoice is received and checked by the purchasing agent, it would go to the accounting department. This is important because it constitutes a liability of the company. The storekeeper would also see the invoices because they familiarize him with the costs of materials. This has a good moral effect and tends to bring about economy in the care and use of materials.

In regard to accounting for containers, the committee pointed out that in purchasing material of certain kinds the shipment is made in containers which are billed against the purchaser on the invoice covering the material. These are returnable when empty and the shipper will allow the price at which they are billed, less the freight charges and cost of repairs. At present on many lines there is no particular system for keeping track of such articles, the matter being generally left in the hands of the store department but without check of any kind. The committee recommended that a special account be opened on the books designated "Container Account," storekeepers to be furnished by the accounting department with container sales order forms, made out when the invoices are received.

Storekeepers would be held responsible for the prompt return of containers when empty, or for satisfactory accounting for them otherwise, so that the container account could be relieved. Storekeepers would follow instructions on the sales order with respect to making shipments and bills for the containers shipped, the credit to the container account being shown on the bill. Other practical details of the scheme were given, but the above will serve to show the general plan.

This report was signed by R. A. Weston, chairman; C. L. Bartlett, G. H. Caskey, A. E. Hatton and J. S. Pardee.

DISCUSSION ON STORES ACCOUNTING

In discussion of the report, W. L. Davis, Allentown, Pa., said that there is one element that might be taken into consideration, namely, the desirability of devising some method of reconciling the accounting system described in the report with the general ledger accounts. Some storekeepers overlook this and make a straight division. The records show certain things and the physical count shows the same things, so that the storekeepers assume that both are correct. They do not always care to reconcile the two records, and of course they also omit adjustments in operating and construction accounts that might be involved in such reconcilement.

On motion it was decided that this feature of the subject be considered by the committee and some action taken upon it at the next meeting. The understanding is that members who have suggestions to make will make them direct to the committee.

Wednesday Session

The first item on the Wednesday afternoon session program was the presentation of the report of the committee on relations with other associations. This was made by M. W. Glover, Pittsburgh, Pa., chairman.

RELATIONS WITH OTHER ASSOCIATIONS

The appointment of this committee was the result of an informal conference in Atlantic City during the annual convention of the National Electric Light Association. A number of electric railway accountants connected with light and power companies, members of the National Electric Light Association, conceived the idea that it would be to the mutual benefit of each association to keep in closer touch with the accounting work of the other association, with a view of promoting uniformity in accounting practices relating to railway as well as light and power accounts. The matter was then taken up with the accounting section of the American Gas Association, and after the matter was considered by the executive committees of the three associations the committee was duly appointed and organized.

Owing to the fact that the plan was not finally approved until August last and as meetings of certain committees of the accounting sections of the National Electric Light Association and of the American Gas Association had to be postponed, this committee has not done any active work, but it is hoped that during the coming year it will be possible to secure greater co-ordination in the accounting work of the three associations and to promote cordial relations between them.

The report was submitted by M. W. Glover, chairman; I. A. May and L. T. Hixson.

Mr. Glover's report was followed by the reading of a paper on "The Budget —Its Preparation and Administration," by Harry A. Snow, assistant comptroller the Detroit Edison Company. This paper had been presented at the Atlantic City convention of the N.E.L.A. last spring, where it made such a good impression that President F. E. Webster invited Mr. Snow to repeat it before the Accountants' Association. In introducing the speaker, Mr. Webster said that he had been operating under the budget system for two years and has found it of inestimable value. In his judgment the time will soon come when companies not now operating under the budget plan will find it of distinct value to do so.

Mr. Snow's paper was abstracted in outline in the Oct. 7 issue of the *Electric Railway Journal.* He prefaced the reading by a statement that the paper was the result of the work of the budget committee of the N.E.L.A. accounting section, of which he was chairman. The work had been divided among sub-committees, all of which contributed their shares to the production of the paper. Further, it was written primarily for electric central stations, but should apply also to electric railways because the two utilities are not essentially different.

In opening the discussion on Mr. Snow's paper, Mr. Webster said that following the reading of the paper at Atlantic City it was found that many matters had been brought to light which were new. Questions were asked by those who had operated under the budget plan, to ascertain what Mr. Snow would recommend to overcome certain difficulties or what initiative he would suggest be adopted to safeguard the future.

Mr. Glover pointed out that the subject of budgeting, particularly with reference to construction expenditures, has received more attention during the last few years than ever before. Even the federal government has taken up the idea. The West Penn Railways uses the construction budget and the operation, or operating cash budget, as explained by Mr. Snow. This company has not gone into the details of the materials and supplies budget, nor has it separated the operating from the cash budget. This will probably have to be done. The management of this company would find it almost impossible to provide funds in advance as needed, without an elaborate budget system.

There should be no fear, said Mr. Glover, that the plan outlined by Mr. Snow is too elaborate. While this system is designed for a large company, it can be used by the smallest one that requires money to carry on its business. Mr. Snow's paper was not a theoretical discussion of something that may take place in some company, continued Mr. Glover, but it was the recital of actual facts.

Another speaker said that the practice of the company with which he is connected is to hold department heads responsible for their particular activities. Each writes a monthly letter in which he sets forth the reasons for the variations between actual expenses and budget estimates. The statistical department reports to the general manager, and to the budget bureau also.

W. G. Nicholson, Omaha, Neb., said that he could not see how any company could proceed with construction work, or any other work, without forecasting revenues and expenditures for the period ahead. In Omaha the department heads report contemplated projects to the general manager before the first of the year. He passes upon them and presents them to the board of directors, with his estimate of the cost of carrying out these projects throughout the year. The accounting department at the same time gives the board of directors an estimate of the earnings and expenses, for the year and the probable amount of cash necessary and available.

Mr. Snow was then called upon to answer the questions which had been asked during the session. As to one on the reconciliation of cash receipts with the statements of earning and expenses, he said that the statement is put on a cash basis first. That is, on accrued items, such as taxes and interest, the statement is turned over to the cash basis. There are the two bases for comparison, one the cash basis in which the checking is done with the cashier, and the other the bookkeeping basis on which the checking is done with the accountant. As to the amount of detail used in the analysis of expenses to check on the operating budget, the budget is made up in the subdivisions supplied by the classification of operating accounts. Thus, the books themselves will be in the proper shape to check the estimates because the latter were made to fit the books in the first place. If two men use the same subaccount, involving two sections of the estimate in one account, it might be desirable to divide that account into two, to facilitate checking.

Taking up several special questions, such as how often the budget should be revised, what should be done if a favorable market were suddenly found permitting a large stock of material to be bought at a favorable price, and the over-sale of stock in a campaign in which the company found itself supplied with a large amount of money which it did not expect, Mr. Snow said that all of these matters can be taken care of by the fact that the budget is not an unalterable law. Budgets must be revised to meet new conditions.

The discussion of Mr. Snow's paper closed with a motion that the paper be published in a separate pamphlet so that the members can have copies as promptly as possible. The meeting then adjourned with a vote of thanks to Mr. Snow for his paper.

Thursday Session

The first business at the closing session of the convention, on Thursday, was the presentation of the report of the committee to represent the Accountants' Association at the annual convention of the National Association of Railway and Utility Commissioners. This was done by W. L. Davis.

The committee reported that copies of the report of the chairman, dated Oct. 17, 1921, had been distributed by the secretary some time ago. This report outlined in a general way the subjects discussed during the commissioners' convention. If the work of the committee is continued, it will be possible not only to keep the Accountants' Association advised of the proceedings of the commissioners' convention but will also afford opportunities to anticipate accounting requirements and to devise ways and means to avoid some of the difficulties incident to analysis of records pertaining to prior years. Among the topics considered by the Atlanta convention of the commissioners, the following are of special interest: Special rates and special compensation for temporary or "risk" service furnished by electric railways; lower fares for regular riders; general use of one-man cars; possible recommendations for a standard classification of accounts; various elements entering into valuation, particularly in connection with arbitrary items.

PAST-PRESIDENTS HONORED

After the discussion of the above report, President Webster turned the meeting over to W. F. Ham, Washington, D. C., who was first presented with a past-president's badge.

Mr. Ham reviewed briefly the history of the association, beginning with the Cleveland meeting of 1897. At this meeting there were about eighteen present, of whom Mr. Ham was one. At that time there was no standard accounting system, although attempts had been made to formulate one. A committee on standard classification was appointed, with Mr. Ham a member. He has been on this committee continuously ever since. The classification was in due time prepared and it has stood substantially in the original form ever since.

During the twenty-five years of its history, said Mr. Ham, the association has done a great deal to dignify the position of the accounting officer and increase the value of the work of the accounting department.

Mr. Ham then took up the list of past-presidents, the oldest of whom in point of service, and still living, is H. L. Wilson, treasurer Boston Elevated Railway. A communication from Mr. Wilson was read.

George B. Willcutt, San Francisco, Calif., who read Mr. Wilson's letter, referred to accounting in the early days in California, where the system of accounting was a mongrel affair. Questions involving relations with the city necessitated a more permanent system of accounts. Mr. Willcutt worked up a system based on the steam railway subdivisions, as called for by the Railroad Commission, which the steam railroads then adopted.

Next a telegram from H. C. Mackay, Milwaukee, was read. This stated that a merger of several public utility properties with which Mr. Mackay was connected prevented his attendance. It was brought out that Mr. Mackay, as well as Past-President C. N. Duffy, who was not present to receive his badge, were members of the classification committee of the early days.

A letter from F. E. Smith, Fort Myers, Fla., and telegrams from W. B. Brockway, Portland, Maine, and C. L. S. Tingley, Philadelphia, Pa., were also read.

Mr. Ham next presented the badge to P. S. Young, Newark, N. J., who in response predicted a much greater field of usefulness for the accountants than ever. The accountant has, he said, been expert in the mechanics of the business and he has been depended upon in that branch of his profession. Today he is depended upon for much more than the mere mechanics of the profession. His advice has come to be sought by the management upon economic questions and upon the financial questions that arise in the business, as well as on many questions of operation. This has come about naturally and without undue forcing of opinions on the men who have been responsible for the operation of large properties throughout the country.

The era of regulation, said Mr. Young, has brought about many problems never thought of in the early days. The accountants in the industry should take part in the solution of these economic and financial problems which must be met. The accountant should bring before his management the necessity for adequate results, preparation, sound financing and good public relations. Accountants should urge the distribution of securities among their customers. This will improve relations between the public and the electric railways.

Mr. Young closed by recommending that the paper by Mr. Dreyfus, presented before the joint session with the engineers on Tuesday, should be presented before joint conferences of accounting men and engineers in each company, for, he said, there is a great deal to be done in linking up the accountants with the other departments. The more they know of each other, the better and more useful they will be to each other.

Mr. Ham emphasized what Mr. Young said. He also impressed on the association the need for depreciation charges. In the early days of the business, he said, there was no accounting for depreciation nor any provision for it, because it was a subject that was not well understood. One of the greatest activities of this association will probably be to work out proper systems of accounts for depreciation. The Accountants' Association, in conjunction with the public relations committee of the parent association, is working with the Interstate Commerce Commission in the endeavor to establish proper rules for depreciation.

A badge was next presented to M. W. Glover, Pittsburgh, who referred to the early meetings, particularly the 1897 meeting held at the Hollenden Hotel, Cleveland, at which H. H. Windsor, Chicago, Ill., presided, and M. W. Hall Camden, N. J., was elected permanent chairman. At this meeting Mr. Wilson was elected president. The first meeting after organization was held at Niagara Falls in October, 1897. In 1906 the name of the association was changed from "Street Railway Accountants' Association of America" to "American Street and Interurban Railway Accountants' Association." Mr. Glover deplored the apparent lack of interest in the work of the association as evidenced in the small attendance at the meetings, and Mr. Ham also felt that there is not the life and influence in the work that there was in the earlier years. Of course, he said, everything was new then and it was possible to get up a couple of hours' discussion on some practice which was now uniform.

T. P. Kilfoyle was the next past-president to be honored with the presentation of a badge. He responded briefly, emphasizing the fact that those who are active in the association get a great deal more out of it than they put in.

Mr. Ham then presented a badge to Retiring-President Webster, who in responding reviewed the work of the year and called upon Walter Shroyer for the report of the committee on resolutions. Next, on motion of the nominating committee, the following were elected for the ensuing year: President, W. G. Nicholson, secretary and auditor Omaha & Council Bluffs Street Railway, Omaha, Neb.; first vice-president, E. M. White, Binghamton, N. Y.; second vice-president, L. T. Hixson, Indianapolis, Ind.; third vice-president, Wallace L. Davis, Allentown, Pa.; secretary and treasurer, James W. Welsh, New York, N. Y.; executive committee, J. J. Duck, Chicago, Ill.; F. J. Davis, Newark, N. J.; Walter Shroyer, Anderson, Ind.; L. E. Lippitt, Auburn, N. Y. After brief remarks by those of the incoming officers who were present, the convention adjourned.

Conference on Electric Railway Track in Paved Streets

PAVEMENT construction for streets containing street railways and the character and the amount of pavement deterioration due to effects of street-car traffic were considered at a conference of street railway and paving engineers held at the Philadelphia Engineers' Club on Oct. 9. Location of utilities in streets; design of street railway track structure; paving and drainage of streets for street-railway traffic; and the extent to which pavement is affected by street railway traffic, were the nominal subjects for discussion. As a matter of fact remarks often wandered afield into pavement design in general and the effect of heavy truck traffic on pavement.

Theoretically the perfect locations in the streets are as follows: Street railways in the center and all other utilities at the sides or under the sidewalks. It was agreed that wherever possible this plan should be followed in new construction. In extensions of streets into outlying territories being developed, many cities are now locating all sub-surface utilities at the sides, leaving the center clear of structures other than the railway track. This clean-cut separation is less practicable in built-up sections and particularly in the older heavily built-up business sections of the larger cities, but even here consistent effort can do much. In Philadelphia, even in the older and narrower streets, many of the utilities other than street railways are, as they are rebuilt, being located at the street sides; on occasions space has been condemned to accomplish this relocation.

Opinion on track design ranged from the advocacy of perfectly rigid construction on a massive concrete base to flexible construction on ties and ballast. The street railway engineers were reluctant to concede that the track or car traffic had any considerable deteriorating effect on the pavement and the city paving engineers contended that they were prime causes of pavement destruction. Many examples of pavement failure attributed to the action of street railway track were cited and shown by pictures. Failures developed first at joints, and more particularly at crossings which were approximately at right angles. From these points they progressively spread. As explained by the city paving engineers, the vibration of the rails at joints and crossings is the cause.

While assenting to the claim that poor track construction contributed to pavement failures the street railway engineers pointed out that many of the poor details of such practice had been or were being corrected and there was considerable promise that the future would show decidedly improved results. They insisted, however, that correspondingly better paving structure was needed. With modern truck loads, there should be thicker pavement, better foundations, and far better drainage. Indeed it was the general attitude of the conference that paving practice generally had to be advanced to meet the present traffic loads and speeds.

Notes on French Car Design

Paper by Prominent French Railway Engineer Before French Railway and Automobile Association Outlines Standards and Analyzes Conditions for Satisfactory Service as Far as Design Is Concerned

THE interest of equipment men in standardization of electric railway cars, as evidenced by the report of the Engineering Association committee on unification of car design and the discussion on the report at the Chicago convention, makes timely a reference to the paper by M. Castaing, read at the 1921 convention of the Union des Voies ferrées d'intérêt local et des Transports publics Automobiles de France. The author is chief engineer of traction of the unified transportation system in Paris.

M. Castaing states that the committee on standardization of rolling stock of the French association recommended five types of motor cars and four types of trail cars, all possessing the following characteristics:

1. Necessity of more than one entrance step is obviated, and
2. Large entrance openings are provided to facilitate interchange of passengers. These are closed by double sliding doors. (On the Paris system the opening width is more than 5 ft.)

The dimensions of these cars are given in Table I. Types A to E are motor cars, F to I trailers.

Bodies of the type D Paris cars are constructed entirely of wood, which the author considers preferable to steel construction because of the greater ease in making repairs. He states that in Paris, for example, there is an average per week of more than ten collisions for each 100 cars in service, but it is possible to keep from 82 to 84 per cent of the motor cars and more than 90 per cent of the trail cars in good condition and ready for operation at all times. The weight of the standard D car as compared with the safety car built by the Osgood Bradley Car Company of Worcester, Mass., as described in the *Electric Railway Journal* for May 15, 1920, is given by the author in Table II.

The Paris company has been making experiments to determine possibilities in the way of weight reduction and has built an experimental car which it is thought will reduce the weight 25 per cent as compared with other cars owned by the company of the same capacity, and at the same time reduce the dead weight on the axles. One way by which it is accomplished is by the abandonment of the truck. The car has four wheels and two axles, each axle being driven by a separate motor whose armature shaft is parallel with the side of the car and drives the axle by double gear. The motors are attached to the car frame, as are the journal box springs. The main dimensions follow:

TABLE II—COMPARISON OF CAR WEIGHTS
(All weights in pounds)

Weight	Paris D Type	Safety Car
Car and equipment	31,450	17,500
Electrical equipment	6,400	2,150
Underground plow	880	......
Car without equipment	24,200	15,500
Seats	49	32
Weight per seat	495	485

Wheelbase	11 ft. 10 in.
Length over all	35 ft.
Width	6 ft. 7 in.
Number of passengers	49

On the subject of suspension the author points out that the functions of this are to assure by its flexibility the comfort of the passengers and the preservation of the body, truck and equipment, against the dynamic shocks from the track. Most of these effects, which depend upon the state of the track and the speed of the car, must be absorbed by the spring system. At the same time there must be sufficient stability to prevent oscillations due to inequalities in the track.

The contradictory requirements must be harmonized, on the one hand by the judicious choice of the total deflection which the car may make and particularly the selection of proper flexibility of the springs; and on the other hand by the proper choice of the type of suspension, of such dimensions of the car as wheelbase, total length and position of the center of gravity, and by determining carefully the points of application of the several springs.

The choice of the ratio of the dead suspended weight to the useful load has a direct influence on the flexibility and stability of the empty vehicle. In one car with a rigid wheelbase which was carefully studied this ratio was between 3½ and 4. For motor cars with two trucks this can be as low as 3 or 3½. For trailers the ratio is necessarily lower, on account of the relative lightness.

It is desirable to secure the maximum value for the ratio of the dead suspended weight to the dead total weight. In one motor car carefully studied this was about 85 per cent. For trailers this value can easily be exceeded. This ratio is affected by the weight of the assembled wheels, axles and springs, to which there must be added for motor cars the weight of one motor, because as a first approximation it may be assumed that one-half of the weight of each motor is suspended, the other being supported by the axle.

Further for stability the maximum value of ratio of length of body to wheelbase is about 3, being limited by the risk of creating a teetering motion which can only be prevented by diminishing the total deflection and therefore the "suppleness."

The choice of the total deflection under load of a tramway car is very important, since on its value depends in great part the flexible quality of the suspension. It is variable with the type of suspension employed, according to whether the suspension is one comprising entirely helical springs or elliptic springs or a combination of these. A suspension consisting entirely of helical springs gives a total deflection necessarily smaller than all other types, on account of the necessity of limiting the oscillations inherent in this type of suspension. For one vehicle carefully studied, of which the useful loads varied between 3 and 4 tons, the total deflection under load may be of the order of 2.4 in. for a suspension entirely made up of helical springs, and 4 in. for a mixed suspension or one with elliptic springs.

TABLE I—MAIN DIMENSIONS OF STANDARD FRENCH CARS

Types of Car	A	B	C	D	E	F	G	H	I
Length over bumpers	31 ft. 3 in.	31 ft. 11 in.	37 ft. 1 in.	37 ft. 1 in.	41 ft. 5 in.	27 ft. 8 in.	28 ft. 6 in.	28 ft. 11 in.	40 ft. 4 in.
Width	6 ft. 7 in.	6 ft. 7 in.	6 ft. 7 in.	6 ft. 7 in.	6 ft. 7 in.	6 ft. 7 in.	6 ft. 7 in.	6 ft. 7 in.	6 ft. 7 in.
Height	10 ft. 2 in.	10 ft. 2 in.	10 ft. 2 in.	10 ft. 2 in.	9 ft. 10 in.	10 ft. 2 in.	9 ft. 6 in.	9 ft. 10 in.	9 ft. 10 in.
Wheelbase of single truck	9 ft. 10 in.	11 ft. 10 in.	11 ft. 10 in.	11 ft. 10 in.	....	9 ft. 10 in.	9 ft. 10 in.	9 ft. 10 in.	....
Distance between truck centers	....	....	....	....	23 ft. 9 in.	....	....	....	23 ft. 9 in.
Wheelbase of double truck	....	....	....	....	3 ft. 11 in.	....	....	....	3 ft. 11 in.
Number of seats	36 or 40	44	49	49 or 50	54	36 or 37	46	48	57
Number of motors	1 or 2	2	2	2	4	..	..	..	..
Capacity of each motor	variable	60 hp.	60 hp.	60 hp.	60 hp.	......	....	......	......
Total weight empty, tons	10.5	13.8	15.8	15.8	20.5	6.4	6.8	4.4	8.9

Public Utility Securities*

Conditions Improving, but More Detailed Reports Are Urged—Comments on Legislation and Other Conditions

By John A. Prescott
Chairman of Committee of Public Service Securities, Investment Bankers' Association of America

During the last two years there has been marked improvement in the demand for public utility securities, which, coupled with declining interest rates, has resulted in a broader market and higher prices. This has affected not only senior issues, like funded obligations, but also junior issues even to some of the more speculative classes. Mortgage bonds, and even preferred stocks, of the best established companies can now be sold with comparative facility, although in case of preferred stocks still at relatively high cost. With very few exceptions, however, common stocks are difficult, if not impossible, to market. Thus, the financial problem is still the overshadowing one.

As we indicated in our May report†, we believe a much larger proportion of capital than has been the practice in recent years should, to accord with sound principles, be hereafter supplied by junior financing. It is very generally understood that if mortgage bonds are to be readily sold they must be protected not only by a sufficient equity or margin of security, but also by a satisfactory margin of divisible income. It is not so well understood, by the public at least, that if a preferred stock is to be readily sold it also must have behind it a margin of security and of income adequate to give it a high degree of safety and reasonable assurance of continuity of dividends.

Capital for the final equity or common stock should be obtained primarily from the people of the community which is to enjoy the service, but if conditions should be such that it cannot be obtained from them, it must be sought in other money markets. Investors in such markets can receive no direct benefit from the development of the utility service itself and must, therefore, be attracted by safeguards to their investment and yields such as will seem attractive to their eyes, as compared to other similar investment opportunities.

Protection of the security and income of the capital invested in the final equities, or common stocks, of public utilities evidently must be, as it should be, the fundamental factor in the development of public utility service. Where such conditions have existed and companies have, therefore, been able to build up sound financial structures, investment bankers have felt safe in supplying common stock capital. As such protection and conditions become more widespread new sources of such capital will be found and drawn upon by investment bankers and customer ownership will become increasingly common.

An increased confidence of investors in public utility securities will accrue from the dissemination of more complete and comprehensive information concerning the economies of the public utility business. A careful study of annual reports, circulars and statistical manuals discloses a marked improvement in recent years in this direction. We believe that co-operative effort on the part of the industry, investment bankers, and publishers of statistical and rating manuals will bring about still further inprovement. Much additional data are really available because many states require the filing of complete operating and statistical reports. These data require only to be made more accessible. Perhaps the greatest need for more complete information is with regard to so-called holding companies. These are often very large and their relations with their operating companies are sometimes very complex. Full information necessary to a complete disclosure of their financial condition often would be very detailed and voluminous, but the fact that such information is furnished by some of them indicates, in the opinion of your committee, that there are no serious obstacles to its disclosure by all. We believe that any such company which seeks capital from the investing public should make available and readily accessible all information and data pertaining to both the holding company and subsidiaries necessary for a thorough study of earnings, expenses, maintenance expenditures or reserves, fixed charges, dividends, assets, capitalization and liabilities. Without these an appraisal of the real worth of its securities would not be possible.

Missouri Constitutional Convention

The constitutional convention in session for some time past in Missouri is attempting to draft a new constitution for submission to the voters of that state. Among the proposed provisions of interest to investment bankers are those for taxation and the authorization and limitation of municipal indebtedness.

The provision for taxation includes the classification of property with a view to a more equitable distribution of the burdens of taxation.

Some of the provisions for the authorization and limitation of municipal indebtedness are to the following effect:

1. The pledge of the general credit of a municipality for general purposes is limited to 5 per cent of the assessed valuation.

2. The general faith and credit of the municipality may be pledged for 5 per cent additional for the purpose of constructing or acquiring public utilities, commonly supposed to be self-sustaining.

3. Additional indebtedness may also be incurred, without, however, the pledge of the faith and credit of the municipality, for the purpose of financing publicly owned utilities, the security being in such case the utility property constructed or acquired and the revenue which may be derived therefrom.

Some of these provisions suggest interesting questions concerning municipal credit. In the cities of some other states, perhaps because of the tax-exempt features of municipal bonds and the consequent ready market for them since tax burdens have become so heavy, there has appeared a rather alarming tendency, encouraged probably in some cases by political exigencies to pile up municipal indebtedness for many purposes, including raising funds to acquire or extend utilities which seemingly might be carried on as well or even more economically by private enterprise. It is a serious question how far such tendencies may be indulged without seriously affecting municipal credit as a whole. Capital absorbed for such purposes ceases to be a subject for taxation and increases in proportion the tax burdens of other property or reduces public revenue. The withdrawal of so much capital from productive industry serves also to menace industry and make industrial financing more expensive. It is not sufficiently appreciated how intimately and adversely such conditions affect the welfare of every individual citizen regardless of his vocation or station in life.

Whatever the correct conclusions as to these questions may be, these tendencies suggest extreme caution on the part of investment bankers in considering securities issued for such purposes. Should not the investment banker be as particular to examine into the feasibility and self-sustaining capacity and the character of administration of such publicly owned enterprises as he would be if he were considering the securities of a privately owned corporate enterprise?

There have been cases where administrations have operated utilities, such as waterworks, for years without publishing operating statements. When such operations finally have been investigated they have been found frequently not to be self-sustaining. Such disclosures have brought surprise and shock to the tax-paying public, and sometimes impaired municipal credit. We believe that taxpayers and investment bankers both should insist that municipalities at least adopt thorough accounting and sound financial methods if they are to own and operate public utilities, so that the public served and investors both may be able to ascertain the results of such operations and to judge whether they are economically managed.

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*Abstract of a portion of a report relating to electric railway securities, presented at the annual meeting of the Investment Bankers' Association of America, Del Monte, Cal., Oct. 10, 1922.

†See abstract in *Electric Railway Journal*, June 10, 1922.

Public utility bonds are already legal investments for savings and trust funds in twelve states. For some time it has been felt generally that savings banks in other states should logically be extended the privilege of purchasing giltedge utility bonds which are generally conceded to constitute one of the safest classes of investment securities and which yield on an average a somewhat higher rate of return than legal rails. A joint committee of the National Conference of Mutual Savings Banks and the National Electric Light Association was appointed last December to consider this question. A member of our committee is serving on that joint committee. The joint committee has held a number of meetings and at the convention last spring of the National Conference of Mutual Savings Banks a session was devoted to discussion of this subject. It is hoped that substantial progress will be made during the coming winter.

IN GENERAL AND IN CONCLUSION

It would be strange indeed if the public utility industry, unlike all other forms of business enterprise, should have emerged from the upheavals of the great war with no changes in the conditions of its existence, no new problems to confront it. Like others it was obliged to meet higher operating costs and heavier taxes with reduced income. The large increase in the number of private automobiles in operation and jitney and auto-bus competition have made inroads into the patronage which the electric roads would otherwise have enjoyed, and the construction of parallel hard surfaced roads will probably further, and sometimes wastefully, multiply transportation facilities and divide the available business. New capital, or capital to meet maturing bond issues, has been and is still unduly costly to all public utility companies, because their securities must compete in the money markets with an enormous volume of tax-free municipal bonds. It has been authoritatively stated that more than one billion dollars of such tax-exempt securities were issued in 1921.

On the other hand, these adverse and discouraging conditions seem likely to be overcome by favorable and encouraging ones. Costs have declined considerably and gradually improving general business conditions are bringing some increases in earnings. The practical experiences and lessons of the war and its aftermath seem to have done much to clear the atmosphere and bring about a more widespread popular understanding of the value and necessity of the services supplied by the public utility companies, the advantages of private ownership and operation under sane public regulation, and the economic and financial conditions under which efficient and satisfactory service, keeping pace with public demand, alone is possible. The present practice of many utility managements of frankly discussing the problems of the industry with its patrons is stimulating public confidence and good will. There is a growing recognition of the real mutuality of interest between the companies and their patrons. To paraphrase a recent statement of the president of one of our most successful railroad companies:

1. The customer's attitude toward a public utility can now be guided and made informed and friendly.

2. Satisfied customers now can be used to build up good will.

3. Pleased customers will voluntarily help a utility to get new business.

This better mutual understanding already has enabled the managements to eliminate much useless expense and many artificial obstructions to efficient operation, and has removed much of the uninformed popular objection to adeouate rates. It certainly will bring many other practical and profitable advantages, including improved credit. Investment bankers will naturally give great weight to such favorable conditions in considering public utility financing.

As has been stated in previous reports, this committee has faith in the fundamental soundness of the public utility business, including gas and transportation as well as power and light. There is an insistent and, we believe, permanent demand for the services it renders. We expect that public utility credit will be soon established upon a basis of greater permanency and stability than ever before. As in other industries, there will be exceptional situations; and discrimination and sound judgment will be required. But the solution of the impending financial problems of the public utility companies will, in our opinion, afford investment bankers opportunities for both constructive public service and profit, and will demand the assumption of duties and responsibilities from which they should not shrink.

Rehabilitation of Electric Railway Tracks*

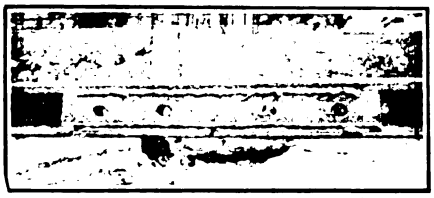
An Account of How the Eastern Massachusetts Street Railway Has Improved Its Tracks, with Special Reference to Drainage—This Company Operates 700 Miles of Track, One-Half Each in City and Country

BY FRANK B. WALKER
Chief Engineer of Maintenance of Way,
Eastern Massachusetts Street Railway, Boston, Mass.

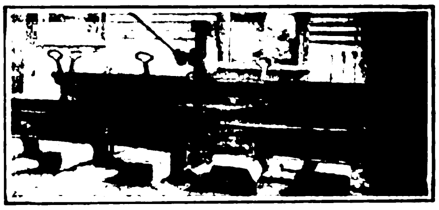
THE tracks of the old Bay State System prior to its reorganization June 1, 1919, had not been adequately maintained and, when the public trustees took charge of the property on that date, an elaborate program of rehabilitation became necessary. This system covers the eastern section of Massachusetts from the Merrimac Valley on the north to Fall River on the south, but with very little mileage in Boston proper. We operate about 700 miles, of which half comprises country lines and the other half paved city lines.

The country lines are constructed for most part alongside town roads and state highways. When rehabilitation work was started, the tracks were low and badly drained, the ties were in poor condition, the rails were out of line, surface and gage, and the joints were low battered and pounding.

During the three years 200 miles have been overhauled and reconstructed, which, together with about 50 miles previously in good condition, gives us now about 250 miles of good country track and leaves less than 100 miles for 1923, when we plan to complete our program.


WELDED AND GROUND JOINT IN 60-LB. RELAYED TEE-RAIL IN HAVERHILL

The city track was in better condition than that in the country, but considerable work was necessary on that also. We have entirely reconstructed 40 miles and made substantial repairs of much more, in addition to completely renewing 700 pieces of special trackwork, such as curves, frogs, switches and mates.


NEW TYPE OF RAIL BENDER DEVELOPED BY EASTERN MASSACHUSETTS STREET RAILWAY FOR USE IN REHABILITATING GIRDER AND TEE-RAIL TRACK

On both classes of track we have installed nearly 400,000 ties, ground the surface of 75,000 joints and the corrugation from the top of about 120,000 lin.ft. of girder rail in paved streets.

In the rehabilitation work special attention was given to drainage. Tracks were raised out of the mud, 6 to 18 in. of good gravel ballast was put in, the backfill was cleaned off above the tie by making full open section where possible or half open in other places, and deep side ditches and offtake ditches were dug. In this work we were assisted materially by co-operation with city, town and state highway engineers. The drainage of city tracks was accom-

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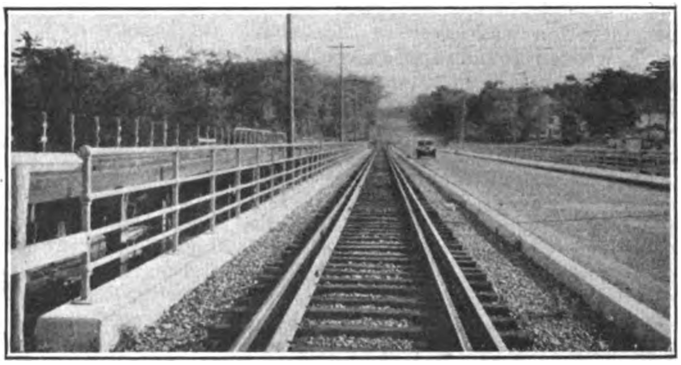
*Abstract of paper read before Boston Society of Civil Engineers, Sept. 20, 1922.

STRETCH OF TRACK ON THE LOWELL-READING LINE, SHOWING METHOD OF DRAINAGE



SAMPLE OF TYPE OF TRACK NOW BEING LAID BY THE EASTERN MASSACHUSETTS STREET RAILWAY

plished largely by raising the tracks and installing additional track catch basins.

Special attention was given to ties. On country lines we use a chestnut tie untreated, and paved tracks are retied with yellow pine treated with 10 lb. of creosote oil.

Country tracks are ballasted with at least 6 in. of good clean gravel and city tracks with at least 6 in. of broken stone. The subgrade is rolled and the stone ballast rolled before the track is laid. The best country lines are laid with 75-lb. A.S.C.E. rail, with welded joints, and paved tracks with 7-in. tee 91-lb. or 9-in. girder 104-lb. rail. The 7-in. tee is the standard and is used wherever the depth of paving will permit. Tie plates are used on all paved tracks.

All tracks, city and country, overhauled or rebuilt have all joints welded and ground. For the past two seasons we have used the metallic electrode arc method of welding and so far there has not been a failure. While plates and rails have broken, the breaks do not total 2 per cent of the total joints welded and are probably due to temperature stresses or defective rails or plates. Expansion joints are put in 750 ft. apart on open tracks.

In repairing a joint on old rail, we first renew the ties, then clean the plates of scale and rust and replace them with bolts or clamps, then bend the rail slightly above the proper surface with a sturdy rail bender of our own design, retamp the ties, weld on the plates, surface weld the cup if there is one, and then grind the surface with a rotary or reciprocating grinder.

New rail is welded in the same way except that no vertical bender or surface welding is needed. We do very little bonding at rail joints, as the welding serves to carry the negative current satisfactorily.

Our seam welders are of the dynamotor or motor generator type, using 20 volts and about 150 amp. Our surface welders are of the resistance type. Of grinding machines we use two general types, rotary and reciprocating. Of the rotary machines, with 14-in. emery wheel and 5-hp. motor, we use about thirty. Of the reciprocating type with four carborundum bricks moved back and forth over the rail by a 5-hp. motor, we have ten, and they are used for grinding corrugation from the heads of rails and on surfaces of joints of new rails. The rotary machine will grind fifteen to thirty joints per day, and the reciprocating machines 200 to 400 ft. of corrugated rail.

In general, I would say that better work must be done on street railway tracks than ever before. This means close attention to details and building up of proper morale of the men. The men must also be trained in the best way of doing work. Last December, January and February we conducted a winter track school, in which we attempted to train 125 of our engineers, roadmasters and foremen. Illustrated lectures each morning were followed in the afternoon by shop work. The results amply repaid our efforts.

On our property we are already noticing considerably decreased maintenance costs in the track due to the fact that more light-weight cars are being operated. We are also experiencing a decidedly decreased maintenance cost in the rolling stock department, amounting to at least $100 per car per year, due to the work of rehabilitation.

Modern Improvements in Rolling Stock*

The Author Contrasts Electric Railway Car Practice in Great Britain and America, and Suggests that Radical Means May Be Required to Overcome Defects—At the Same Time the Tramway Is Far from Obsolete

BY C. J. SPENCER
General Manager London Group of Tramway Companies

IN A PAPER presented before a recent congress of the Tramways and Light Railways Association (England) the writer drew attention to the fact that while in America on a visit in 1919 he had noted very great changes in the design of rolling stock as compared with an earlier visit in 1903, yet in England little or no change had taken place, the type of car and its equipment being almost identical with that in use twenty years ago.

Probably the reason for this is to be found in American method and psychology, as compared with British methods and practice. The American tramways engineer is adaptable to changing circumstances and is generally a great believer in scrapping rolling stock for new types whenever possible, in contrast to the more conservative policy of the European.

Which of these is the better policy it is difficult to say. As in most things moderation is desirable. I should be the last to contend that the English type of car is the best and that it is not open to considerable improvement.

The last ten years have seen a remarkable development of the rubber-tired road-borne type of vehicle, as contrasted with the rail-borne variety. Some enthusiasts have gone so far as to say that for street transport work there is no need for a rail and that the transport of passengers can be more efficiently undertaken with a rubber-tired vehicle, whether gasoline driven, or of the railless trolley type.

I think, however, that among experienced transport men it is conceded that there is a proper field for both types; that they are not necessarily competitive and, in fact, may be complementary.

The tramcar is not, however, quite as popular as it deserves to be. The development of the newer vehicle has impressed the public and the stationary period of evolution in tramcar design has seriously damaged its reputation. The public draw comparisons unfavorable to the tramcar for reasons which, in the view of the writer, need not exist. It is said, for example, that a tramcar is a noisy and from a modern point of view, a slow, cumbersome and inconvenient vehicle.

A steel wheel running on a steel rail must inevitably create more noise than a rubber-tired wheel on an ordinary road surface, but I am not sure that we need have as much noise from this source as we have today if full consideration was given to the merits of a wooden foundation as contrasted with a concrete foundation, with a paving substance of wood or otherwise, with the object of deadening wheel and rail noises.

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*Abstract of paper read at convention of Union International de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Brussels, Oct. 2-6, 1922.

In England all tramways have been constructed under a general act of Parliament, 1870, which imposes upon the Tramway Authority the duty of keeping an almost perfect road level, and this has inevitably led to the construction of a rigid concrete foundation and consequently a hard, non-flexible and noisy track.

From observations in the United States I can say that any attempt to achieve the impossible, i.e., introduce a light railway on the highway without impairing the surface, is not undertaken there.

The introduction of some non-conductor of sound and vibration between the tire and the wheel center or between the wheel center and the axle would greatly improve matters. If by some means it were possible to isolate the short vibrations (noise) inseparable from the running of a steel wheel on a grit-covered steel rail, noise would be largely eliminated and the premature destruction of many parts of the equipment by short wave vibrations would be obviated. On the first electric cars run in England (on the Blackpool Electric Tramways, opened in 1885) the motors were attached to the car body, the drive to the axle being by means of a double-reduction spur gear and an endless chain. While this design was by no means ideal, the cars certainly ran much quieter, apart from the spur gear, than most cars do today; in fact, with a well-meshed spur mounted on the body the car was nearly noiseless.

REDUCING WEIGHT OFFERS POSSIBILITIES

Full attention has not been given to the possibility of reducing unsprung weight. For example, the wheels, axles, axle-boxes and half the weight of the motors represent a dead weight of 4,700 lb. on an ordinary four-wheel, fifty-passenger car, and this unsprung weight is hammering on a rigid base in some cases at a speed of 20 m.p.h. or more. It is not surprising that considerable damage is done to joints, points and crossings.

Tramway operators might well ascertain whether the major portion of this unsprung weight could not be converted to sprung weight. Automobile engineers have managed to reduce unsprung weight to a relatively small amount.

Furthermore, by the employment of some of the modern high tensile steels, or other metals, much of the present weight of axle and wheel necessary to withstand the strain could no doubt be eliminated and thus facilitate the production of a really scientifically designed wheel and axle.

It is difficult to understand why it should be necessary to carry more than half the dead weight of the motor, with its accompanying heavy gears, on the car axle, and why the motor cannot be carried as sprung weight driving the car axle by some other means than a spur gear with the consequent elimination of the noise inseparable from such heavy gears.

This also opens up the possibility of higher-speed motors (in consequence of higher gear ratios) which would mean lighter and cheaper machines. Some progress has certainly been made during recent years in the direction of lighter motors, but we are not yet near the limit of possibilities. A well-known firm of motor-omnibus builders is today employing an electric motor on its vehicles of a total weight not exceeding 25 lb. per horsepower output, whereas the lightest tramway motor I know of weighs about 70 lb. per horsepower.

Designs of a motor as low as 20 lb. per horsepower output have recently been considered by my companies.

GETTING HIGHER SCHEDULE SPEED

There is, of course, a limit to maximum speed in the public highway beyond which it is not safe, but that maximum in its turn is governed by the time taken to bring the car to a standstill without unduly straining the equipment, or the passengers, in the process. The whole question turns on the employment of power brakes as contrasted with the present very unmechanical hand brake, first used I believe on Roman chariots. A braking rate of 4 to 6 ft. per second per second is a practicable proposition, and a rate at which cars could be brought to a standstill in a very short distance without inconvenience to passengers. This, together with better acceleration, would give an improved return to the undertakings, better service to the public and lower working costs on account of the higher average speed.

The present acceleration of a tramcar is admittedly not inseparable from jerks. A steady high rate acceleration is very desirable, providing it is steady, but the present method of series-parallel control does not lend itself to this desirable feature. I would suggest that the subject of shunt motors, with an even acceleration capable of running at any economical speed up to the maximum, is worthy of consideration, with the possibilties of regeneration of current.

Regenerative control was, in my view, just a little ahead of time. I had some very interesting results from experiments with Mr. Raworth's system some years ago. From the operation side the system was successful and practical in every way. The net current consumption of the cars fitted with this control was from 25 to 30 per cent less than the ordinary equipments, but the motors could not withstand the continuous work, and became overheated. Since then, however, motor design has improved, and what was impossible in, say 1908, may, with ventilated and inter-pole motors, be quite feasible to-day.

Allied to this subject of speed control is a recent development of considerable value, viz., the use of contactors in the place of direct control of current from the platform. The present "box of tricks" on the car platform has continued too long a feature of every tramcar, and I am sure we all welcome the efforts of manufacturers to remove complications and substitute simplicity. Field shunting for control again comes well into view in consequence of commutation improvement and the combination of all these new ideas should result in greatly improved and more economical service.

BETTER COLLECTOR IS NEEDED

The trolley pole, so extensively adopted, has always appeared to me to be about the most unmechanical and absurd piece of mechanism it is possible to imagine. Recently some slight advance has been made in the adoption of sliding heads instead of wheels. From reports on the results of experiments carried out on the lines of one of our companies it appears that, from the traffic department standpoint, the sliding head (or skid) has certain advantages over the trolley wheel from the running point of view, as it dewires less frequently, but in the event of dewirement is not so readily replaced on the wire as the wheel. The rolling-stock department states that the skid has an advantage over the trolley wheel from the upkeep point of view, as not only has the cast-iron skid a considerably longer life than the wheel, but the maintenance of its parts is much less, and therefore it does not need the same attention.

Tests undertaken from December, 1921, to April, 1922, show the number of dewirements per 10,000 miles, for cars fitted with skids, to be 1.49, and for cars fitted with wheels, 2.35.

Further, the sliding head, owing to its lightness and the fact that it is not liable to foul the overhead equipment on dewirement, does not result in the same amount of damage as is occasioned by the wheel.

On the other hand, the overhead department reports that the wear and tear of the trolley wire with this type of head is about double that of the trolley wheel, but it is hoped that this can be reduced by the adoption of more suitable material or means for lubricating the wire.

I believe that if we could get the right type of designer and some insistent demand from tramway managers for better collector gear, a marked advance on the present apparatus would soon appear.

DESIGN OF CAR BODY LARGELY GOVERNED BY FARE COLLECTION

As to the "carriage work" of the car, much could be learned by studying the latest methods of body construction employed by motor-omnibus builders. The body, like the rest of the equipment, should be scientifically designed with the main object of cutting down weight.

The design of a car body is very largely governed by the system of fare collection. "Pay as you enter" or "Pay as you leave" is almost standard practice in America. The critic will say that "pay as you enter" has been tried and found a failure, owing to the British zone-fare system as contrasted with the flat-fare system and to the coinage and change difficulty. There is a great deal of truth in this, but I do not think it can be said that everything has been done to make "pay as you enter" possible.

The London United Tramways have recently developed and experimented with a one-man car. The car has been in regular service for several months and, beyond a few preliminary troubles due to its newness, has been running over light traffic routes with satisfaction both to the public and to the company.

In connection with the development of this car, we have of necessity had to give close attention to the possibility of the fare transactions taking place on the platform and have introduced several pieces of fare-collecting and ticket-issuing machinery. The use of machinery considerably simplifies the fare collection problem.

CONCLUSION

My object in making the foregoing remarks will have been achieved if those who are responsible for producing new ideas will note the trend of desirable evolution, and appreciate the fact that tramways will only become obsolete when new designs for tramcars have become impossible. I cannot but feel that if the tramway industry had had the benefit of the almost Herculean efforts of the automobile engineers during the last ten years we should have been running to-day a much more up-to-date type of vehicle and would be securing considerably better results.

It is somewhat lamentable, but none the less true, that what we require today was in reality invented many years ago, was tried and abandoned, generally because the inventors were a little ahead of their day, and if one might discreetly express an opinion the tramway manager is prone to lose heart in a new thing if immediate success is not attained. New ideas have generally got to go through their "teething period," and early designs are generally crude. If, however, we would only condemn those ideas that are fundamentally wrong and struggle with those that are only wrong in some detail, great progress would result.

The one-man car, which is so popular in the United States was, I believe, first tried in England and abandoned. Regenerative control was also introduced but did not flourish, and so it might be said of many other new ideas, not only affecting the tramway industry. The ideals of the early inventor are generally ahead of immediate practicability, but it is often worth while to review some past failures and hopeful attempts in the light of new conditions.

New England Street Railway Club

THE New England Street Railway Club will hold its October meeting on Thursday, Oct. 19, at the Copley Plaza, Boston. Two instructive papers will be read on iron and its products. Frank B. Walker, superintendent of maintenance of way Eastern Massachusetts Street Railway, will read an illustrated paper on "Mining of Iron in the Mesabi Iron Range," and F. A. Weymouth, sales metallurgist Bethlehem Steel Company, will read a paper on "Modern Steel Practice of Rolling Special Steel Tee and Girder Rails." The dinner will be held at 6:15 p.m.

Canadian Association Committee Appointments

MAJOR F. D. BURPEE has appointed the following special committees of the Canadian Electric Railway Association: Committee on standards, G. Gordon Gale, Hull, P. Q., chairman; D. E. Blair, Montreal, P. Q.; E. P. Coleman, Hamilton, Ont.; C. C. Curtis, Sydney, N. S.; W. G. Murrin, Vancouver, B. C. Committee on public relations, A. W. McLimont, Winnipeg, Man.; George Kidd, Vancouver, B. C.; W. J. Lynch, Quebec, P. Q.; E. W. Oliver, St. Catharines, Ont.; M. A. Pooler, St. John, N. B. Committee on safety, J. F. H. Wyse, Toronto, Ont.; C. C. Curtis, Sydney, N. S.; W. H. Garracott, Winnipeg, Man.; W. B. McRae, Toronto; R. M. Reade, Quebec.

Traffic Men Meet

SEVENTY traffic men, representing practically every interurban line in Kentucky, Indiana, Ohio and Illinois attended the annual meeting of the Central Electric Traffic Association at Webster Lake, Ind., recently. It has been voted that Webster Lake shall be the permanent meeting place for the association's annual sessions. Traffic policies for the coming year were discussed.

American Association News

Record Breaking Registration at Chicago

AT THE close of the Chicago convention of the America Association on Thursday evening, Oct. 5, the total registration had reached the gratifying total of 4,200. At least 3,000 persons in addition were admitted to the pier and the meetings by tickets, an innovation this year.

New Reports and Compilations

THE following special reports and compilations prepared by the Bureau of Information and Service of the American Association are now available to member companies in good standing:

Public Utility Laws—A summary of the laws creating the state public utility commissions, giving an analytical digest of the main provisions covering their jurisdiction and powers over transportation companies. This is the fifth installment of this compilation which was begun in June.

Wage Bulletin No. 127—A complete new edition of the association's wage bulletin showing wages paid trainmen by over 300 companies based on replies to a circular letter sent out during September.

Motor-Bus Operation — Operating cost figures and other data on the design and operation of motor buses collected in part by the committee on trackless transportation and in part gathered from other sources.

Traffic Ratios—A tabulation of the following ratios of nearly 200 companies: passengers carried per car-mile, revenue rides per inhabitant (riding habit), passenger revenue per revenue passenger (average rate of fare), car-miles per mile of revenue track, car-miles per car-hour (average speed), car-miles per car operated, passengers per car operated, etc.

Credit Where Credit Is Due

IN THE Convention Report Issue of the *Electric Railway Journal*, that for Oct. 7, credit should have been given to the Moffett Studio, Chicago, for the photograph of Edward Hungerford appearing on page 538.

The copyright line was also inadvertently omitted from the photographs of H. A. Wheeler, page 541, and Hon. W. W. Warwick, page 545, the copyright in both cases being held by Harris & Ewing, Washington, D. C.

Resolutions on President C. B. Holmes

THE following appreciation of the late Charles B. Holmes, past-president of the association, was presented to the executive committee at a recent meeting by a special committee composed of Gen. George H. Harries, John J. Stanley and H. W. Blake and was approved and adopted:

> Because of the departure of Charles Butler Holmes, one of the notable pioneers of our industry and a past-president of our association, the executive committee of the American Electric Railway Association herein records its appreciation of the valuable services rendered by him to this organization and to the public at large.
>
> Blest with uncommon foresight and financial courage, he was a national leader in successive developments of city transportation methods from the horse cars of the early '60s to the electrically operated latter-day equipment. His cable installation in Chicago was a highly important factor in the growth of that city.
>
> In principle and in practice he was an ardent advocate and supporter of the association and convention idea, and was president of this association in 1887-88, when the horse-to-electric transformation was in process.
>
> Sensible of our loss, we deeply regret his decease, and we tender to his surviving relatives our sincere sympathy.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Disorder in Buffalo

Striking Employees Again Cause Trouble—Manhattan Transit Operates Jitneys—Fare Hearing

Rioting has been resumed by striking employees of the International Railway, Buffalo, and their sympathizers and many loyal trainmen have been severely beaten and robbed within the last week. Lack of adequate police protection has forced officials of the company to be sworn in as special police and they are patrolling lines in outlying sections of the city in automobiles. Every effort apparently is being made to intimidate new employees of the company, who now are working at the regular scale of wages, 55 cents an hour. Despite the renewed disorder, passenger travel is increasing on all local and interurban lines.

Two Hundred Jitneys Operate

More than 200 jitneys charging a 10-cent fare started operating in Buffalo early in the week under the direction of the Manhattan Transit Company of New York, which claims to have authority under a charter granted in 1899 to the General Carriage Company. After operating twenty-four hours, the company suspended service in Buffalo pending a decision as to the legality of such service. Attorneys for the International Railway hold that the operation of such jitneys was in defiance of the laws of the state and the three injunctions issued by Justice Charles H. Pooley in Supreme Court. Joseph H. Hoadley, president of the Manhattan Transit Company; Henry D. Chapin and Charles N. Shaffer of New York were in Buffalo to watch the initial operation of the jitneys. The same interests recently operated in New York City.

Members of the Buffalo Jitney Owners' Association leased their cars to the New York company and each jitney carried signs indicating the destination and the words, "Operated by the Manhattan Transit Company of New York." The 16-cent taxis, however, continue to operate along the local lines of the International, but officials of the company claim to have evidence that the jitney-taxis are in almost every instance charging only a 10-cent fare. Injunctions now are being served on the owners of many jitney-taxis and as soon as the necessary evidence is secured by jitney riders employed by the International, arrests will be made. The local courts are clogged with jitney cases so that those demanding jury trials have to have their cases put off until late next March.

Suit has been brought against the Buffalo Jitney Owners' Association by the International in Supreme Court to recover financial losses alleged to have been sustained because of the illegal operation of jitneys since the start of the street car strike July 1. Counsel for the jitney owners has applied to Justice Harry L. Taylor in Supreme Court for an order to examine Herbert G. Tulley, president of the International, before trial.

Mayor Frank X. Schwab and Commissioners Graves and Kreinheder, the city's representatives on the committee which will negotiate with a committee of the International seeking to restore the 5-cent fare on the Buffalo lines of the company, went to Cleveland early in the week to investigate the service-at-cost plan in effect there. In 1919 the New York State Legislature passed an act enabling the city and the company to enter into a service-at-cost agreement, but Governor Smith vetoed it.

Formal application has been made to President Tulley of the International by the municipal authorities of the city of Lockport and the transportation committee of the Lockport Board of Commerce asking for the restoration of local trolley service in the city. Lockport has been without traction service since the strike was called July 1. If the International fails to comply with the request at once, the Lockport authorities threaten to take the matter to the Public Service Commission. There have been rumors in Lockport that the International is willing to surrender its local franchise except the right to operate through cars on the Buffalo-Lockport-Olcott lines.

Testify on Valuation

The Public Service Commission held a preliminary hearing in Buffalo recently on the complaint of the city against the International seeking to restore the 5-cent car fare on the local lines. The fare now is 7 cents or four tokens for 25 cents. Colonel Pooley, who heard the evidence, indicated there will be no 5-cent fare pending the final determination of the case. The company's experts testified that the reproduction valuation of the company as of December, 1919, was $96,539,185, of which about $35,000,000 represents intangible value, for which the Public Service Commission makes no allowance. The International was represented by Coleman J. Joyce of Philadelphia, general counsel for Mitten Management. Inc.; Thomas Penney of Penney, Killeen & Nye, counsel for the International and former president of the company; Herbert G. Tulley, president, and E. J. Dickson, vice-president. The company's figures were prepared by a committee consisting of Charles Hansel, consulting engineer of New York, and other consulting experts.

Mayor Explains Attitude on Interurban Ouster

Declaring that the plan to bar interurban cars of the Detroit United Railway from the streets of Detroit, which will be placed before the voters on Nov. 7, is not due to any animus towards the Detroit United Railway. Mayor Couzens made the statement that the plan has been instigated to enable the street railway department to give the best service to its citizens at the lowest possible cost and at the same time to facilitate the coming in and going out of the city of interurban passengers.

The Mayor's statement was issued in answer to letters sent to his office in connection with the proposed elimination of interurban cars from municipal tracks. He cited that it was not generally known that Detroit streets are used to transport freight from Ohio points to Michigan points and expressed the belief that the people of Detroit do not want their streets used for freight traffic—at least not in train loads, the way the Detroit United Railway is transporting it now.

Although believing that freight traffic should be handled, the Mayor thinks it will have to be with lighter equipment, as light as the city's own urban cars so as to relieve in every way possible the tracks for comfortable and proper use by car riders. He further pointed out that interurban cars are constructed for open track use instead of for paved streets which makes the interurbans out of place on paved streets.

It is expected that the Detroit United Railway will pay the city $80,000 a month for the use of its tracks but that will not compensate the city for the destruction of trackage and the inconvenience caused the public. The question of fares is not of particular interest to the administration, but the preservation of streets and the facilitation of services for local riders as well as for interurban car riders are. The extent of damage already done to the municipal tracks by interurbans is evident according to the Mayor and can be ascertained by anyone interested.

No Special Legislative Session on Buses

Governor Miller said on Oct. 7 that he would refuse the Board of Estimate's request to call a special session of the Legislature to consider New York City's bus problem. The Governor said:

> The Board of Estimate has ample power for relief in the Transit Commission.
>
> If they want to play politics in New York they may do so. I certainly shall not.
>
> Has the Transit Commission the authority to give the city relief on buses?
>
> It has if the Board of Estimate refers the subject to it.

Resolution Calls for Traction Conferences

Officials of the Cincinnati (Ohio) Traction Company are called upon to confer with representatives of the Cincinnati Street Railway in a resolution adopted at a meeting of Mayor George P. Carrel's traction committee, with a view to accomplish "certain defined objectives."

These objectives are stated in the resolution, which was submitted by former Vice-Mayor Gilbert Bettman, to be a divorcement of the interlocking relationship that exists between the Cincinnati Traction Company and affiliated corporations. Another objective is to reduce the outstanding amount of securities that now are entitled to earnings under the 1918 franchise, agree to such modifications of the terms of the lease and of the 1918 ordinance as will enable the company's property to be efficiently operated and at a reasonable rate of fare.

The Mayor's committee will meet again Oct. 26, when a reply to the proposals made in the resolution is expected from the two companies. The resolution accompanied the report by Mr. Bettman, who was a member of the sub-committee named by Mayor Carrel which held conferences with officials of the two companies during the summer months.

Adoption of Transportation Act Will Produce Active Opposition

The activities of the California Real Estate Association in making an appeal to the real estate men of the State to support in the coming November election the so-called "Transportation Act," is meeting with considerable opposition from various cities in southern California. The Mayor of Los Angeles recently called a meeting of officials of numerous other cities in southern California to prepare to wage a fight against the proposed measure which is designed to give the State Railroad Commission exclusive power to grant franchises for the construction and operation of street, interurban and suburban railways, and bus lines.

The act, if adopted, will give the commission power to compel extensions of street railways into districts where the need existed. Neither the state nor municipal government has such power under present laws. Under present franchise laws governing street railways in California there is no power that can compel the extension of a street car line, consequently cities and towns throughout the State which are suffering from lack of extensions are being handicapped by inadequate service, according to the claims of the association.

Grand Rapids Set as Example

Convinced of the fact that the growth of the city of Saginaw is being retarded by the lack of reliable transportation service and that the actions of other cities in handling their transportation problems should be of especial interest to the citizens of Saginaw, the Saginaw *News-Courier* under date of Sept. 24 publishes an analysis on the overwhelming vote in favor of the new franchise in Grand Rapids.

The *News-Courier* says that its readers have been asking many questions on the neighboring city's adopting a franchise to run for thirty years. In order to answer the questions, the *Courier* wired the Grand Rapids *Press* "asking for a detailed and complete article telling how Grand Rapids thought and voted and of the arguments and information that played any part in the campaign."

Suggests Abolishment of Franchise Tax

Suggestion that the franchise tax against the Cincinnati (Ohio) Street Railway be abolished and that the company be placed in somewhat the same category as the automobile and truck owners of Cincinnati was made by Vice-Mayor Froome Morris in an address at the Lawyers' Club of the Cincinnati Chamber of Commerce. Mr. Morris said in effect that the franchise tax under the present service-at-cost ordinance of Cincinnati is illogical as it amounts to an indirect tax upon the car rider and he did not think it would ever make it possible to pay the franchise tax to the city. He declared that under the service-at-cost ordinance the railway did not owe the franchise tax unless it earned it and as a matter of fact it had never earned enough to pay the tax. It paid the tax only once and then it had to borrow the money to pay it. He said, however, that he did believe that the railway ought to be assessed a tax sufficient to keep the thoroughfares in first-class repair.

New Plan Submitted in Chicago

The All-Chicago Council on Sept. 29 submitted to the Chicago City Council committee on local transportation a comprehensive report providing for extensions of surface and elevated lines and the building of an initial subway.

The report recommends that the lines be municipal property, but operated and controlled by a regulatory body composed of representatives of the public, the employees, the municipality and the investors.

The total cost to carry out the All-Chicago Council's program was estimated at $154,575,000. Of this amount the initial subway system would cost $84,000,000; elevated line extensions, $44,875,000, and surface line extensions, $29,500,000. The plans call for 255 miles of surface line extensions, 179 miles of elevated line extensions and 58 miles of subway construction.

Plan for Trackless Trolleys to Be Heard.—A plan for a system of trackless trolley lines for Staten Island, calling for the expenditure of $4,235,000, was submitted to Mayor Hylan of New York recently by Grover A. Whalen, Commissioner of Plant and Structures. Of this amount, $3,000,000 is asked for 118½ miles of lines and cars, and $1,235,000 for an electric power plant.

Celebrates Thirty Years of Operation

On Sept. 22, 1892, thirty years ago, the first electric street cars were put in operation in the city of San Diego, Calif., and the occasion was observed on Sept. 22, 1922, by the company giving a dinner at the San Diego Hotel to the eleven surviving employees of the former date, General Manager Claus Spreckels and Assistant General Manager E. J. Burns representing the company as hosts. The honor guests were M. J. Perrin, superintendent thirty years ago, now assistant to the general manager; M. D. Ryder, dispatcher; J. A. Johnson, retired conductor; M. Thurnes, conductor; Robert Irwin, motorman; W. T. Laird, motorman; O. C. Newby, conductor; S. H. Holton, motorman; W. C. Enneking, dispatcher; A. J. Santee, retired motorman; W. Z. Allen, supervisor of trainmen.

The San Diego Electric Railway had its beginning in 1892, when the Spreckels interests purchased the property of the San Diego Street Car Company for $115,000 at receiver's sale, including the Park Belt Motor Line. The combined properties included 10.11 miles of track, laid with 30-lb. rails, one carhouse, stables, corrals and a repair shop located at Arctic and F Streets; a carhouse, stables and corral at Seventh and Market Streets; thirty cars, 147 horses, forty sets of double harness and 108 extra collars. The cars had a capacity of sixteen to twenty-five persons each.

The first electric cars were placed in operation on the morning of Sept. 22, 1892, on two of the company's routes—one from Fifth and L Streets to Fifth Street and University Avenue, and the other from the Santa Fe wharf, at the foot of Market Street, to Thirty-first and National Avenue. The first cars were double-deck, single-truck affairs.

The company now has a total single-track mileage of 78.6, owns 139 modern cars, operates 10.902 car-miles per day and hauls an average of 69,623 passengers daily. The total investment is placed at $4,239,391, and the monthly payroll is $52,706.

Detroit Commission Rents Buses

A fleet of motor buses has been rented by the street railway commission of Detroit from the Detroit Motorbus Company to give service to patrons of the south Chene line while reconstruction is in progress on Chene Street from Gratiot Avenue to the river. The emergency buses are hired on the car-mile rental basis, the revenues collected in fares going to the Department of Street Railways. The route to be followed is over Joseph Campau Avenue, the buses operating with the same rate of fare and the same transfer privileges as were in effect on the south Chene line. The temporary arrangement is expected to result in only a slight curtailment of motorbus service on Jefferson Avenue according to the president of the Motorbus Company.

Railway Problem Not Yet Solved

Although six months have passed since the Winnipeg (Man.) Electric Railway applied for a ten-year franchise extension no agreement has been reached between the railway and the city and no decision has been made on the question of submitting the issue to a public vote. A. W. McLimont, vice-president of the company, does not see the necessity of a plebiscite. In a statement he says that the question of the franchise extension is a business proposition and should be dealt with as such. The matter has been followed in previous issues of the *Electric Railway Journal.*

Winter Operation Expected in the Future

If the improvement in the operation of the Moncton Tramways, Moncton, N. B., is continued it is highly probably that in the course of the next few years winter operation will be resumed. Every effort has been made to aid the company in which Boston capital is largely interested into becoming a paying venture. The Moncton Tramways is one of the few street railways in the world that suspends operation in the winter. With the advent of the snow, the five cars of the company are stored in the carhouse.

The company was organized twelve years ago, laid rails, built a power plant and installed poles, etc. For several years the company operated the year round, but seven years ago, in view of the ever-rising cost of removing snow and of general operation in the winter, it was decided by the company to discontinue the service about December 1 and resume about April 1. Owing to the heavy outlay for removal of snow and other expenses contingent upon the cold weather period, the company had met with increasing deficits. During the winter and also in the summer motor buses are used on the lines of the street railway. The one-man car system is now in force.

It is considered very likely that the advent of the hydro-electric current from Musquash provincial station will have a decided effect on the company's prospects. It is not known as yet if the company will distribute the current in Moncton and vicinity, but present indications point that way.

Permits Harbor Frontage for Radials

The City Council of Toronto, Canada, has passed the agreement giving a fifty-year lease to the Ontario Hydro-Electric Power Commission of a six-track right-of-way over the harbor front land in the jurisdiction of the Board of Harbor Commissioners of Toronto. The nominal price will be $1 a year, with the Hydro-Electric Commission having control over radial railways.

The matter has been strongly contested for some time, the Toronto Transportation Commission opposing the agreement on the ground that it practically gave to the Hydro-Electric Commission the right to run electric cars within the city limits to the detriment of the city's interests represented by the commission. The Toronto Board of Trade and Board of Harbor Commissioners also opposed the agreement.

The agreement will have to be ratified by the Ontario Legislature before it becomes effective.

Instruction in Public Utilities in Austin

A course in public utilities will be offered at the University of Texas, at Austin, during the coming session. The course will be under the direction of Prof. W. M. W. Splawn, chairman of the Department of Economics and Sociology. The course will include lectures and instruction in the following topics: Demand for service on public utility companies; development of public utility companies; problems of financing; problems of management; problems of control; regulation of service; rate fixing; valuation.

Rerouting System to Be Planned

During the coming winter the Jamestown (N. Y.) Street Railway will work out a system of rerouting which the company hopes to put into effect in the following spring. According to A. N. Broadhead, president of the company, the idea is in line with the company's plan of connecting various parts of the city without the delay and inconvenience caused by transferring from one car to another. "In other words," said Mr. Broadhead, "we intend to establish a system whereby it will be possible for persons residing on the south side, for example, to make the trip to the north side without changing cars at the central terminal." This plan will improve the service in Jamestown materially.

Decreased Number of Accidents Reported

A report just rendered by the Los Angeles Board of Public Utilities shows that street railway accidents in Los Angeles are decreasing. This showing is exceptionally favorable in spite of the fact that traffic in the streets in Los Angeles is greatly increasing. The number of accidents on street railway lines in Los Angeles during the year ending June 30, 1922, was 597 fewer than during the previous year. The engineers of the board attribute this decrease to the starting of "no left-hand turns" at the busiest of the downtown street intersections, to the installation of the automatic traffic signal devices at various street intersections through the busy section of the city and to safety campaigns conducted by various civic bodies, including the Chamber of Commerce, the Safety Council and the Los Angeles Traffic Commission.

The report of the board showed that for the year ending June 30, last, there were 17,912 reported accidents on street railway lines in Los Angeles as compared with 18,509 during the previous year. Of the total of 17,912 accidents, collisions of street cars with automobiles numbered 13,022; miscellaneous accidents, 1,198; accidents to persons alighting from street cars, 1,544; collisions of street cars with other vehicles, 651; accidents to persons boarding street cars, 966, and collisions of street cars with pedestrians, 531.

News Notes

Votes Against Station Plans.—The City Council of Connersville, Ind., has voted against the station at Sixth Street and Western Avenue proposed by the Indianapolis & Cincinnati Traction Company.

To Wage Ceaseless War on Carelessness.—According to the "Subway Sun" published now and then by the Interborough Rapid Transit Company, New York, N. Y., the company has enlisted in the war against carelessness. This declaration was made in view of "Safety Week," which was conducted in New York City Oct. 8-15.

Wages Remain Unchanged.—After two weeks' negotiations an agreement was reached on Oct. 10 between the Springfield (Ohio) Street Railway Company and the carmen's union continuing the present wage scale for another year and leaving unchanged the working conditions. The wage scale at present is 42, 44 and 46 cents an hour depending on the length of service.

"How Come" Will Give You the News.—Bulletin boards containing cards giving information concerning the activities of the company for the benefit of the patrons are being placed in all of the cars operated by the Indiana, Columbus & Eastern Traction Company. General Manager Bleecker of the company said that the cards would be contained in box frames in the front of each car, and that the cards would be changed each week. "How Come" has been adopted as the slogan to head the cards. This slogan will appear at the top of each card, and underneath will be a terse sentence giving some vital fact concerning the company's operations.

P, A. Y. E. Plan Altered.—To satisfy protesting citizens a change has been effected in the pay-as-you-enter system on the North Birmingham line of the Birmingham Railway, Light & Power Company, Birmingham, Ala. The seating arrangement in the cars used prior to the pay-as-you-enter system will be in effect again, and according to J. S. Pevear, general manager, the entrance payment plan is continued, but negro passengers will occupy the front seats and exit through the front door and white passengers the rear seats and will exit through the rear door. Patrons are still fighting for separate entrances for the races.

Financial and Corporate

Milwaukee Gold Bonds Offered

In order to retire $7,822,000 outstanding funded debt, to reduce floating indebtedness incurred for property additions and to provide funds for further additions to the company's plants and system the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will issue $12,500,000 of its refunding and first mortgage gold bonds. These bonds will bear interest at the rate of 5 per cent and will mature June 1, 1961. The bonds are offered, subject to prior sale, at 92¼ and interest, yielding about 5.50 per cent. The refunding and first mortgage 5 per cent bonds will cover all the property of the company, subject to underlying liens, and, under the provisions of the indenture, after Dec. 1, 1931, will become a first lien on the entire mortgaged property. The physical value of the company's property, as determined by the Wisconsin Railroad Commission, aggregates $58,151,284, as against a total of refunding and first mortgage bonds and underlying issues in the hands of the public of $36,547,000. Following the funded debt are over $17,000,000 preferred and common stocks representing an equity based upon this valuation of more than $19,000,000. Regular dividends on the preferred stock have been paid for the past twenty-two years and dividends averaging 8 per cent per annum have been paid on the common stock every year since 1903.

Merger Effected

The Northwestern Pennsylvania Railway, the Crawford County Railways, the Northwestern Connecting Railway and the Peoples' Incandescent Light Company on Oct. 1 were merged into and with the Northwestern Electric Service Company of Pennsylvania. All operation of these properties will be conducted hereafter under the corporate name of the Northwestern Electric Service Company of Pennsylvania. Under the merger terms the new company acquires all the properties and assets and assumes all the liabilities of the above companies.

Arguments Heard on Indiana Consolidation

The Indiana State Supreme Court heard oral arguments on the validity of the consolidation of seven Indiana light and traction companies into the Indiana Electric Corporation, which was authorized by the Indiana Public Service Commission last January, and later declared by Judge Linn D. Hay of Indianapolis to be unlawful. In summarizing before the court the opposition of the cities of Indianapolis and Kokomo to the formation of the new company, attorneys declared the Public Service Commission had no power or authority under the law to authorize the merger and that the order therefore was void. Attorneys speaking for the corporation said the utilities law of the state permits any corporation to buy another corporation, regardless of whether the companies planning to merge provide similar service. The companies united by order of the commission are the Merchants Heat & Light Company, Indianapolis; the Elkhart Gas & Fuel Company, Elkhart; Valparaiso Lighting Company, Valparaiso; Indiana Railways & Light Company, Kokomo; the Putnam Electric Company, Greencastle; the Cayuga Electric Company, Cayuga, and the Wabash Valley Electric Company, of Clinton.

Submits Twelfth Annual Report

Gross earnings of the operating companies of the Kentucky Securities Corporation, Philadelphia, Pa., for the year ended June 30, 1922, were $1,549,241. The net surplus available for depreciation, corporation expenses and dividends was $338,012. For the fiscal year ended June 30, 1922, $163,447 was required for the corporation operating expenses and the 6 per cent dividend on the $2,271,598 preferred stock outstanding, leaving a balance of $174,565, or the equivalent of $8.50 per share on the common stock.

In the annual report of the directors to the stockholders President P. M. Chandler said that the directors had declared an initial dividend of 1 per cent on the common stock out of earned surplus payable Oct. 2. The regular quarterly dividend on the preferred stock of 1½ per cent was also declared. He stated a large amount of the preferred dividend scrip had been purchased and cancelled and funds had been set aside for the payment of the remainder, upon presentation on or after Oct. 2, 1922.

Increase in Net Earnings Reported

The seventh annual report of the board of directors of the Barcelona Traction, Light & Power Company, Barcelona, Spain, for the year ended Dec. 31, 1921, was recently submitted to the shareholders. It states that trade depression seriously affected business in Barcelona, but that toward the end of the summer there was a marked renewal of activity. The operating results of the tramways company showed an increase in gross earnings of nearly 18.64 per cent over those of the previous year, but owing to a large increase in operating costs, the increase in net earnings was only about 13.35 per cent. Considerable work was done during the year on the railway including the relaying of track and extending the workshops and their equipment.

Gives Permission to West Penn Subsidiary to Acquire Electric Plant

In the race between the West Penn Company and the Penn Public Service Company, electric corporations of Pennsylvania, for control of the strategic position occupied by Oakland and Garrett County, the West Penn Company appears to have won. The West Penn Company now has control of the electric system formerly known as the Hagerstown & Frederick Railway and its subsidiaries.

The Public Service Commission filed its opinion and orders in the case, giving the West Penn Company, through its subsidiary, the West Maryland Company, all that had been asked. That was permission to acquire the municipal electric plant at Oakland, permitting the West Maryland Company to exercise all the rights, privileges and franchises granted it by the Mayor and Town Council of Oakland and authorizing it to execute a mortgage upon the property it already has arranged to acquire.

Although only $40,000 was involved in the sale of the property, the case was followed with greater interest than any other which the commission has been called upon to consider for some time.

Improved Condition Reported

The Nova Scotia Tramways & Power Company, operating the street railway system in Halifax, has reduced operating expenses so that the railway is now being operated at a substantial profit. A contrast is afforded in the figures submitted for the month of August in 1921 and 1922.

In August, 1922, the gross earnings were $100,143; operating expenses were $70,745. After bond interest and amortization charges were paid, the surplus for the month was $7,309. For August, 1921, there was a deficit of $2,590.

The improvement in earnings is attributed largely to the installation of Birney safety cars. The use of these cars has cut down the number of trainmen needed and their operation is said to have resulted in fewer accidents being recorded.

The Nova Scotia Tramways & Power Company was taken over by Stone & Webster, Boston, two years ago.

J. G. White Takes Control.—A group composed of Marshall Field, Glore, Ward & Company, Spencer Trask & Company, Estabrook & Company, Raymond M. Smith & Company and associates, and interests connected with the J. G. White Management Corporation have acquired control of the Richmond Light & Railroad Company, New York, N. Y. It is the intention of this group to make every effort to effect a sound plan of reorganization and to give the best possible service to Staten Island. As plans for doing this are developed, the public will be informed with regard to them.

Security Holders Accept I. R. T. Reorganization Plan

Holding Company Wiped Out, Five-Cent Fare Guaranteed, Elevated Lease Modified and Public Representation on Board of Directors Provided in the Plan Presented to New York Commission for Approval

THE New York Transit Commission on Oct. 8 made public a communication from the Interborough-Metropolitan bondholders committee asking the commission's formal approval of plans that mean practically the reorganization of the Interborough Rapid Transit Company. The commission has set Oct. 17 as the time for the statutory hearing on the application.

The plans for the reorganization of the Interborough Company are the result of pressure to that end exerted by the Transit Commission from almost the first month of its existence. In its effort it has had at all times the able and effective support of Federal Judge Mayer.

In the course of conferences held with the representatives of the Interborough Company, the Manhattan Company, the Interborough Consolidated Holding Company and the various groups of security holders held last spring, the commission, without committing itself in the matter of final judgment, laid down certain fundamental conditions that it would, in any event, require to be met. Those were:

1. That it should not contemplate any increaes of fare beyond 5 cents; or any reduction of the joint service for a 5-cent fare now given upon Interborough and Manhattan lines.
2. That it should provide funds for new cars, additional power service and other equipment necessary to meet the present and future service orders of the commission. It is estimated that the cost of such new equipment will be in the neighborhood of $15,000,000.
3. That is should do away wholly with the Interborough Consolidated Holding Company—the successor of the Interborough-Metropolitan—with its $114,000,000 of securities.
4. That it should limit the possible future dividends of the Interborough to 7 per cent, to be payable only when earned. This would prevent the declaration and payment at any future time of excessive dividends which, during the war period, went as high as 20 per cent.
5. That no dividends whatever should be paid upon Interborough stock during the next five years, all revenue, within the proposed limitation, to be devoted exclusively to service.
6. That it should eliminate the fixed 7 per cent return on Manhattan stock paid by the Interborough by way of rental for its elevated properties, amounting to $4,200,000 a year; and that the rental paid the Manhattan be reduced to a reasonable rate, payable also only in years in which it is earned. The fixing of this rate at 3 per cent for the first year means a reduction of the amount of rental to be paid to $1,800,000, and a gain of $2,400,000, from this source alone, for additional service.
7. That it should provide for public representation in the new board of directors; and finally
8. That it should be treated as a preliminary step in the carrying out of the commission's broader plan for the municipal ownership and unification of all the useful transit properties in the city.

The commission also made public a letter signed by Grayson Murphy as chairman of the Interborough-Metropolitan bondholders committee, but written on behalf of all the parties to the settlement. That letter reports the result of the canvas of security holders which has proceeded throughout the summer, and indicates that the companies are prepared to meet all of these conditions.

In concluding its statement the commission said:

> Thus, through the joint efforts of the Transit Commissioners and Judge Mayer, the security holders have already virtually agreed to changes of corporate structure and policy that should do away with even the possibility of a repetition of the financial abuses that in past years have aroused the just resentment and criticism of the public.
>
> The commission at this time can make no comment concerning its official attitude toward the reorganization plan as a whole. All of its phases will require examination. Prompt attention, however, will be given the application, and the decision will not be delayed.

The communication of Mr. Murphy to the commission is very largely a reiteration of the statement of the commission with respect to what is hoped to be accomphlished. He does, however, stress the fact that provision is made for the public authorities to have a voice in the management of the properties through representation on the board of directors or otherwise. Mr. Murphy reiterates the fact that the plan preserves the 5-cent fare and will make it possible for the Interborough subway and elevated lines to be operated efficiently at that rate of fare and kept together as one system. He explains that this has been accomplished through the reduction of the Manhattan rental, which, in respect of all stock subject to the plan, becomes payable only out of earnings and the suspension for a five-year period of the sinking fund requirements of the Interborough Company's first and refunding mortgage.

The Interborough Consolidated Corporation—the holding company—will cease to hold any stock in the Interborough Rapid Transit Company and will go out of existence.

As a result of the elimination of the Interborough Consolidated Corporation the following securities disappear:

Interborough - Metropolitan 4½ per cent bonds......	$63,808,000
Interborough Consolidated Corporation preferred stock	45,740,500
Interborough Consolidated Corporation common stock without par value stated at $5 per share...	4,663,134
Total	$114,211,634

In place of these securities there will remain only the original $35,000,000 of Interborough Rapid Transit Company stock, which will be held by the stockholders, instead of by a holding company.

As regards other phases of the matter, Mr. Murphy says:

> No dividends can be paid upon the Interborough Rapid Transit Company stock for five years and in no year can the dividend exceed 7 per cent. Thus provision is made against Interborough stock being a speculative security and against the payment of excessive and improvident dividends. Any earnings in excess of 7 per cent upon the Interborough Rapid Transit Company's stock must remain as a reserve against lean years or for use for additions and betterments, or to retire capital securities, thereby reducing the fixed charges resting upon the enterprise.
>
> ### FIXED CHARGE ELIMINATED
>
> The Manhattan stock dividend rental is eliminated as a fixed charge as to all Manhattan stock subject to the plan, as it becomes payable only out of earnings. The obligation to pay dividends upon Manhattan stock in excess of 3 per cent for the first year, 4 per cent for the second year and 5 per cent for succeeding years (but never in excess of 7 per cent) will arise only in case of the payment of dividends upon the Interborough Rapid Transit Company's stock.
>
> Additional capital for the new equipment and the improvements and additions deemed by the commission necessary to provide the public with adequate service is secured through the sale of $10,500,000 of ten-year 6 per cent notes (which it is hoped ultimately to retire by the use of first and refunding mortgage 5 per cent bonds), and also by such a reduction in fixed charges as to justify the expectation that substantial surplus earnings will be available for capital purposes.
>
> The committees which formulated the plan, and the company, being heartily in accord with the principle that the public authorities should be represented in the management of the enterprise, have made provision for certain of the directors of the Interborough Rapid Transit Company to be chosen by your commission and by the City of New York if they elect to avail themselves of the opportunity. Unfortunately there is no present legal authority for such election and we ask your co-operation in an effort to secure the necessary legislative authority. In the meantime a voting trust agreement embracing all the stock of the Interborough Rapid Transit Company subject to the plan will contain effective provision whereby your commission and the city may nominate three directors. This voting trust agreement is submitted herewith for your consideration especially with respect to those provisions which deal with the election of directors to represent your commission and the city.
>
> ### HOLDERS SAVED FROM HEAVY LOSSES
>
> The consummation of the plan, avoiding as it does a receivership and the disintegration of the system, which would otherwise be inevitable, saves the security holders from very heavy losses. This is especially true in respect of the Interborough-Metropolitan 4½ per cent bonds, of which there are about 6,300 holders, of which nearly half are women, estates, trustees, savings banks, trust companies, insurance companies and educational and charitable institutions. The holders of these bonds have received no benefits from the dividends in excess of 9 per cent upon Interborough Rapid Transit Company stock paid during the years of liberal earnings, inasmuch as the return upon the bonds was limited to 4½ per cent. Yet as soon as earnings declined, default in the payment of interest upon these bonds was made.
>
> This default has continued for more than three years, thus imposing great hardship upon the bondholders. For a time it seemed impossible to save anything out of the wreck for these bondholders, but the present plan, providing, as it does, for the distribution of the stock of the Interborough Rapid Transit Company among the bondholders, affords them substantial ground for hoping that if conditions improve they will receive a reasonable return upon the investment represented by their stock—a return limited to 7 per cent upon the stock, which is only 3½ per cent upon the surrendered bonds. The 4,400 holders of Manhattan stock, the 18,000 holders of Interborough 5 per cent bonds and the 7,000 holders of Interborough 7 per

cent notes, while not in so precarious a position as the holders of Interborough-Metropolitan 4½ per cent bonds, are saved the delay, confusion and expense and probable interruption of income which would have resulted from an Interborough-Manhattan receivership.

Provision is made for paying off 10 per cent of the $38,144,000 of Interborough Rapid Transit Company notes (most of them bearing 8 per cent interest) and converting the balance into ten-year notes with interest reduced to 7 per cent. It is confidently expected that the conversion privilege offered to holders of the extended notes will result in their conversion before maturity into 5 per cent first and refunding mortgage bonds maturing in 1966.

ADVANTAGE TO THE PUBLIC

No one can doubt the great advantage to the city and to the public in avoiding the disintegration of the Interborough-Manhattan system and in insuring the continued operation of the subway and elevated lines as a single system with a 5-cent fare.

Finally, we submit that the present plan may fairly be regarded as an important step in the direction of carrying out the commission's comprehensive plan embracing all the traction properties of Greater New York.

The saving of the Interborough-Manhattan system from receivership and dissolution will make possible a much earlier consideration of the commission's plant than would otherwise be possible. If the receivership, which for a time seemed inevitable had come there would have been a disintegration of the system, the mortgage securing the Interborough Rapid Transit Company bonds would have been foreclosed and the Manhattan Company would doubtless have resumed possession of the elevated lines. All the lines would probably have been operated by receivers for a considerable period with greatly increased expense. It would probably have taken at least two or three years to settle by litigation the complex controversies between the holders of the various classes of securities which a receivership would have precipitated and the settlement of which would have necessarily preceded action by the security holders upon the Transit Commission's plan.

James F. Sheffield, special master, sold 339,128 shares of capital stock of the Interborough Rapid Transit Company at public auction on Oct. 11. The stock was held as collateral by the Empire Trust Company as successor trustee of the Windsor Trust Company under a trust agreement made in 1906 with the Interborough-Metropolitan Company, which was succeeded by the present Interborough Consolidated Corporation. The sale was in accordance with a decree of foreclosure signed by Judge Julius M. Mayer of the Federal Court.

Capt. D. Raymond Noyes, representing Grayson-M. P. Murphy, Frank L. Polk, and Guy E. Tripp, voting trustees under the reorganization plan, was the only bidder. His offer was $1,750,000. It was accepted by Mr. Sheffield, who under the terms of the foreclosure decree has two days within which to report the result of the sale to Judge Mayer.

New Issue in Prospect

President R. S. Hecht of the New Orleans Public Service Corporation, who returned from New York on Oct. 7, where he went to look after the matters connected with the issuance of $12,000,000 of bonds of the new corporation, is of the opinion that the new issue will be in readiness for the market within a week. A meeting of the board has been called for the purpose of approving the issue. It is understood that the new 4½ per cent bonds may not yield 6 per cent, as agreed, and may cost the company less than 6.70 per cent. That the new bonds, at first, will not sell at par is admitted in local financial circles, though their attractiveness as an investment will grow stronger even at a low rate of interest, as the earnings of the new company increase through rehabilitation of the property and its more economical operation and maintenance.

Financial News Notes

Receiver Appointed. — S. H. Eagle, banker, has been appointed receiver for The Gallipolis & Northern Traction Company, Gallipolis, Ohio.

Authorizes Issue. — The Topeka (Kan.) Railway has been authorized by the State Public Utilities Commission to issue $66,793 in car trust notes which will be used for the purchase of ten new one-man Birney cars.

Increases Surplus. — The Brooklyn (N. Y.) Rapid Transit Company reports a surplus of $269,067 for August operation and a surplus of $604,012 for the two months ended Aug. 31, 1922. For the same two months' period of 1921 the surplus after charges amounted to $487,284.

Will Purchase Bonds.—The Market Street Railway, San Francisco, Calif., has sent a notice to holders of the first consolidated mortgage 5 per cent gold bonds that it will purchase for the sinking fund an amount of bonds sufficient to absorb $160,000. Sealed bids were asked to be presented on or before Oct. 10.

Gold Bonds for Sale—Halsey, Stuart & Company, First Wisconsin Company and Blodget & Company are offering $5,495,000 of the Wisconsin Public Service Corporation first lien and refunding mortgage 6 per cent gold bonds Series "A." The price is 99½ and interest to yield about 6.05 per cent. This issuance has been authorized by the Wisconsin Railroad Commission.

New Company Formed.—The Cumberland Traction Company has been formed with $100,000 capital to take over the operation of the trolley lines between Bridgeton and Millville, N. J. Clayton McPherson, who has been operating the line recently, is president, with General Manager William L. Martin, vice-president; Gus C. Westcott, secretary, and George Maier, treasurer.

Earnings Increase.—The Alabama Traction, Light & Power Company, New York, N. Y., reports an increase of $90,748 in gross earnings for August, 1922, against August, 1921, and an increase of $500,646 for the twelve months ending Aug. 31, 1922, over the same period in 1921. Net earnings for the twelve months ended August of this year amounted to $2,600,185, an increase of $317,200 over the same period in 1921.

Gold Certificates Offered.—Halsey, Stuart & Company, New York, N. Y., are offering $1,725,000 of the Northwestern Elevated Railroad, South Side Elevated Railroad and the Metropolitan West Side Elevated Railway 6 per cent equipment trust gold certificates, Series C-1 Trust of Sept. 1, 1922. The price ranges from 100 and dividends to 100.48 and dividends. The certificates will be dated Sept. 1, 1922. The issuance has been authorized by the Illinois Commerce Commission.

Company Incorporated.—Lima City Street Railway has been incorporated with $750,000 authorized capital. The incorporators are D. J. Cable, C. M. Cable, John L. Cable, Catherine Werline and F. A. Bundy. D. J. Cable says that the incorporators named are not the actual interests back of the plan to buy the local Ohio Electric lines and to secure a new franchise.

Mortgage Debentures Offered. — Greenshields & Company, Montreal and Greenshields, Wills & Company, New York, are offering $500,000 of the Montreal (Que.) Tramways 5 per cent perpetual mortgage debentures. The market price will yield about 6.25 per cent. Sufficient revenue to pay interest on these debentures is assured to the company by a contract between the City of Montreal and the company ratified by the legislature.

Gold Debenture Bonds Offered.—Bonbright & Compan,y Inc., and the Electric Bond & Share Company are offering $7,500,000 of the American Gas & Electric Company's 6 per cent gold debenture bonds. The bonds dated May 1, 1914, and due May 1, 2014, are offered at 100 and accrued interest to yield about 6 per cent. The proceeds from the sale will be used to reimburse the company for the cost of properties recently acquired and for other corporate purposes.

Gold Bonds Offered.—Stone & Webster, Inc., are offering $1,250,000 in first mortgage sinking fund 5 per cent gold bonds of the Norfolk & Portsmouth Traction Company assumed by the Virginia Railway & Power Company. The bonds are dated May 10, 1906, and are due June 1, 1936. The price is 93 and interest to yield about 5⅜ per cent. The Virginia Railway & Power Company assumed the bonds of the Norfolk & Portsmouth Traction Company when the two properties were merged in 1911.

Net Income of $1,315,135.—According to the report of the Philadelphia (Pa.) Rapid Transit Company a net income of $1,315,135 was realized for the eight months ended Aug. 31, 1922. This figure compares with $936,583 for the eight months ended Aug. 31, 1921. The passenger revenue for January-August period of this year amounted to $27,249,098, against $27,555,073 for the same period a year ago. The total number of passengers carried in the eight months period of this year was 554,621,826, an increase of 1,152,000 over the traffic from January-August, 1921.

Traffic and Transportation

Commission Orders Increase and Decrease

In Utica Rates Are Raised from Six Cents to Seven Cents, While in Syracuse the Rates Are Ordered Lowered from Eight Cents to Seven Cents

DECISIONS have recently been handed down by the Public Service Commission of New York affecting the rates of fare charged by the New York State Railways in Utica and Syracuse. The actions were separate and distinct. In Utica the rate of fare has been 6 cents, while in Syracuse the rate has been 8 cents, with four tickets for 29 cents. Under the new ruling the commission, pending the finding of a valuation for the Utica property, has decided that a 7-cent fare shall be charged in that city, this rate being deemed necessary to preserve the property under the rate base found in the decision of Sept. 15, 1921. In the Syracuse case a reduction has been ordered in the cash fare from 8 cents to 7 cents, with no mention made of any change in the ticket rate. These cases have been referred to previously.

On Sept. 15, 1921, the commission made an order dismissing the application of the New York State Railways to increase passenger fares in Utica and vicinity. The company sought a review of the commission's decision and, as a result, the Supreme Court, Appellate Division, remanded the case to the commission for further consideration. Particular emphasis was placed by the court upon what it believed to be the commission's omission in not giving due attention to the estimates of overhead.

Shortly after the decision of the Appellate Division, the company filed with the commission a petition for permission to increase passenger fares in Utica to 7 cents, and to file a schedule on short notice. A hearing was held on Aug. 16, 1922, which is to be regarded as a hearing in reconsideration of the case as remanded to the commission, but with particular reference to the establishment on short notice of the 7-cent fare in the Utica zone.

Figures submitted by the company for the ten months from Sept. 1, 1921, to June 30, 1922, indicated that there had been a deficit for the ten months' period of $158,760.91 under the amount to which the company believed itself entitled on the basis of an 8 per cent return upon the rate base established by this commission in its opinion of Sept. 15, 1921, namely, $2,864,000.

The city of Utica submitted a brief setting forth its views upon the points at issue in the application for a 7-cent fare. The company submitted no brief, resting its case upon the computations set forth in its statement of earnings. The city made the following claims:

1. That the item general amortization should be excluded from the company's statement of expenses;
2. That wage reductions effective June 15, 1922, will reduce operating expenses;
3. That complete one-man car operation will reduce expenses;
4. That increased speed of operating the cars will reduce expenses;
5. That the cost of repairs to equipment and of power due to poor condition of track is abnormal;
6. That operating expenses are heavier the first six months than during the whole year and consequently that this period is not a fair index of an entire year's operation;
7. That taxes attributed to territory outside of the Utica 6-cent fare zone should be deducted.

The city's claims concerning items one and two, the commission believed to be well sustained. In respect to No. 1, that the item, general amortization, should be excluded from the company's statement of expenses, the commission said there should be no dispute. This item had been disallowed in other rate proceedings affecting the company. It was disallowed by the commission in its opinion of Sept. 15, 1921, on the ground that general amortization for depreciation that occurred prior to 1908 should not be charged to operating expense account, as this burden does not properly fall on car riders of 1921. The amount to be deducted on this account will be $17,050.

In respect to item No. 2, that wage reductions effective June 15, 1922, will reduce operating expenses, the commission was satisfied that a reduction, amounting to $14,250 would be effected, and due consideration was given to it.

In respect to the other items before mentioned, namely, Nos. 3, 4, 5, 6 and 7, the commission did not believe the city's contentions had been sustained.

In respect to the rate base, the commission said that it had already been noted that the company in support of its application for an increase of fare to 7 cents based its calculations of deficiency in revenue on the sum of $2,864,000, this being the rate base fixed by the commission in its decision of Sept. 15, 1921. The city contended that this rate base was excessive, on the ground that there was allowed to the company in arriving at the rate base the sum of $434,000, which represented a capitalized deficiency, in earning an amount necessary to represent the accrued depreciation figured upon this property, namely: $1,335,721. The city based its demand for the elimination of this capitalized sum of $434,000 upon the decision of the Supreme Court of the United States in the case of the Galveston Electric Company vs. the City of Galveston, decided April 19, 1922. On this point the commission said in part:

> It is open to very serious question whether the decision in the Galveston case applies to this particular instance. If the contention of the city is accepted it means that the rate base would have to be reduced $434,000. The commission should not undertake to do such a thing in the face of the judgment of the Appellate Division until the entire rate base has been reconsidered. We are unable to accept the city's view on this point, and for the purposes of this application will let the rate base stand as fixed in the decision of Sept. 15, 1921.

The commission also rejected the plea of the city not to allow a rate of return in excess of 6 per cent, holding that the 8 per cent used in the commission's decision of Sept. 15, 1921, should be allowed.

The following table sets forth the basis upon which the commission decided a rate of fare should be computed:

RESULTS OF OPERATIONS, SEPT. 1, 1921-JUNE 30, 1922

	Sept., 1921-June, 1922 (10 Months)
PER EXHIBIT NO. 87	
Operating revenue	$927,834
Operating expenses:	
Maintenance	$173,227
Power	118,732
Transportation	389,648
General (including traffic)	102,005
Depreciation	61,966
Total	$845,578
Taxes	52,596
Total expenses and taxes	$898,174
Operating incomes (excess of revenue-return)	$29,660
ADJUSTMENTS AND RATIOS	
Add:	
General amortization erroneously included in expenses	$17,050
Wage reductions June 15, 1922, to be deducted	14,250
Revised operating income	$60,960
8% on investment $2,864,000	190,933
Deficiency	129,973
Per passenger[1]	.0086

[1] Computed on basis of 1,500,000 per month.

In conclusion the commission said:

> There is shown a deficiency of 0.86 of a cent per passenger on a rate base which the commission is called upon to reconsider on the ground, as stated by the court, that "The incomplete method of valuation has necessarily reduced the total valuation of the relator's property so substantially as to make it uncertain whether an adequate return on such property has been allowed." It would, therefore, appear that pending a determination of this case, which involves the finding of the valuation of the company's property, there should be an increase of rate, sufficient upon the rate base found in the decision of Sept. 15, 1921, to preserve the property of the company. Such increase requires a 7-cent fare, which should be the rate to be charged and collected until the final determination of this case.

In its review of the Syracuse case the commission explains that the rate of fare on street surface railroads in cities of the State was fixed by the legislature at 5 cents and this statutory rate prevailed in the city of Syracuse until the former commission in November, 1918, permitted and authorized an increase of fare to 6 cents. There was no valuation of property in that case, and the relief given the company was a matter of emergency, and stated by the commission to be warranted on the basis of its funded debt. The 6-cent fare prevailed until the former commission upon the petition of New York State Railways authorized and permitted a fare of 8 cents, and half fare to children, and provided for the issuance of four tickets or tokens for 29 cents. This order became effective April 27, 1921, and the rate fixed by it is the one against which the complaint is filed. In conclusion the commission said:

> The company is entitled to a reasonable average return upon the value of the property actually used in the public service. We conclude that 8.0 per cent is a reasonable average return to the company upon the value of its Syracuse lines. In determining the return there are several elements which must be considered—cost of money, a regard for surplus and contingencies, the use of the reserve by the company which will be created by the allowance of charges to operating expenses for replacements and renewals, extension of paving assessments over a period of ten years at 5 per cent interest, the allowance of Federal income tax as an operating expense; and the further economies which may be effected in the management of this company. The commission prefers to encourage good management rather than to penalize imprudent management.
>
> The determination of this question, as we have stated, depends upon the amount applicable for return after deducting from revenue expense and taxes as outlined in the early part of this opinion.
>
> Using the valuation of the property which we have allowed, we make a computation as follows:

Total operating revenues at 8-cent fare		$2,428,489
Deductions:		
Revised operating expenses	$1,512,752	
Taxes	141,855	1,654,337
Income available for return		$774,152

> This is a return of 8.54 per cent on $9,038,050 valuation which we have allowed on this property. This exceeds a fair return and the 8-cent fare complained of is therefore unreasonable and unjust. The duty is therefore upon us under the requirements of the statute to determine the fair and just rate to be observed as the maximum to be charged fcr service to be performed by this company.

Using the rate base reached of $9,038,050 and allowing a return of 8 per cent	$723,044
Revised operating expenses	1,512,752
Taxes	141,585
Total	$2,377,381
Deduct revenue from other operations	67,539
Leaves a balance of revenue required to meet cost of service	$2,309,842

> When the 6-cent fare went into effect in November, 1918, there was a falling off in passengers during the following year of a trifle less than 10 per cent. In the year ending March 31, 1920, there was a material increase and in the year ending March 31, 1921 (the 6-cent fare continuing) the largest number of passengers in the history of the company were carried. In April, 1921, the 8-cent fare went into effect and the traffic fell off in the year ending March 31, 1922, about 20 per cent. For the year ending July 31, 1922, there was a general decrease of passengers of nearly 200,000. The general industrial depression commenced in Syracuse in September, 1920, and continued to March, 1922, before relief therefrom was apparent. This undoubtedly had a considerable effect upon passenger traffic. As a further cause of reduction in traffic the company assigns the increased use of automobiles.
>
> The increase of fare and these other causes undoubtedly combined to decrease passenger traffic. The automobile will continue without question to affect it to a considerable extent, particularly during summer months. With a restoration of business, with a reduction in rate, we have estimated that the number of full fare passengers for the coming year will be at least 33,199,000. Dividing the cost of service, $2,309,842, by this number of passengers gives an average rate of fare of 6.96 cents, or substantially 7 cents.
>
> It is the duty of the commission, therefore, to establish a 7-cent cash fare, effective for a period of six months commencing Oct. 1 next and until the further order of the commission.

In the original fare case the company presented four sets of valuation figures varying from $9,101,187 to $15,795,415, the latter based on prices then prevailing. The city contended for a valuation of $7,140,931 for the Syracuse lines.

Propose to Fight New Passenger Rates

Dissatisfied with the through interurban passenger rates as increased by the California State Railroad Commission on the Pacific Electric Railway lines on Jan. 1, 1922, the cities of Pasadena, South Pasadena, Glendale and Alhambra through these cities' attorneys have filed a petition for a writ of review with the State Supreme Court on the ground that the ruling of the State Railroad Commission is unconstitutional. The rates were the result of several drawn-out hearings held since the year 1918 before the State Railroad Commission and vigorously fought by the attorneys, associations and committees from fifty-seven different small towns and cities served by the company's interurban lines.

The decision invokes the constitutional provision that "a through rate shall not be greater than the sum of the intermediate rate," and asks that the high court set aside the ruling of the commission on through fares.

Detailed items of the alleged violation of rate-making principles are set forth in the petition. It is alleged that while the through rate from Los Angeles to Pasadena was fixed by the commission at 29 cents, a passenger may ride to Sierra Vista station for 10 cents and then from Sierra Vista to Pasadena for the same amount, making a total through rate of only 20 cents if the passenger makes the Sierra Vista stop.

The through fare to South Pasadena from Los Angeles, the petition sets forth, was fixed by the commission at 24 cents, but a passenger may ride to Sierra Vista for 10 cents and then to South Pasadena for 6 cents, cutting the through straight fare by 8 cents. Other similar situations exist on the Garvanza Line, and the lines to Glendale and Alhambra.

The city attorneys hope that a speedy decision will be had on the writ. When the commission formerly announced its decision in this matter the cities involved in the present action petitioned for a rehearing, after which, in September, the commission reaffirmed its earlier ruling.

Providence Will Have Lower Fares

The United Electric Railways, Providence, R. I., recently announced a fare reduction to become effective on Jan. 1, 1923. Fares which have been 6 cents will be lowered to 5 cents through the purchase of ten tickets for 50 cents. The tickets will be good in any 6-cent fare zone. Ticket holders will be permitted to purchase transfers for 2 cents as under the present system of cash fares. The cash fare will remain at 6 cents. The company's statement says that operating costs do not warrant a fare reduction, but that it is expected sufficient revenue will be raised through the collection of the 5-cent fares for regular riders and 6-cent fares from occasional riders.

Transportation News Notes

Bus Operation Up to Commissioners.—The question of granting a permit to the Pennsylvania & New Jersey Railway to operate buses between Bristol and Doylestown, Pa., and tear up its tracks will be submitted to the entire Board of Public Service Commissioners at Harrisburg. Commissioner James Benn conducted a preliminary hearing in Philadelphia. Protests were filed by the various municipalities through which the company now operates. They wished to know whether the company would put the road in good condition if the trolley tracks were abandoned.

Trackless Project Before Council.—James F. Hamilton, president of the New York State Railways, has applied to the Common Council of Rochester for permission to operate trackless trolleys or buses through certain streets of the city of Rochester. In his application President Hamilton said that trackless trolleys were feasible and could be installed within a short time. He mentioned the fact that the trolleys could be operated over Driving Park Avenue bridge, which would be a great convenience for those citizens who have to use a circuitous route by electric railway or by foot.

Through Cars Will Be Run.—By an agreement between officials of the Springfield (Mass.) Street Railway and the Holyoke Street Railway, through cars are to be run, beginning Oct. 12, between Holyoke and Westfield, Mass., avoiding changes and waits at the intercity line. In order to effect this change, brought about by an agitation of patrons, it is necessary for the Holyoke Street Railway to make an exception of its established policy which has barred the use of one-man cars on its lines. As one-man cars are run on the Westfield end, the Holyoke company will rig up a sufficient number of one-man cars so that the cars may be run through on this route.

Seeks to Increase "Owl" Fare.—Permission to increase the fare for riding on "owl" cars from 5 to 10 cents has been asked in a petition filed with the Indiana Public Service Commission by the Indianapolis Street Railway. The petition declared the owl service is being provided at a loss of approximately $15,000 a year under the present fare. Owl cars are operated between 12:30 and 5 o'clock in the morning for the convenience of persons working at night and arriving in the city on late trains. Approximately 350 000 passengers are carried by them annually. The proposed increase would meet the deficit of $15,000 incurred in operating the service. The Corporation Counsel of Indianapolis has given notice that the city administration will not oppose the proposed increase.

New Publications

Two Important Books on Heavy Traction

Railway Electric Traction. By F. W. Carter, technical engineer British Thomson-Houston Company, Rugby, England. Longmans, Green & Co. New York, N. Y. 412 pages. Extensively illustrated.

La Traction Électrique aux États-Unis. By Marcel Japiot and A. Ferrand. Reprinted from the *Annales des Mines*, issues from October, 1920, to March, 1921. Published by Durod, Paris.

Mr. Carter's book meets a need for an up-to-date and comprehensive treatise on heavy electric traction. It is by no means a compilation, although replete with data, for it is written out of a wealth of experience and analysis. In spots mathematics is used freely, principally in connection with mechanics, but this permits a great deal to be given in a small space. The formulas can be skipped by those who are more interested in the author's opinions and data than in his mathematical deductions. One refreshing feature of the text throughout is the frank and yet appreciative comment on practices and sources of information.

Mr. Carter is outspoken in favor of direct current for heavy traction. He believes that results have justified his early predictions as to the outcome of the struggle between it and single phase. At the same time he gives some attention to the latter, although without enthusiasm. Regarding frequency and the European comment that 25 cycles as used in America is too high, he states that the lower frequency is better and zero frequency best of all.

"Railway Electric Traction" covers all of the technical phases of the subject, locomotives, motors, control, distribution, power supply, etc. Two excellent chapters are given to the mechanics of train operation. A feature that will prove of great reference value is a table of data for thirty-two locomotives, United States and foreign, with pictures to permit the data to be visualized. The "unattended" substation, as the author terms what is called the "automatic" substation in America, also comes in for a reasonable share of attention.

In conclusion it is only fair to allow the author to say a word for himself regarding his book. Here is, in part, what he says:

"In writing this book the author set himself a twofold task: firstly, to discuss the methods of electric traction, as applied to railways; secondly, to expound methods of technical calculation applicable to the subject. In pursuance of the first objective he propounded to himself, and endeavored to answer the questions: What constitutes good practice, and why?"

The book on Electric Traction in the United States, by Messrs. Japiot and Ferrand, in French, is of great interest on account of the careful manner in which these and other French engineers have of recent years studied the heavy traction development in this country. Mr. Japiot is an engineer of high position with the Paris-Lyons-Mediterranean Railway, while Mr. Ferrand is also an engineer of high standing in this field. They visited the United States in 1919 as part of the committee sent here to study the electrification of railroads, and in this book give the results of their study. They made liberal use of the files of the *Electric Railway Journal* in this connection, giving credit in numerous footnotes scattered throughout the book.

It is unnecessary to go into details of the contents of "Le Traction Electrique" as most of the material is familiar to close readers of this paper. However, it gives the information in convenient form and furnishes what is always interesting, a picture of ourselves as others see us.

The Mechanism of Lubrication

By William Stone, late chief electrical engineer Victorian Government Railways. Published by "Industrial Australian and Mining Standard," Melbourne, Sydney, London. 1922.

In a thirty-six-page pamphlet the author gives the text of a lecture in which, with the aid of diagrams and working models, he explains the theory and practice of lubrication.

Experimental Production of Alloy Steels

By H. W. Gillett and E. L. Mack. Bulletin 199. Bureau of Mines, Government Printing Office, Washington, D. C.

Electric railway engineers who are interested in metallurgy will find much of interest in this publication. Among the alloying metals studied were uranium, manganese, molybdenum, chromium, vanadium, nickel, copper and zirconium.

Maintenance of Lead Storage Batteries

Die Krankheiten des Blei-Akkumulators. —F. E. Kretzschmar. Published by R. Oldenbourg, Munich and Berlin, 1922.

This is the second edition of a convenient reference manual on the operation of lead storage batteries. It is highly practical in character and to railway power men familiar with the German language would be useful if they have any lead batteries within their jurisduction.

Year Book of A.S.T.M.

Year Book of American Society for Testing Materials. Published by the Society, 1315 Spruce Street, Philadelphia, Pa.

This year book, revised to August, 1922, contains the membership directory comprising 3,069 names, the constitution of the society, lists of committee members, regulations governing various activities, information regarding the American Engineering Standards Committee and a list of standards of the A. S. T. M.

Statistical Abstract of the United States

Issued by the Department of Commerce. Obtainable at a nominal price from any district or co-operative office of the Bureau of Foreign and Domestic Commerce, or from the Superintendent of Documents, Government Printing Office, Washington, D. C.

This is a 962-page compilation of information, covering manufactures, imports and exports, wholesale prices of commodities, consumption of commodities, railroads, labor statistics, wages, strikes, industrial action, etc. The cost of compilation has been met by the Department of Commerce, so that the government is only charging the cost for paper, printing and binding in the price set on this volume.

Railroad Shop Practice

By Frank A. Stanley, Consulting Mechanical Engineer. McGraw-Hill Book Company, Inc., New York, N. Y. 331 pages. Well illustrated. Cloth. 6 x 9 in.

The material presented has been adapted largely from articles by the author which appeared in *American Machinist* and other technical journals. Much original matter, with some contributions from other authors, is included. Descriptions are given of tools, equipment and best methods used in steam railroad shops for machining and repairing various locomotives and car equipment parts. Chapters on wheel shop equipment and methods, portable tools and appliances, special tool cutters and toolroom methods, and reclamation work contain much information which will be of assistance to electric railway shop men.

Standard Handbook for Electrical Engineers

Fifth edition. Frank F. Fowle, editor-in-chief. McGraw-Hill Book Company, Inc., New York City. 2,137 pages. Illustrated.

The well-known "Standard Handbook" is gradually expanding in size, although the publishers are endeavoring, by constant revision, to provide for advances in the electrical field without unduly expanding the book. With this edition the total issue reaches 68,000 copies, indicating a widespread use.

The "Standard Handbook" has now been in use practically fifteen years. During this period its general publication policy has been consistently maintained, experts in the many fields of electrical engineering being enlisted to maintain the high character of the text. The present edition is a thorough revision, and a number of new sections have been added. The section on electric railways, by A. H. Armstrong and N. W. Storer, covers 150 pages and is considerably revised from the last edition.

The May, 1922, issue of the *South African Railways and Harbor Magazine* was an electrification number. It contains many articles on the subject of steam railroad electrification by noted authorities, who treat the subject from several points of view. Included is a summary of world progress in railway electrification.

Personal Mention

Three Efficient Leaders

F. E. Connors, Waldo G. Paine and J. F. Gannaway Will Continue to Direct Washington Companies

Certain changes have been made in the staff of the Spokane & Eastern Railway & Power Company and the Inland Empire Railroad, Spokane, Wash. They follow the death of the former president, George H. Taylor, and the resignation of other former officers. The personnel is now as follows: President, M. H. MacLean, Chicago; vice-president, J. W. Esmond, Chicago; vice-president and general manager, F. E. Connors, Spokane; vice-president, traffic manager and treasurer, Waldo G. Paine, Spokane; secretary and auditor, in charge of accounting, freight claims, car service, taxes and right-of-way matters, L. C. Ream, Spokane; assistant secretary and assistant treasurer, Chester Corey, Chicago; claim agent, F. Weidmer, Spokane; superintendent, J. F. Gannaway, Spokane; electrical superintendent, J. W. Hungate, Spokane; mechanical superintendent, A. H. Mayham, Spokane; chief engineer, A. J. Mitchell, Portland.

It is a noteworthy fact that the three men who have been largely responsible for the operation of the traction lines during and after the receivership have been chosen to continue as captains. A better crew would be unnecessary, even if it could be found, than that composed of Mr. Connors, Mr. Paine and Mr. Gannaway.

Mr. Connors, now fifty-three years old, took up his first railway work, when he was sixteen years old, with the Chicago & Alton Railroad. For five years he remained in the Chicago office. His next move was to the Santa Fé Railroad, at Topeka, Kan. Though he was a clerk in the stationary department when he started, he was assistant to the vice-president when he left in January, 1919. As assistant to the vice-president he had charge of purchases, stores, timber and coal properties of the company. Only one more change in railway association figures in the life of Mr. Connors. His resignation from the Santa Fé company on Jan. 9, 1919, was followed by his appointment next day as the receiver of the Spokane & Eastern Railway & Power Company and the Inland Empire Railroad. The surest measure of his success and the greatest tribute to it came in February, 1920, when he was elected vice-president and general manager of both companies.

J. F. GANNAWAY

Centering his attention in the Northwest, Mr. Paine has been intimately connected with the railway development there. He was associated with F. A. Blackwell and others in the building of the old Cœur d'Alene & Spokane Railway, which extended from Spokane, Wash., to Cœur d'Alene, Idaho. This property was afterward combined with the Jay P. Graves properties, which consisted of the Spokane Traction Company—city lines—and the Spokane Terminal Company. Of these lines Mr. Paine was made general passenger agent. Still later they were joined with the Inland Empire Railroad, which extended into the Palouse country, and Mr. Paine was made general freight and passenger agent. It is this growth which Mr. Paine has fostered. In 1910, when the Hill interests purchased the property, Mr. Paine was made vice-president and traffic manager. Recently he was instrumental in furthering the consolidation of the city lines of the Spokane & Eastern Railway & Power Company with those of the Washington Water Power Company. Mr. Paine was elected a director of the Spokane United Railways, which is the successor under the consolidation. He continues as vice-president and traffic manager of the interurban lines, the Spokane & Eastern Railway & Power Company and the Inland Empire Railroad.

Since 1918 Mr. Gannaway has been superintendent of these lines. His first position with the company was that of trainmaster, with headquarters at Spokane. This was in 1911. As superintendent of the interurban lines of the two companies which have been evolved, Mr. Gannaway has charge of 168 miles of road electrically operated. The companies handle both freight and passenger service under standard rules. His previous experience Mr. Gannaway gained with the Chicago, Burlington & Quincy Railroad in Iowa and Illinois as telegraph operator for three years; with the Missouri Pacific Railroad, as telegraph operator, and as train dispatcher at Atchison and Concordia, Kan. From 1909 to 1911 he was chief dispatcher for the Spokane, Portland & Seattle Railroad. In 1911 he became connected with the Spokane & Eastern Railway & Power Company and Inland Empire Railroad.

W. G. PAINE (LEFT) AND F. E. CONNORS

C. L. Cadle Nominated State Engineer

Charles L. Cadle of Rochester, N. Y., well-known in electric railway circles, has been nominated by the Republican party as state engineer and surveyor.

From 1904 to 1906 Mr. Cadle was associated with the Cleveland (Ohio) Railway. He then became manager of the Electric Railway Improvement Company of Cleveland and in 1917 went to the New York State Railways as electrical engineer. Two years later he was appointed chief engineer of the New York & Harlem Railroad. Meanwhile he continued his duties with the New York State Railways in Utica, Syracuse and Rochester. He was an officer of the American Electric Railway Engineering Association and president of Clark, Cadle, Harmon Corporation of Rochester. For two years he has been state superintendent of public works.

Mr. Cadle was born at Mentor, Ohio, March 10, 1879. Completing his academic education, he entered Case School of Applied Science at Cleveland, graduating from that institution in 1904 with the degree of B. S.

Changes in Bay State System

Resignation of Thomas Lees Ends Long Railway Career—M. E. McCormick Is Successor

If "Certain People of Importance" were to be written about the electric railway industry among the L's would be Thomas Lees, past-president of the New England Street Railway Club, and recently resigned manager of the Lowell Division of the Eastern Massachusetts Street Railway. By his achievements is Mr. Lees known even where personal acquaintance has been impossible. Since 1901 he has had the responsibility of making the Lowell Division of the Bay State System run smoothly, look trim, please the public and make money. For twenty-one years he has done all these things, and through the month of October he will remain in an advisory capacity to impart to the new manager, Maurice E. McCormick, formerly of the Salem Division, the peculiarities of the Lowell Division which he has studied for so many years. Mr. Lees in his resignation stated that he wanted more time for his other business matters.

THOMAS LEES

Thirty-four years ago Mr. Lees made an unostentatious entrance into the transportation industry as conductor and driver with the Lowell Horse Railroad. From 1890 to 1892 he was with the Boston & Maine Railroad, then returned to the Lowell & Suburban Railroad, the outgrowth of the merging of the Lowell & Dracut and the Lowell Street Railway Companies. The road had started to electrify its lines. Mr. Lees was in the shops of the company during the electrification.

From 1895 to 1897 he was starter at Lakeview Park, but in 1898 became starter in Lowell. In 1899 Mr. Lees was promoted to be assistant superintendent in Nashua, N. H., and was later made superintendent there.

In 1901 Mr. Lees was brought back to Lowell as local superintendent. He remained in that position until April, 1903, when the Boston & Northern Street Railway was divided into two districts. District 1 was in Lynn, and District 2 was in Lowell. Mr. Lees was appointed district superintendent of the Lowell district, which embraced the cities of Lowell, Lawrence, Haverhill, Woburn and Nashua. When the public trustees were appointed in 1919, Mr. Lees was reappointed to this post.

In 1912 he served as president of the New England Street Railway Club.

Mr. Lees was born in Catrine, Scotland, in 1858, and came to the United States in 1870.

Mr. McCormick, who is to be the new Lowell manager, entered the employ of the company in 1920, coming from Bangor. He was assigned to the management of the Quincy district and a year ago was promoted to be manager of the Salem Division. He has been engaged in street railway work since 1896, starting as an armature winder in the maintenance department of the Bangor (Me.) Street Railway. In 1917 he became manager of the New Brunswick Power Company, St. John, N. B., and remained there until becoming associated with the Eastern Massachusetts Street Railway.

M. E. McCORMICK

Mr. Nicholson an Auditor of Extended Experience

W. G. Nicholson, who was elected president of the American Electric Railway Accountants' Association at the Chicago convention, was first vice-president of the association last year. Mr. Nicholson has had extended experience in accounting matters on both steam and electric railways. He is secretary and auditor of the Omaha & Council Bluffs Street Railway. Mr. Nicholson has held the position of auditor since Jan. 1, 1910, and secretary since Jan. 19, 1914.

Prior to his connection with the electric railway field Mr. Nicholson was connected with the accounting departments of various steam railroads. He was with the Chicago, Rock Island & Pacific Railway, Chicago, Ill., for a number of years. In 1905 he entered the service of the Cincinnati, Hamilton & Dayton Railway at Cincinnati, Ohio. After a brief connection with that company he resigned to become chief clerk to the secretary and treasurer for the Indiana, Columbus & Eastern Traction Company, which is now included in the system of the Ohio Electric Railway, Cincinnati, Ohio. He went to Omaha in 1910.

Park Named For Dr. Jameson

Dr. Henry Jameson, chairman of the board of directors of the Indianapolis (Ind.) Street Railway, now has a city park in Indianapolis named for him, which proves that public service does not always go unrequited. For years Dr. Jameson was a member of the Indianapolis park board and as such was instrumental in establishing the present public park system. He gave freely of his time and money, and since his retirement from public life has always been a "friend at court" to those who were seeking to put through something which would be of lasting benefit to the city. Ellenberger Woods, named thus after the man who formerly owned the tract, has been rechristened Jameson Park.

C. D. Shellabarger Is Lackawanna's Master Mechanic

The responsible position of caring for the ninety-four cars and three electric locomotives of the Lackawanna & Wyoming Valley Railroad, which operates 50 miles of track in and about Scranton, Pa., has been turned over to C. D. Shellabarger. His title is master mechanic and he is a busy one, for the lines of the company serve the important cities of Wilkes-Barre, Scranton and Pittston as well as other smaller towns. This road, known as The Laurel Line, was one of the first high-speed electric interurbans in the East. It is of almost standard construction and follows the line of steam railroad operation.

Mr. Shellabarger's promotion, effective in July, took him from the position of general shop foreman of the company. This he had held since November, 1921, when he joined the Lackawanna Railroad.

His previous work has had an important bearing on his present success. After graduating from the University of Dayton in 1901 he held the post of rating chief electrician of the United States Navy from 1902 to 1907. For the next year he was armature winder of the Dayton (Ohio) Electrical Manufacturing Company, and from 1908 to 1909 he was machinist with the Joyce Cridland Company at Dayton.

After 1909 he centered his activities in and about New York, during that year acting as electrical foreman for the P. T. Dunn Contracting Company. From 1910 to 1911 he was airbrakeman in the Thirty-ninth Street shops of the Brooklyn Rapid Transit Company, and from 1911 to 1917 he was airbrake foreman for the New York, Westchester & Boston Railroad.

Then came the war and Mr. Shellabarger returned to the navy as chief machinist of the United States Naval Aviation from 1917 to 1920. Thereafter until taking up his work with the Lackawanna railroad, he was with the Interborough Rapid Transit Company in various shops as airbrake inspector.

C. E. Bitzer has been appointed superintendent of the City Railway, Dayton, Ohio. F. Huber formerly held this position.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES - BUSINESS ANNOUNCEMENTS

Soft Coal Shipments Increase

Although the aggregate shipments of soft coal have increased gradually during September, the shipments from individual producing districts have fluctuated irregularly. A government table showing by districts the average daily shipments for the last three weeks in September and the daily shipments for the first three working days of October indicates that in Pennsylvania there was a slight decrease each week since Sept. 9, and that the week of Oct. 5 was begun with shipments at a lower rate than the previous week. In Maryland and part of northern West Virginia there has been a steady increase, but in southern West Virginia there has been a steady decline. In Kentucky, there has been little or no change up to the present week, for which, however, a decline is indicated. In Alabama, daily shipments have been falling off since the close of the first week of September. In Ohio, Indiana and Illinois, there have been gradual gains up to this week which now appear to be checked. West of the Mississippi shipments have in the main steadily increased. The total of daily shipments of soft coal from producing districts given in net tons, assuming fifty tons to the car, based upon records of cars loaded, as reported by the railroads to the American Railway Association is shown in table above.

District	Average Week Ended Sept. 16	Average Week Ended Sept. 23	Average Week Ended Sept. 30	Monday Oct. 2	Tuesday Oct. 3	Wednesday Oct. 4
Total Pennsylvania	383,767	369,766	346,466	419,750	332,300	326,250
Total West Virginia and Maryland	270,625	264,433	255,959	350,100	254,000	240,100
Total, east of Mississippi River	1,272,926	1,281,548	1,288,410	1,652,200	1,214,950	1,183,150
Total, west of Mississippi River	192,024	194,683	197,508	249,150	189,300	193,650
Grand total bituminous shipped	1,464,950	1,476,231	1,485,918	1,901,350	1,404,250	1,376,800

Pacific Electric Places New Cars in Service to Hollywood

The fifty new all-steel cars as built by the St. Louis Car Company for the Pacific Electric Railway for improving its local street car service to and from Hollywood have been delivered to the company at the rate of five cars per week, whereby twenty cars have now been received and placed in service. These cars were ordered on the ruling of the California State Railroad Commission when on Jan. 1, 1922, it granted the Pacific Electric an increase in fares to and from Hollywood. These new cars are a decided improvement over the old ones in speed of loading as they have considerable loading space within the cars, enabling them to get under way while fares are being collected.

They have center entrance and exit, as well as end exit. The end door on trail cars can be operated by collectors from the street, making it possible to load passengers during the peak hours through two entrances.

All entrances and exits are closed while cars are in motion to prevent step accidents. The seating capacity of the cars is sixty-five. The length of the cars is 52 ft. 7½ in. The cars have 36-in. aisles. They are equipped with four 50-hp. motors. They are to be operated in single, two and three car trains. One of the complete cars was on exhibit at the Chicago convention.

Important Discovery in Wood Preservation

A new method by which it is claimed wood can be preserved indefinitely against attacks of all kinds of organisms, both land and water, has been discovered recently by Dr. Paul Bartsch of the Smithsonian Institution. Dr. Bartsch's method consists of impregnation with paraffin containing soluble poisons, those used so far in the experiments having consisted of iodide of arsenic and iodide of copper. Arsenic is known to be deadly to animal organisms, while the efficacy of copper salts for the destruction of plant elements is well known. Specimens of wood have been given this new treatment by the Forest Products Laboratory with great success.

It is understood that the investigations at the Forest Products Laboratory have shown that the new treatment will not cost any more, if as much, as present preservative treatments, and that the paraffin penetrates wood more readily than do the preservatives now being used. Furthermore the same equipment heretofore used for first-class impregnation with creosote and other substances can be used for impregnation by the Bartsch method.

It is said that wood treated by Dr. Bartsch's method will retain its poison compounds because they are effectively sealed in and cannot leach out through the action of water or any other agency. Organisms attacking wood so treated will ingest the poison material and thereby commit suicide.

Marine pilings protected in this manner should withstand for a long time attacks from teredos, or marine borers.

G-E Railway Men Meet at Erie

A meeting of G-E apparatus salesmen and railway supply specialists was held at the company's Erie (Pa.) works on Sept. 28 and 29, just before the convention held by the American Electric Railway Association and affiliated bodies at the Municipal pier in Chicago during the week commencing Oct. 2. Approximately seventy-five men were in attendance at forenoon meetings to discuss various engineering and sales problems. A trip through the Erie factory, the central manufacturing and shipping point for all G-E electric railway apparatus, and also an inspection of a gas-electric locomotive in operation there were features of the two days' programme.

At a dinner at the Erie Club on Thursday evening W. B. Potter was the principal speaker, his subject being "Railway Electrification in Europe." Mr. Potter recently returned from a trip abroad to observe European practices and tendencies in electric railroading there.

Fuel Conversion and Power Making to Be Treated at Exposition

The National Exposition of Power and Mechanical Engineering will serve as the rallying place for all designing and operating engineers and manufacturing executives who are faced today as probably never before by the problems of fuel combustion and power generation and utilization. The exposition will open at the Grand Central Palace, New York City, on Dec. 7 and will extend through to Dec. 13.

The list of those who have reserved space proves conclusively that all phases of the problems of fuel conversion and power making and use will be given complete treatment. Each of the exhibitors is endeavoring to display the possibilities of his products for greater economies. Such an exposition will give a remarkable opportunity for interested engineers and executives to gain a great deal of information in a very short time, as the wares of the various exhibitors in similar lines may be compared and personal contact established with the supplying organizations that should be greatly helpful in the present day struggle for lowered costs.

Metal, Coal and Material Prices

Metals—New York	Oct. 10, 1922
Copper, electrolytic, cents per lb	13.975
Copper wire base, cents per lb	15.625
Lead, cents per lb	6.50
Zinc, cents per lb	6 975
Tin, Straits, cents per lb	32.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7 25
Somerset mine run, Boston, net tons	4.30
Pittsburgh mine run, Pittsburgh, net tons	3 625
Franklin, Ill., screenings, Chicago, net tons	3 25
Central, Ill., screenings, Chicago, net tons	2 875
Kansas screenings, Kansas City, net tons	2.60
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	6.50
Weatherproof wire base, N.Y., cents per lb.	16 00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	90.50
White lead, (100-lb. keg), N.Y., cents per lb.	11.625
Turpentine, (bbl. lots), N.Y., per gal	$1 39

Increasing Rolling Stock for New Haven

The New York, New Haven & Hartford Railroad has recently placed an order with the Westinghouse Electric & Manufacturing Company for five 181-ton electric locomotives. The new locomotives will practically duplicate the ones which are now proving so successful in high-speed passenger service, being equipped for operation on either alternating or direct current.

Rolling Stock

Topeka (Kan.) Railway plans to purchase ten new one-man Birney cars.

Indiana, Columbus & Eastern Traction Company, Cincinnati, Ohio, under the plan to operate three limited trains daily between Zanesville and Dayton, will make additional limited trains into chair cars.

New York, N. Y.—The cars and equipment for use on the proposed trackless trolley lines on Staten Island are to cost $3,000,000, according to Commissioner Whalen's estimates. The plan for trackless trolleys on Staten Island was recently submitted by the Commissioner of Plant and Structures to Mayor Hylan of New York.

Cincinnati (Ohio) Traction Company is converting its non-prepayment type cars, which number about 250, into prepayment type cars by inclosing the rear platform and installing manually folding doors. The company also is eliminating all monitor deck destinations signs and placing them in the front vestibule of each car. All cars are being equipped with illuminated dash route number signs which correspond with the routes on the transfers.

Track and Roadway

Grimsby, Ont.—The Council has passed a resolution indorsing the construction of the proposed hydroradial from Port Credit to St. Catharines.

Wichita Falls (Tex.) Traction Company is building an extension of its lines to the new high school building recently erected. The extension will involve an expenditure of about $75,000.

Knoxville Power & Light Company, Knoxville, Tenn., has been granted the right of way on Walnut Street, which is a definite step toward the construction of a track extension on Walnut between Clinch and Union Avenues.

Rome Railway & Light Company, Rome, Ga., is improving its trackage on Cases Spring Road. Work which is being done will leave only a short stretch of car line not in the center of the road.

Toronto (Can.) Transportation Commission is reported ready to start the construction of the loop at Don Cliff and Glen Echo roads in North Toronto. The Ontario Railway Board has given final approval to the plans of the commission and the Hydro-Electric Power Commission of Ontario for the loop houses and tracks for the radials.

Philadelphia, Pa. — The Frankford Elevated line and the Market Street subway-elevated have been joined. The laying of the tracks is now completed with the exception of a short gap in the third rail. The contract calls for opening the elevated on Nov. 5. The Philadelphia Rapid Transit Company will take possession of the structure on Oct. 25.

Power Houses, Shops and Buildings

United Electric Railways, Providence, R. I., is preparing plans for a large extension to its carhouse at Olneyville.

Underground Railway, London, England, is planning to enlarge its station at Piccadilly Circus to relieve congestion. Negotiations are proceeding looking toward this extension.

Interstate Public Service Company, Indianapolis, Ind., suffered a loss of $10,000 recently when a large transformer at the plant at Columbus blew out. A short circuit is said to have caused the explosion.

New York, N. Y.—The Transit Commission will receive bids on Oct. 20 for construction of foundation and a supply and erection of steel superstructure of new shop and administration building at the Interborough Rapid Transit Company's yards north of 147th Street, New York, N. Y. The total cost of the addition, which is the result of a purchase of 350 new cars, will be more than $1,000,000.

Boston (Mass.) Elevated Railway is rapidly completing the new inspection shop at Hyde Park Avenue, Forest Hills, Boston. The contractors are MacDonald & Imhoff Company of Boston. The new building is of brick, steel and reinforced concrete construction, absolutely fireproof, being one-story high 500x50 ft. The trustees of the railroad company are taking bids on the installation of a dry and wet pipe automatic sprinkler system of approximately 650 heads for the building. The shop will be fitted out with the latest type of machinery and tools.

Electric Express Company, Dallas, Tex., will soon erect a large express depot and warehouse on the block bounded by Market, Young, Jefferson and Wood Streets, site of the recently burned Farmers' Alliance warehouse, according to Burr Martin, general manager of the Texas Electric Railway. The Electric Express Company already owns the site and has a small express depot there now. The present quarters are too small for the company's business. Work is expected to start at once, it is announced, and the depot will be ready for occupancy soon after the Dallas-Terrell Interurban line is put into service, which is expected to be right after Dec. 1. It is expected that the new depot will cost approximately $500,000.

Trade Notes

Gold Car Heating & Lighting Company, Brooklyn, N. Y., announces the death of Allen Sheldon, one of its Chicago representatives.

Bridgeport (Conn.) Brass Company announces the opening of a Detroit office in the General Motors Building, with Frank H. Longyear as district manager.

The J. G. Brill Company, Philadelphia, Pa., has issued a letter, the purpose of which is to place before interurban railway officials the high-speed lightweight interurban car recently developed by the company's Kuhlman plant for the Western Ohio Railway. Inside the letter the illustration and details of construction and equipment are given.

The Hardwood Manufacturers' Institute, Chicago, Ill., has started the issuing of a monthly news bulletin. The first number, dated Sept. 30, urges all members of the institute to read the bulletin carefully and to offer suggestions for the future members. All activities of the Hardwood Manufacturers' Institute will be given in these bulletins.

American Brake Shoe & Foundry Company, New York, N. Y., through its directors approved a plan for forming a subsidiary company, to be known as the Ramapo Ajax Corporation, to take over property of the Ramapo Iron Works plants at Hillburn, N. Y.; Niagara Falls, N. Y., and Niagara Falls, Ont., and the Ajax Forge Company, with plants at Chicago and Superior, Wis. The plans call for the sale of $2,500,000 first mortgage twenty-year 6½ per cent bonds, which already have been underwritten.

New Advertising Literature

Century Wood Preserving Company, Pittsburgh, Pa., has issued a twenty-three page bulletin (No. 24) entitled "Treated Ties and Timbers for Industrial Plants." The booklet is well illustrated and gives some valuable information on wood preservation, processes used in timber treatment, etc.

The Hardwood Manufacturers' Institute, Chicago, Ill., has issued a booklet entitled "Waste Elimination in the Production and Consumption of Hardwood Lumber" which describes and illustrates different simple methods of avoiding waste in hardwoods. It is believed that by the use of grade rules 2,000,000 ft. a day can be saved.

General Electric Company, Schenectady, N. Y., has issued Bulletin 46108 describing the Type M-4 demand meter which is manufactured by it and designed for use in combination with a watthour meter to indicate maximum demand. It is of the so-called "block interval" type indicating the maximum demand integrated and averaged over a definite time interval.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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Claims Association Program a Comprehensive Treatise

PRAISE for the work of President Cecil G. Rice will undoubtedly be forthcoming from the Claims men generally for the great amount of work and thought given to the planning of the Claims Association program when there has been time to digest the papers and appreciate the scope of the subject matter. This issue of the *Journal* gives the reader a practically complete review of the proceedings, though the unusual volume of matter made necessary a more rigid boiling down process than would ordinarily be followed with papers of equal value. The report herein will give the reader the meat of the papers and proceedings, and the expansion of ideas expressed can then be studied further with the later publication of the verbatim report by the association.

From what is recorded in this claims issue, it will be seen that President Rice's program comprises a truly comprehensive treatise of present-day problems of the claims department. It is replete with ideas and suggestions to help claim agents in developing and improving the claims work of their own companies. There is also food for thought which gives direction to any undertaking toward joint action in securing needed state-wide and nation-wide reforms to eliminate bad conditions that add seriously to local claims costs but are beyond the reach of the individual company to correct. The convention work forms the foundation for a real advancement in the art of handling claims generally. Some idea of the personal effort contributed by Mr. Rice may be gained from the knowledge that the program comprised fifty papers and addresses for which he outlined the themes and picked competent authors and speakers, practically 100 per cent of whom responded. In addition, the interest aroused in the meeting beforehand inspired the largest attendance in the history of the Claims Association.

A Secretary in Common Will Help Association Activities

BOTH the Accountants' Association and the Claims Association took action at Chicago which should materially assist them in their own operations, as well as aid their relations to the parent association and to their two sister associations. The action referred to was the election, by each of them, of J. W. Welsh as secretary. For some time the American Association secretary has also served the Transportation & Traffic and the Engineering Associations as secretary. The present action makes it unanimous. It was taken at the request of the American Association Executive Committee, which has, particularly during the operation of the association since its reorganization last year, appreciated what good can come from a secretarial office common to all the associations.

The two associations concerned will find, surely, that they have acted wisely in taking advantage of headquarters facilities for their secretarial work, rather than "going it alone." The very machinery available is enough in itself to warrant the step. But more important, and this is where the industry as a whole is most concerned, the new arrangement automatically provides for that co-ordination of work of the five associations so eminently desirable for the associations' most useful services. Under the new constitution the public policy committee is charged with the duty of passing on the policies of inter-association activities and is held responsible to the parent association for questions of policy which may be involved in the activities of the affiliated associations. The result cannot be other than that the work of this committee will be made easier and more effective with but one secretary.

All of which points to a more virile and useful association activity for the benefit of the industry.

Claims Men Believe Prevention Is Better than Cure

MODERN medical science is based on the theory that it is better to prevent the spread of disease by the adoption of sanitary methods, antitoxin and aseptic treatment rather than to permit disease to be contracted and then attempt to drive it out of the patient's system.

It was undoubtedly the same theory which impelled the Claims Association this year to change its constitution so that the purposes of the organization could be better stated in the light of present conditions and practice. The former constitution was adopted in 1906, when the objects of the association were considered those of bringing together the members of electric railway claims departments "for the interchange of ideas and to promote the mutual protection of such companies from fraudulent claims." Actually, the association outgrew this somewhat limited scope a number of years ago, and the activity of practically all the members of the association as well as of the association itself has been much more to prevent the occurrence of accidents, the discouraging of unreasonable claims and the proper adjustment of claims actually owed, rather than simply the protection of railways from fraudulent claims.

Work along these lines promises to be a tremendous benefit to electric railway companies, entirely apart from the great direct monetary saving in the cost of prevention over the cost of defending suits and paying damages which should result. In the first place, the number of suits will be greatly reduced, so that it will be far easier to separate the honest ones from the dishonest ones. In the second place the public, including courts and juries, will realize that the companies are doing everything which they possibly can think of doing to avoid accidents. This should improve their standing both in court and in public opinion, so that the damages as set by juries or claimed as the result of casualties should more nearly approximate what is a reasonable amount. Finally, the number of those injured in railway accidents both through their own negligence and that of the company should be greatly reduced. This of itself is a great gain because whether a person is injured through his own carelessness and receives no compensation or is injured through a railway's negligence and receives compensation, he would much prefer to be whole, and the reduction of the number of such persons should greatly reduce the number of those in any community with grievances against the company.

Altogether the change made by the Claims Association in its constitution is a wise one and should stimulate that organization to even better future service.

Electric Railway Men Are Eligible to Join the A.S.M.I.

AT ITS annual convention, held in Cleveland during the week of Oct. 2, the American Society for Municipal Improvements voted to amend its constitution so as to permit engineers employed by public utilities to hold the grade of active membership. This action is highly commendable and can have no other effect than to be to the mutual advantage of the society and the engineers concerned. The municipal engineers and those employed by public utility corporations have many problems in common. The scope of activity of the engineer for a utility company is very largely along lines which overlap the field covered by the municipal engineer and frequently calls for the closest kind of co-operation with the latter. Both are community builders and the action of the society should result in fostering a better relationship between these two classes of engineers, something which is greatly to be desired. The society will profit through being able to make use of the additional engineering talent which will now be available for its specifications committees, and the utility engineer, as well as the corporation by which he is employed, will profit through the broadening of his field of activity and through the representation he will have on matters which vitally concern public utilities.

The Spirit of Research Is Commended by Mr. McCants

IN A VALUABLE paper contributed to the discussion of the report of the Transportation & Traffic Association committee on personnel and training of transportation department employees, read at the Chicago convention, M. McCants, assistant general manager Market Street Railway, San Francisco, said some rather unusual things on the subjects covered by this committee report. He disclosed in a general but helpful way some details of what the San Francisco company has been doing to improve the characteristics of its employees and to reduce labor turnover. In general, Mr. McCants approved heartily of the suggestions and recommendations of the personnel committee, but above all he commended the underlying spirit of research which the report illustrated. He showed in his contribution that his company is maintaining a research attitude toward the live problems of the electric railway business. In fact, the way in which it has tackled the job of improving its methods of selecting and training employees shows the real scientific spirit. This sort of thing is expected in a college or scientific society; it is comparatively rare in the transportation field.

The committee on personnel and training had hoped to do some actual experimental work during the past year, in applying so-called psychological tests to selected groups of employees and applicants for employment, analogous in a way to the research which the American Bureau of Welding committee on welded rail joints will make during the coming year with the support of the American Association. The association did not see its way clear to finance the psychological tests last year, but it is to be hoped that such support will be forthcoming soon. The association has made a good start in appropriating money for the rail-joint tests. It is important to have information as to the best method of track construction, particularly of joint construction. By the same token, electric railways need the best possible information as to their prospective and present employees. Mr. McCants showed that research is necessary to secure such, and his company, among others, is making research in this direction. This reinforces in a practical way the recommendations of the committee.

Data Show A. E. S. C. to Be a Going Concern

THE fact that the American Engineering Standards Committee is already beginning to exert a potent influence in industry is indicated by the facts that twenty-four standards of various grades have already been approved and that 106 projects are now before the committee in different stages of completion. Of the latter a dozen were initiated by the American Electric Railway Engineering Association and electric railway engineers are interested in a number of projects emanating from other bodies. All of the Engineering Association projects are in the stage of progress next to the last; that is, they are "proposed standards submitted for adoption." This means that unless something unforeseen develops they will become standards within a short time. It will be encouraging to those who are anxious to get some actual transportation standards into force to realize that there is not to be a lot of red tape to be unwound before the standards have a chance to show their effectiveness.

The coming calendar year is an important one in connection with the putting through of American standards, because until Dec. 31, 1923, standards which are accepted by recognized organizations can skip all preliminary stages of progress and go at once to grade 6, the one in which the Engineering Association standards are now found. It behooves every technical committee of the Engineering Association, therefore, to round up its standardization work so that all propositions which can be put into acceptable form during 1923 may be submitted to the A. E. S. C. This may mean some tedious and strenuous work on the part of some committees, but it ought to be done in the interests of general economy of later efforts. The standardization work of the association so far submitted has been commendable and apparently is going through.

Discussion at the Chicago convention showed a disinclination to attack any new problems in standardization that would later have to be solved from the beginning under the auspices of the standards committee, but the situation is entirely different with standards already practically complete. Some of these need but a few finishing touches, while others will require a lot of work. Whatever they need they ought to have in the way of effort to finish them. Later it may take years to accomplish what can now be done in a few months.

Holding Company and $114,211,634 of Securities to Be Wiped Out

THE storm clouds that threatened receivership for the Interborough Rapid Transit Company, New York, apparently have been lifted. Action is still pending from one source looking toward the appointment of a receiver for the company, but it is not expected that the court will take cognizance of this plea, particularly under the present circumstances. The latest augury of good in the company's favor is the plan advanced by the bondholders of the Interborough Consolidated Corporation, the holding company, calling for the elimination of all the securities of that company. The consummation of this plan is expected to prevent disintegration of the system. Under it there will be eliminated all of the $63,808,000 of 4½ per cent Interborough-Consolidated bonds, all of the $45,740,500 of preferred stock of that company and all the common stock, which at $5 nominal rating a share would be valued at $4,663,134.

These securities have all been treading on very thin air ever since that company succeeded the late lamented Interborough-Metropolitan Company, and any hope of value for the future that appeared to be ahead of them disappeared with the destruction of the high earning power of the Interborough Rapid Transit Company, operating the rapid transit and the elevated lines. Pledged to secure the bonds of the holding company was the stock of the Interborough Company, which now will be distributed among the holders of the bonds of the Interborough Consolidated Company.

To say that this particular holding company was ill-conceived and in the nature of a financial monstrosity is simply to reiterate the warning of students of corporation finance made years ago, but ignored by the creators of the company at the time of its inception. The only ray of sunshine discernible in the clouded financial sky is that the Interborough itself apparently has been saved from disaster, although the Manhattan stockholders, whose guaranteed rental is now to be scaled down by compulsion, are not overjoyed at the prospects of the meager return immediately ahead for them. In the rapidly changing traction history in New York the Interborough-Consolidated Corporation had come by a process of elimination of first one branch and then another to be entirely dependent for income on the return from its Interborough Rapid Transit stock holdings. With the changing in the economic status of the Interborough Rapid Transit Company and the passing of the dividend by it in April, 1919, the holding company was reduced to a state of financial impotence. As the *Wall Street Journal* said editorially in its issue of Oct. 12: "The holding company had been dead for years, and there was nothing for the reorganizers to do but inter it."

As a study in corporation finance, a brief review of the situation affecting the holding company would seem advisable. The original holding company, the Interborough-Metropolitan, was formed in 1906 with $45,740,000 of 5 per cent cumulative preferred stock and $93,262,000 of common stock to take over all the New York city surface lines and the Interborough Rapid Transit Company. Inside of a year and a half the company which operated the surface roads was forced into the hands of a receiver, leaving the Interborough-Metropolitan with only one means of support, the Interborough Rapid Transit Company. As a result by 1915 about 40 per cent back dividends had accumulated on the holding company's 5 per cent preferred stock. It was to get rid of these back dividends and the troublesome cumulative dividend clause that the Interborough-Consolidated Company was formed. The successor holding company, the Interborough Consolidated, had $45,740,000 of non-cumulative preferred stock and 932,620 shares of common stock with no par value. There was also outstanding $67,825,000 of 4½ per cent bonds. Back of this for earning power was the $33,912,800 of stock of the Interborough Rapid Transit Company owned by the holding company and the $15,270,100 of stock of the New York Railways, the successor after foreclosure to the old Metropolitan Street Railway. Early in 1919 the New York Railways itself succumbed and went into receivership. As indicated previously the quietus of the holding company was sounded in April, 1919, when the Interborough Rapid Transit suspended dividends, for the source of income was cut off with which payments had previously been made by the Interborough Consolidated to its bondholders.

As has been stated already, the holding company will pass out of existence in the scheme for reorganization now before the commission for approval. Further, the plan provides for a continuation of the 5-cent fare, limitation of dividends (of which there are to be none for a period of five years) to 7 per cent as a maximum, elimination of the burdensome features of the lease of the Manhattan Elevated Railway under a fixed rental, provision for securing new capital and a stipulation arranging for representation by the public on the board of directors of the railway. These are among the more important features. There certainly is a lesson in them of the trend events are taking in city railway operation.

The changes proposed are drastic. They do not appear, however, to be any more drastic than needed under the circumstances to save the situation and avoid throwing the Interborough Rapid Transit itself into the hands of receivers. It has, indeed, been a feat of diplomacy to harmonize all the different security interests, and for their accomplishment in this respect great credit is certainly due to the committee of security holders headed by Mr. Murphy and to those acting for the Manhattan stockholders, who accept a scaling down of the guarantees made previously by the Interborough Rapid Transit Company to them. The easy thing to say, of course, of the Manhattan holders is that they were compelled to submit, but that is not altogether true.

In over-ruling objection to confirmation of the sale of the Interborough Consolidated collateral, Judge Mayer of the Federal Court said that he had lived with the situation day in and day out for many months. In view of the complexities of the situation it is easy to believe this statement. To him also is great credit due for the turn for the better which affairs have taken. As for the Transit Commission, the proposed plan of reorganization appears to meet the fundamental conditions laid down by it last spring as part of the commission's elaborate unification plan still in the making. No matter what the final outcome may be of that plan, the present reorganization move is another feather in the cap of the commission in its effort to better service on the transit systems in New York and bring about a settlement of the transit problem along lines that give evidence of stability for the future. Certainly, as one financial authority has said, it has been demonstrated that there appears to be no place in so rigidly regulated a field as city traction for a holding company which had taken nominal control of operating companies at inflated valuations.

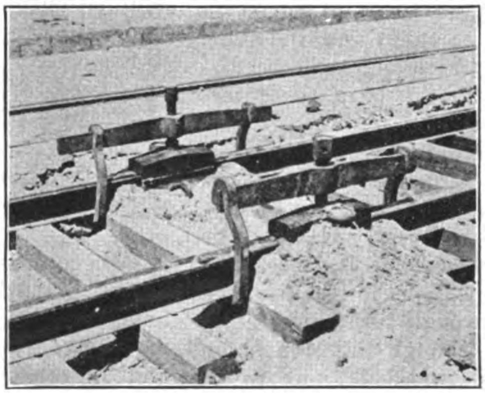
Cast Welded Joints in Brooklyn

The Brooklyn Rapid Transit Company Has Had a Large Number of Cast Welded Rail Joints in Service Since 1911 and the Excellent Results Obtained Have Led the Company to Make This Type Standard for Its Lines

BY G. H. MCKELWAY
Engineer of Distribution, Brooklyn (N. Y.) Rapid Transit Company

AT ONE time the use of cast welded joints was considered as being the most approved practice that could be reached in rail joint construction by electric railways, but more recently the popularity of that form of joint has decreased so that now but few companies use it and the practice is considered by many engineers as being a poor one. The three principal reason for the decline of the popularity of the cast weld were: First, the breaking of the joints by contraction after they had been welded; second, the belief that the hot metal poured about the head of the rail and then slowly cooling drew the temper from the steel and softened it so that the receiving ends of the rails were more easily pounded down than before; and third, the inability to make repairs other than grinding of the joint after it had once been installed.

PUTTING THE MOLDS IN PLACE


MOLDS IN PLACE AND BANKED

PREHEATING THE MOLDS

The bringing out of a successful method of bar welding also reduced the demand for the cast weld, as the electric welding apparatus, although more cumbersome than that for cast welding, is owned by the manufacturing company holding the patents and rented to the users, the steel company supplying skilled employees as well as the welding train. This has permitted the use of the electric welding apparatus by many railways that could not afford to purchase a cast welding outfit or to employ continuously the one or two skilled men necessary to operate it. In addition, the bar weld is installed on the web of the rail and not near the head so that by the use of the bar weld there is no danger of overheating the head.

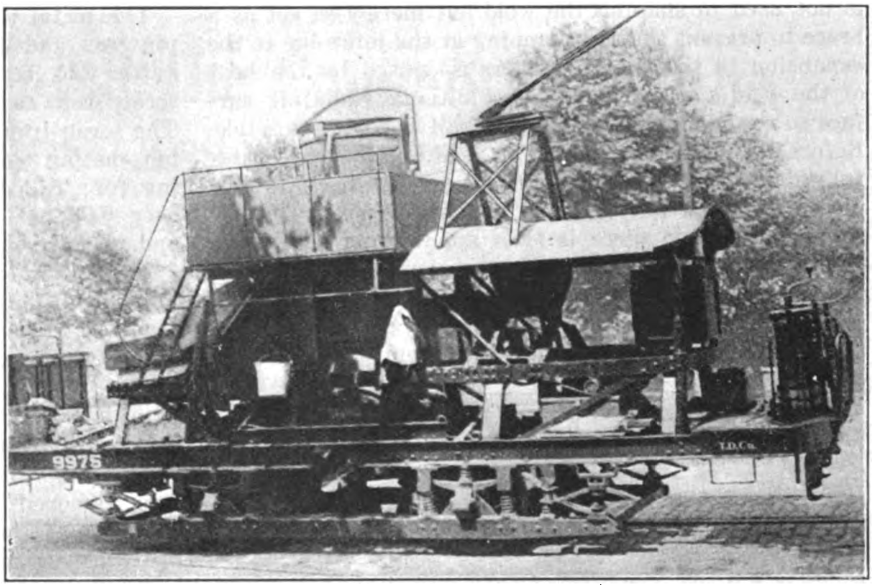
Notwithstanding the belief that the use of the cast weld joint is almost obsolete some railways are still using it and getting excellent results.

One of the companies on the lines of which cast welded joints are standard is the Brooklyn Rapid Transit Company. A large number of cast welds were installed in Brooklyn on the lines of the old Nassau Electric Railroad twenty-five or more years ago and were very successful, many of them being in first-class condition when the rails had to be removed because they were worn out. Brooklyn has also made a thorough test of the electrically welded joints, though most of them were installed on lines equipped with old rail out of which it was thought that, with an improved joint, a few more years of service could be obtained.

A thorough investigation of the joints which had been cast welded, not only in Brooklyn but in other cities as well, convinced C. L. Crabbs, the engineer of way and structures, that they could be used with perfect success and at a less cost than the electrically welded ones. Therefore, in 1911, a cast welding cupola was purchased. The company was fortunate in having on its payroll a man who could be placed in charge of the cupola as he had held a similar position with the old Nassau company fifteen years before. It was therefore unnecessary either to go to the expense of getting a new skilled man for that work or to attempt to break in an unskilled one, a procedure which might cost much more in the way of unsatisfactory joints than could be saved in the difference in wages paid to the experienced and new men.

In 1911 there were 390 joints installed, a number of which were not satisfactory. In some cases the joints broke and in others the welds were sheared from the rails, permitting the ends of the latter, when contracted by the cold weather, to pull away from each other and open the joints. In the first winter twenty-three of those that had been installed in 1911 failed in one or the other of these ways and the next year eight more of those first welded became defective. There were two sections of the track welded in 1911, the smaller having only seventy-two joints and none of the joints on this section have failed as yet, although they have been in use for eleven years.

Instead of being discouraged by the poor showing made by the welds installed in 1911 the management made a careful investigation of the causes of failure and ways of preventing them. It was decided that the greatest trouble was due to the metal cooling while being carried from the cupola to the rail and therefore



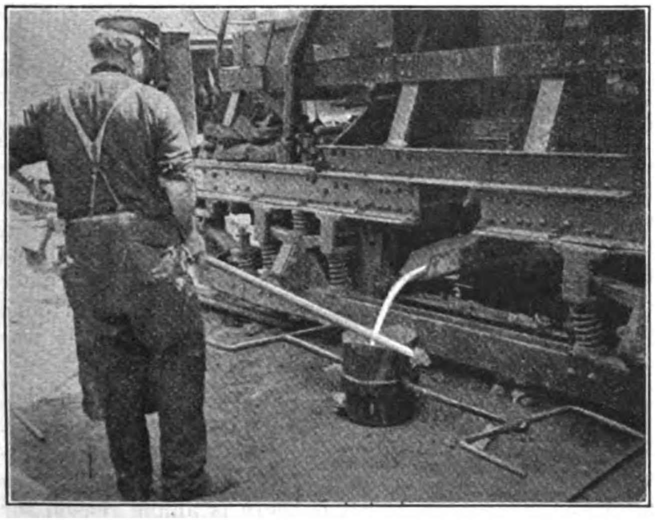
BROOKLYN'S CAST WELDING CAR

being merely cast around the joint instead of being welded to and becoming a part of the rails themselves.

It had been the practice to tow the heavy wagon, on which the cupola was mounted, to the location where the joints were to be welded and then set it on the street at one side of the tracks until the operation was finished. A change in this method was made by mounting the cupola on a work car equipped with its own motors and controllers so that it could be moved at any time. This permitted the car to be run up close to where the joints were to be installed and ended the trouble due to the cold metal. Another improvement was made by adding more metal to the amount poured around each joint. As a still further precaution against the danger of not making a real weld between the metal in the rail and that in the joint, the ends of the rails were preheated just before the joints were poured by the use of an oil-burning blow torch.

The quality of the metal used in the weld was improved by the addition of titanium alloy to the pig iron and scrap iron which formerly made up the entire charge. Still another improvement, although entirely of a mechanical nature, was the incorporating into each joint of four pins made of cold rolled steel each 3½ in. long and 1 1/16 in. in diameter except at points ½ in. from the ends, where grooves ⅛ in. deep and ¼ in. wide were turned in them. These pins are for the purpose of getting a better bond between the rail and the weld and to help distribute the strains through the casting instead of having them all come as a shear next to the rail.

After these changes the number of the defective joints very rapidly decreased and their percentage to the whole number cast is becoming less and less with each year's operation of the welding car, due to the greater experience of the men engaged in the work. Up to the end of 1921 the failure of the joints poured in 1911 amounted to 16.13 per cent; in 1912, to only 1.46 per cent; those poured in 1913, 4.94 per cent; 1914, 3.52 per cent; 1915, 0.62 per cent; 1916, 0.41 per cent; 1917, 0.05 per cent, and none of the 2,411 welds installed since 1917 have broken. These figures show that a thoroughly satisfactory joint is now being made, the efficiency having been brought up to a point where there is very little hope of appreciable improvement. During 1921 of the 15,676 cast welded joints on the system, only twenty-four were broken; eight of them having been installed in 1911, one in 1912, six in 1913, seven in 1914, and one each in 1915 and 1916.



FILLING THE LADLE

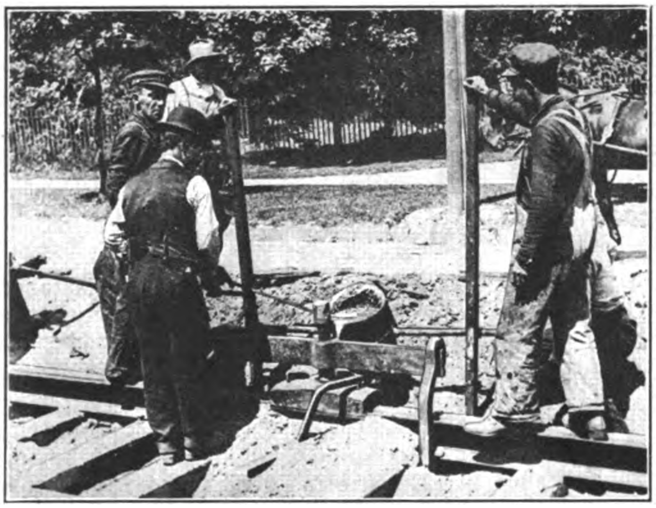
Not only has the quality of the joints been much improved but the quantity of them has been increased until the welded joints are now standard for all new construction as well as the reconstruction of old lines. Of course where there are only a few pieces of rail to be cut in or where the pieces are scattered it would not pay to use the welding car and in such places bolted joints with compressed bonds are used. Of late years many of the new construction and large reconstruction jobs in Brooklyn have been given out to contractors, but when that is done, it is made a part of the agreement that the contractor is to lay the rails but the railroad company welds the joints.

Instead of doing only 390 joints, which was the record for the first year, the average per year since then has been over 1,500, the respective numbers being as follows: 1911, 390; 1912, 1,092; 1913, 1,641; 1914, 3 124; 1915, 1,925; 1916, 2,898; 1917, 2.195; 1918, 1.179; 1919, 628; 1920. 0; and 1921, 604.

The number of joints installed in the last few years would have been much greater if the company had been able to obtain, first, the labor necessary for laying track as easily as was done before the outbreak of the war and, later, the money to purchase both labor and material.

The welding process is as follows: After the road-bed and ties have been placed the rails are laid and temporarily spliced, the abutting ends being connected to each other by splice bars with two bolts in each end. The holes for the bolts are 2½ and 6½ in. from the rail ends. When the rails are to be welded the plates are removed and the special pins previously described are driven into the bolt holes. The ends of the rails are then cleaned with a sand blast and the molds are placed in position. These molds consist of three pieces, one for each side and one for the top, although the top piece is not used in shaping the weld but merely to act as a brace to prevent the rail humping at the joint due to the expansion in the ends of the rails caused by the heat of the weld and also to supply additional radiating surface so as to keep the head of the rail as cool as possible. Before the molds are placed in position they are carefully dried and the inside surfaces oiled. The two side pieces are then put in place and held there with "C" clamps. The top piece is then applied and held down tightly to the rail by hooked straps passing under the base as shown in the illustrations.

The next step is to preheat the molds so as to prevent their chilling the metal poured into them. This is done with a kerosene burner, after which the molds are banked with dirt. In order to keep out this dirt or any other foreign substance which might fall into the molds the openings are covered with pieces of paper which are weighted down with stones to prevent their being blown away.



POURING THE JOINT

This work is all done in the morning after the rush hour is over, when it is possible for the passenger cars to single-track past the section being cast welded by means of portable crossovers placed at each end of the section. About noon the joints are ready for pouring and then the welding car is run into the middle of the section and the ladlefuls of hot metal are carried out from it in both directions. The fire in the cupola has been lighted before leaving the yard in the morning so that only a few minutes elapse between the time that the blast is started and the metal is ready to pour.

The pouring ordinarily consumes from an hour to an hour and a half so that there is ample time for the joints to cool and the molds to be removed before the evening rush hour, which generally commences about 4:30 p.m. The joints are placed opposite to each other so that if any humping of the track should occur, due to the expansion of the rails, it would occur at only half as many points as it would if the joints were staggered. This humping, however, has been hardly ever noticed and is caused only when the top clamps have not been tightened up sufficiently.

There has been no trouble experienced due to the softening of the head of the rail, although to prevent this the casting is not made heavy near the top. On account of this precaution and also due to the ability of the top piece of the mold to conduct away the heat, it is possible for a man to place his hand upon the head of the rail close to the joint without danger.

The metal used for pouring consists of 60 per cent pig iron and 40 per cent scrap iron. Each joint requires 200 lb. of metal or 120 lb. of pig and 80 lb. of scrap iron, to which is added ⅓ lb. of titanium alloy. The scrap iron is made up mostly of broken machinery but the pig iron is purchased under specifications calling for: Silicon, from 2¾ to 3½ per cent; sulphur, not over 0.03 per cent; manganese, not over ½ per cent, and phosphorus, from 0.6 to 0.8 per cent.

The estimated weight of metal for each completed joint is 176 lb., so that about 12 per cent of the 200 lb. required to be melted in the cupola for each joint is lost as either slag or waste in pouring. A special rest for the ladle consisting of two upright wooden posts with lugs on which to rest the handle is used and permits of pouring slowly, without spilling.

After the joint has been poured and the molds have been removed after the metal has cooled, the top of the ends of the rails is filed with a heavy file drawn by two men, so as to make the joint perfectly smooth and leave no possibility of one rail end being slightly higher than the other.

While almost all of the work in Brooklyn has been confined to girder rail in paved streets, yet a little has been done on exposed tee rail and with perfectly satisfactory results. In the paved streets the rails are held to gage by tie rods and also by the pavement, so that there is no possibility of their being affected by expansion in hot weather. The tee rail, however, has not these safeguards, so that allowance has to be made for expansion and contraction. This is done by welding the rail in sections of about one thousand feet and then cutting in slip joints made of switch points at the ends of these sections, thus permitting of sufficient sliding action to compensate for the alterations in the length of the rail due to the changes in temperature.

Not only are the joints satisfactory physically as connections between and supports to the ends of the rail, but electrically they furnish a connection which cannot be duplicated by bonds and one which is permanent and does not deteriorate with years of service as do bonds. As a proof of the unchanging electrical resistance of the joints it is only necessary to quote the results of tests made on 8,172 joints welded in the years 1911 to 1915 inclusive and tested once in 1916 and again in 1918, as below:

Year Welded	No. of Joints	Resistance in Feet of Rail	
		1916	1918
1911	390	4.01	4.07
1912	1,092	3.64	3.60
1913	1,641	3.86	3.83
1914	3,124	3.78	3.85
1915	1,925	3.50	3.59

While there is a slight increase in the resistances measured in 1918 over those in 1916, yet it is exceedingly slight, an average for all of the joints showing only 0.04 ft. of rail or ½ in. increase in the equivalent length of rail. Even this increase may not have been exactly correct as the tests were, of course, not made under laboratory conditions but in the field with bond testers of ordinary accuracy and with which it was difficult to read to fine divisions of a foot.

The cost of a cast weld is but little more than that of a welded joint and the results are much superior. When the cost of bonding, even to a smaller conductance, is taken into account it is easy to see that the weld has made good and that there is ample reason for standardizing upon it on this property.

What Was Done at the Convention of the Claims Association

By Cecil G. Rice

Past-President American Electric Railway Claims Association
and Manager Associated Bureaus, Receivers
of Pittsburgh Railways

DISTINCTLY progressive, definitely constructive and co-operatively harmonious features were recorded in the Chicago convention of the American Electric Railway Claims Association. Positive action tending further to broaden and develop the work of the organization was officially adopted.

Acknowledged to have been the most successful claims conference ever held, it also ranked high in importance in comparison with sessions of the affiliated associations. Hereafter the Claims Association must be more seriously considered in the counsels of the parent association as to members, objects and accomplishment.

CECIL G. RICE
Retiring President
Claims Association

The action of greatest fundamental importance was the unanimous adoption of new objects of the association. As finally approved they record broad purposes, openly declared and strikingly phrased. The new paragraph of the constitution not only brings up to date all that the more advanced departments are doing but sets a goal for further revision and achievement, and co-ordinates the best interests of claim departments with the ultimate best interests of their companies as well. By this constitutional revision the Claims Association takes a step in advance of any similar organization. The new objects are:

> The objects of this association shall be to endeavor through co-operation, study and discussion to ascertain, inaugurate, maintain and develop those modes of procedure, practices, policies and ethics most effective in preventing accidents, determining and discouraging unreasonable claims, minimizing inequitable expenditures and other waste, defending against unfair demands, adjusting claims owed and otherwise advancing the ultimate best interests of member companies and those they serve.

Heretofore the interests of claims departments, the legal and medical branches, other departments and the company generally were unnecessarily but unfortunately considered more or less separately. With the new objects carried out the Claims Association becomes a forum where all these elements are to be considered. No one informed of the facts will doubt the decided mutual advantage which will result from such co-operative counsel.

Second only to the adoption of the objects, because its full accomplishment awaits the 1923 convention, is the consideration of a Code of Ethics. At my urgent solicitation, Russell A. Sears, general claims attorney of the Boston Elevated Railway, prepared such an outline. When it was reached on the program it had become necessary for several members to leave to make trains and Mr. Sears recorded his approval of such an adoption but considerately asked that the president appoint a committee to report next year, when the code can receive the approval of the full membership. When the code is made a part of its guiding literature the Claims Association will join the group of professions and businesses whose objects and ethics are permanently recorded. Influence and prestige will follow. The mystery surrounding claims will vanish. Understanding and business principles will overcome odium and prejudice.

An accomplishment of great future benefit, if encouraged and developed, was the establishment of co-operative relations with five other national organizations having similar interests or otherwise directly affected. Consideration of the indefensible and receipts wasting influence of "ambulance chasing" and exorbitant contingent fees of attorneys and doctors was vitalized by messages from the presidents of the American Bar Association, the American Medical Association and the National Electric Light Association. Present to lend encouragement were R. H. Doolittle, president; R. C. Greene, past-president; H. D. Morris, secretary, and J. C. Rose, member of the executive committee, of the Association of Railway Claim Agents, composed of the steam railroads, and H. R. Harrold, chairman of the executive committee of the International Claims Association, composed of insurance companies. Two territory organizations also were represented by C. M. McRoberts of Los Angeles, president Pacific Claims Agents' Association, and W. C. Swisher of Kansas City, president of the Mid-West Claims Association.

The foundation for action tending to control this rapidly increasing evil was laid in two papers recording the practices which prevail and two learned addresses analyzing the legal effect and aspects. The studied address by A. E. Powell, of Squires, Sanders & Dempsey, attorneys-at-law, of Cleveland, was a literary effort of much practical value. To this was added a symposium stating the experience of attorneys from various parts of the country in reducing and controlling these crimes locally. A detailed survey of methods found effective, with recommendations for local adoption, supported by the several associations probably will result from the work of the committee whose appointment was authorized by resolution.

Deferred reference is made to the subject of safety only because its importance and actual necessity are generally recognized, the only debatable point being the methods to be adopted to fit particular conditions. Public and company organizations and general but unorganized methods were described, followed by a recital of the actual results in claims cost reduction of various companies.

A resolution formally approving the principle and practices of accident prevention was adopted. The operating phase of the subject was discussed and the work of the Transportation & Traffic Association was described, the report of its safety committee being distributed. The same object is sought by both organizations and no conflict is possible.

The prevention, investigation, adjustment and defense of automobile accidents and claims were treated in ten especially worthy papers describing practices employed in the North, East, South and West by both large and small companies. These fine papers are of distinct value to any one who wishes to be fully informed in relation to the subject, and it is found that from 40 to 75 per cent of traction accidents involve motor vehicles in the larger cities. The appointment of a committee to conduct further research was authorized by resolution.

The medical defense of litigated claims is a much used and abused procedure employed wherever claims occur. The learned contribution by Dr. John Leeming, medical counsel of the Chicago Surface Lines, constitutes a text book of information that has a practical value not possible to estimate. The same subject was also treated from the trial attorney's point of view.

The question of women jurors was but briefly referred to. It appears that the calling of women to pass upon damage cases is not yet so generally in use as to afford deductions of value. Where ambulance chasing is developed, jurors friendly to them or their attorneys find their way into the wheel. It is generally believed that the danger of women having such relations is less. A contribution of much value to attorneys was a digest of the jury laws of the various states.

That claims work is a dignified profession demanding rare and exacting attributes was thoroughly presented by J. R. Guilliams, general attorney of the Chicago Surface Lines, probably the largest organization of its kind in the world.

That the requirements for claims directors have changed and that a claims executive who develops policies and systems in one city proves his fitness for developing his professions in another city was made clear.

That the title claim agent carries an undeserved odium, aids in encouraging claims and handicaps active participation in accident prevention—now the first duty of a progressive claims man—was developed.

That acts of management and operation directly affect claims and verdicts may have presented a new thought for many executives.

That a budgetary procedure for governing claims expenditures offers advantages to the claims director as well as the management was a new subject.

It was declared and its truth accepted that claims men, as a class, have not received the recognition to which their ability and knowledge of human relations entitle them, that their value to their company may have been lost sight of in the trend toward newer management features and that the pay of investigators and adjusters often was less than that of conductors and motormen, although the work of these men is probably the most exacting of any within the industry. These facts present thoughts for fair-minded executives to investigate.

No man is too big for claims work. He should be paid what it is worth. The survival of the fittest applies as fully as in other lines of endeavor.

The attendance, despite most trying and unfavorable weather conditions, broke all previous records. Every section of the country was represented. The Pacific Coast sent several representatives. A notable feature was that some twenty-five of those present had never before attended a convention. Comprised in the registration was a large group of attorneys, doctors and company executives. Serious attention was given to the papers and addresses. Discussion was developed in groups after the sessions. Twenty-eight subjects were treated by an authority with some forty-five papers and addresses. Out of all this number there was but one failure to be present or send a paper.

A carefully arranged display of framed cartoons, safety indorsements and charts, a large detailed organization chart and graphic charts showing the studied results of 350 court trials, provided by the Associated Bureaus of the receivers of the Pittsburgh Railways, attracted lasting attention. The same bureaus presented a "Book 'o Smiles," being a collection of jokes relating to litigation, claims and transportation, in each of which may be found a quiet suggestion against unreasonable claims.

The convention was opened by a prayer and invocation. During the entire twelve hours but one story was told.

Perhaps no better indication of the benefit derived from the convention can be had than through the following extract from one of perhaps a hundred letters received by me before and since the convention, the writer being the general manager of a Mid-West property:

> I wish to express to you my appreciation of the splendid program you succeeded in working out—no doubt requiring months of time and study—and I am convinced that all the members present feel as I do; amply repaid for the time and money spent in attending the convention. This is the first convention of the kind I have attended. If I can put even a small part of what I learned into actual practice on the property of which I am manager my company will have profited by the expense of the trip.

I am convinced that the Claims Association offers unlimited possibilities for the advancement and betterment of the claims men and the companies they serve. The need is for a greater development of an association spirit which will subject every act to the one test:

"What is for the best interests of the Claims Association?"

Those executives and others who avail themselves of the opportunity of reading and digesting the proceedings of this convention in conjunction with the information and enthusiasm absorbed by their representative in attendance will learn that the real value derived—immediate and future, practical and theoretical, relating to claims and to the company generally—is the best investment ever made on a basis of the insignificant expense of attendance.

The personnel of the new officers seems to assure that the harmony, interest and co-operation now existing will be nurtured and developed.

Next year's convention can be made better. Let's prepare now. See that your "boss" has his attention called to what you did this year.

Steam Engine Statistics

ACCORDING to recent statistics of the Census Bureau, relating to the manufacture of engines, there were 19,427 steam engines built in the United States during 1919 as compared with 14,664 in 1914. The horsepower capacity figures are: for 1919 7,244,337, as against 2,192,079, or an increase of 230½ per cent. At the same time the value of the product increased from $21,784,109 to $101,952,707, or 368 per cent. The figures include both reciprocating engines and turbines.

Proceedings at the Claims Convention

Accident Reduction Stood Out as the Salient Feature of the Program, with Special Reference to the Automobile Hazard—The Effects of This Work on Claims Were Shown to Be Striking —Wallace Muir, Lexington, Ky., Was Elected President

THE first session of the nineteenth annual convention of the American Electric Railway Claims Association was called to order at Claims Hall, Municipal Pier, Chicago, at 2:30 p.m., Oct. 2, by President Cecil G. Rice. Prayer was offered by Doctor James S. Stone, director of St. James Episcopal Church. At the close of the invocation, Augustus Baker, on behalf of the Associated Bureaus, Pittsburgh Railways, presented Mr. Rice with a gavel. The gavel was inscribed with the name and title of Mr. Rice and bore testimony to the "appreciation of his unfaltering loyalty to ideals, policies and principles which have made for the national advancement of accident prevention and claims organizations and the best interests of our companies, our associated bureaus and ourselves." Mr. Rice expressed his appreciation of the gift.

President Rice then explained that he had just come from a hospital bed and would ask Mr. Hellmuth to read his presidential address. It follows, in part:

PRESIDENTIAL ADDRESS

I have very definite ideas as to the work our association should now undertake, but they will be withheld for my successor, should he care to receive them. My proper task now is to direct your minds to the immediate present.

We who are here form an industry group upon whose judgment $50,000,000 is annually paid out for injuries, damages and expenses. This sum indicates the immensity and the importance of the work in which we are engaged. Grouped here it is easier to visualize our relative position in the business, professional and social world.

Everything which affects the human being bears directly or indirectly upon our work. We are specialists in human nature, expert buyers of a variable and changing commodity. We fight that deception and greed which are so inherent and developed in man. We must be just and equitable while others seek to take advantage of us. We endeavor to compensate for life which cannot be replaced, and for pain and suffering which cannot be removed. I have yet to find an executive with a theoretical and practical understanding of claims work who has not been a claims man.

Is it not true that conductors and motormen are paid more than some of those who investigate and settle claims; that safety supervisors in industry draw salaries two and three times as high as the average claims director; that one contingent fee collected by but one of the many legal wolves against whom we battle exceeds our pay per year, possibly? Whose fault is this?

WALLACE MUIR
President Claims Association
1922-1923

We have met, we have discussed, we have raised the efficiency of our department. But what have we developed by research? What standard form of practice have we adopted? What outstanding thing have we done as an association to raise and broaden our group sphere of usefulness and respect?

What can we do? We can increase the efficiency of our departments, more fully co-operate with other departments, overcome prejudice and inspire confidence, grasp and develop the newer, higher and most profitable claims complement, the prevention of accident. Then we can sell our association our work, our department and ourselves. We need and must develop an association spirit. Let the test of our actions be what is for the best interests of the American Electric Railway Claims Association.

At the completion of President Rice's address a letter was read from M. B. Starring, president United Railways Investment Company, extending his best wishes to the association and hoping that the meeting would be an unqualified success.

The first speaker of the day was J. R. Guilliams, general attorney Chicago Surface Lines, who spoke on the subject "The Dignity and Fundamentals of Claims Work." After welcoming the delegates to Chicago, Mr. Guilliams read the paper, of which an abstract follows:

FUNDAMENTALS AND DIGNITY OF CLAIMS WORK

Figures for 1920 show the amount of money then invested in the four principal utilities in the United States as follows:

Electrical	$4,800,000,000
Electric railways	4,500,000,000
Gas	3,700,000,000
Telephone	2,000,000,000

While all of these utilities are engaged in hazardous business, that of the surface railways is the most hazardous. During the morning and evening rush hours, a majority of the railway passengers are in a hurry to board the first car, and they are usually in just as great a hurry to alight from the car, so it is easy to understand how many accidents occur. The annual cost of accidents in all lines of industry and business in the United States is now $1,500,000,000 and $50,000,000 is the annual accident loss maintained by the electric transportation lines alone. Almost every large industry in the United States, particularly every large public utility industry, has its claims department, and while I am an urgent advocate of safety work, I believe that well organized public utility claims departments will be necessary until the millennium arrives.

The code of ethics which should be adopted and maintained by a claims department is the same as that which should be adopted and maintained in the conduct of every other honorable business, and that should be "A square deal for every one from every one." Employment of trickery, dishonesty or unscrupulous methods cannot be thought of. Every claims director or agent or other employee in the department who in spirit or action is not in accord with these principles should be discharged. A claims director or agent can have no foundation on which to act in disposing of a claim until he is in possession of the facts, so far as reasonably they can be obtained.

In street railway claims the first information, as a rule, is the report made by the train crew and other employees. Under our system these reports are delivered to the claims department before 3 a.m. on the following day, when several copies, including the names and addresses of witnesses and of the injured, are made before 8 a.m. The chief investigator, when he arrives at the office, reads these reports, passes judgment on the importance of each and indicates what attention shall be given to it. A file is made of those deemed inconsequential, and no further attention is given to them unless a claim is filed. For those determined to be of minor consequence a written request is sent through the mails to each witness, asking for a statement of the facts. Our experience shows that about 35 per cent of the inquiries sent out are answered, while of the statements sought through investigators, 75 per cent are secured. The other 25 per cent are accounted for by failures to locate or refusals to make statements.

In the more important cases direct investigation is followed. In such cases the chief investigator decides whether an inspection of the car track or paving, a photograph of the car or other vehicle, a plat of the situation, or a vicinity investigation shall be made. The original and one copy of the accident report are then placed in the file. One copy goes to the general claim agent, another to the chief investigator, another to the superintendent of transportation, and another to the investigator for his information.

In the letter used in making investigations through the mail, a stamped envelope is inclosed. The letter requests the witness to give all the facts, and the reverse side contains ten questions which are deemed pertinent for the purpose of eliciting the necessary information. One of these invites the witness to tell in his own way how the accident happened. The work of the adjuster includes the interviewing of the injured and the doctor, and at the appropriate time, the obtaining of a written, and if possible a signed, statement from the injured, covering his knowledge of the facts involved. Adjusters do not make calls on the injured before a claim is presented, except in those instances where the information in the possession of the department indicates quite clearly that a claim will in all probability be presented and where the injuries are apparently serious.

In those matters deemed serious by the train crews, they are required to inform the claims department immediately by phone of the accident, giving as full information as the circumstances require. Where the department is in doubt as to whether the individual sustained injuries of serious consequence, a quiet investigation is made for the purpose of determining this fact.

Where the liability is clear, the claim should always be settled promptly. Where a difference of opinion honestly exists as to liability, settlement is usually justified if made on a compromise basis. Where the case is "blind," that is where no report has been made by train crew or other employees, compromise is not usually desirable unless the claim agent is satisfied that the claim is meritorious. Where liability should be denied, no compromise is made, whether the injury is serious or slight.

The difficulty of course is to determine the class and also what is considered a reasonable figure. In the first class of case mentioned, when the claim agent has fixed in his own mind what he considers a fair figure, it devolves upon him to satisfy the claimant on this point. Largely the same conditions prevail in the second class of case mentioned. With "blind" cases, it is our policy to insist upon full disclosure from the claimant, and if it appears probable that the accident or injury occurred as claimed, we try to compromise the claim upon fair terms. If, however, the claimant refuses to make the disclosure, we have no hesitancy in permitting the claim to go to suit. My experience is that juries as a rule are not kindly disposed toward "blind" cases. The non-liability cases call into play, on the part of the claim agent, a clear appreciation of what in law is required by both the company and the claimant.

We have a well qualified surgeon who is in the headquarters of the company during the entire forenoon of each day and is provided with the necessary equipment for minor surgical work and treatment to care for those injured who are willing to come to the office. This surgeon also makes an examination of any claimant, when this is desirable, and he consults with the general claim agent as to just what should be done surgically or otherwise. The Chicago Surface Lines also has, in its general office building, a medical department which does work for the claims department when requested and advises on cases, particularly when there are any unusual features. The claim agent also consults with the legal department almost daily.

The claims department also co-operates with the other departments, and in every case of accident the chief of the department responsible for the accident receives a copy of the report of the accident, and at the end of each week he receives a report from the claims department, stating its conclusions with reference to where the blame should be placed. The claims department weekly also furnishes the superintendent of transportation with a statement showing the number of accidents for the week, divided into ten classifications.

At the conclusion of this address, President Rice announced that the next would be by P. O. Solon, claims attorney San Francisco-Oakland Terminal Railways. An abstract follows:

MINIMIZING EXPENDITURES THROUGH CO-OPERATION OF TRAINMEN IN OBTAINING OBSERVERS

The street railway should do everything within its power to furnish its trial attorney with as many favorable witnesses as possible. As a class, trainmen do not make intelligent witnesses, and when cross-questioned by clever attorneys for the plaintiff they can easily be confused, bewildered and caused to lose their temper when on the witness stand. A railway defending an action for damages with no disinterested witnesses to testify in its favor is usually as a sheep being led to the slaughter house. It is in the favorable testimony of disinterested observers that lies the street railway defendant's greatest hope of convincing the jury in a proper case. The company with which the writer is connected recently asked its trainmen the following questions in regard to witnesses in accident cases:

Do you pick out anybody in particular for the first one you will ask to sign a card? If so, whom do you pick?

When you hand a card to a passenger or bystander to get name and address, just what do you say? (Write the words you would use.)

Do you always first ask if the party you are speaking to saw what happened?

If the party says, "I didn't see the accident," then what do you say?

What do you say to people who don't sign because they do not want to get mixed up in it?

Is a passenger who does not see what happened in an accident of any use as a witness? If so, why?

If an accident occurs and you have no passengers, what do you do as a rule in trying to get names of witnesses?

If car is crowded and a woman is hurt in a step accident, about how many names do you think you should get?

What is the most difficult situation you have to deal with in getting names and what do you think is the best way to overcome the difficulty?

What method in getting names have you found best?

Write further remarks, and ask any questions on this subject you would like to have answered.

More than 1,200 questionnaires were filled out, and if any claim agent or claim attorney thinks he is well informed upon the difficulties that attend the efforts of car men to secure the names and addresses of persons, he should read the answers given and he would conclude that while a large percentage of our men are evidently in need of individual instruction, many others have intelligent methods of getting passengers and bystanders to "sign up." The best of all the answers have been compiled, and in the course of the next month it is expected they will be printed in a small book, wherein will be printed the merits and demerits of the answers. A copy of one of these books, with a letter of commendation and criticism upon the answers he personally gave, will be sent to each platform man.

The next address was by H. O. Allison of the Beaver Valley Traction Company on "Personnel Specifications for Modern Claims Men." An abstract follows:

PERSONNEL SPECIFICATIONS FOR MODERN CLAIMS MEN

Claims work is a profession, a science demanding as profound study as the profession of the lawyer or the physician, the science of chemistry, bacteriology, or etymology. There are no books for guidance. The essentials must be acquired and retained within the mental storehouse. Each new day opens up its share of problems, as different from those of the day previous as night is from day. In recent days we have heard much of psychology. Those who have been in claims work for ten or fifteen years practice it daily. Probably they did not know it by that name, but their remaining in this work shows an understanding of human nature still beyond grasp of many accredited psychologists. An academic study of man discloses frailties, vanities, ambitions and desires of a greater or less degree in every specimen. It is with this complexity that the claims men deal.

This is a profession which can be practiced in any city or state. A man trained in Pittsburgh can do equally as well in San Francisco, Chicago, Cleveland or Dallas. The specifications of a claims man should not be whether he is a native, an experienced transportation man, a lawyer, a "good fellow" or a member of many fraternal orders. The successful modern claims man is one who decreases claims in a field of rising hazards; one who, when a liability occurs, makes an adjustment equally just to the claimant and the company he represents, who conducts his business with the least aid of courts and juries, who reduces the number of claims and amount of expenditures made through prevention of those occurrences which prompt claims.

An educational broadening of the mental grasp, supplemented by a practical worldly experience is a desirable personal specification for those entering claims work. From that point, progress is only by ability, increasing as experience becomes more general. There must be a thorough study of accident causes, the human element and its equation, and the nature of the animal known as man. Absolute honesty is an indispensable attribute, as sharp practices resulting from misunderstood covenants have no place in claims work. Some of those entering this work may become good investigators but poor adjusters. The ideal entrant is the man who can do both equally well, and as he progresses in both, the foundation is laid for a future head of the department.

At the conclusion of Mr. Allison's address, President Rice said that there has been some consideration in the past few years as to whether the title of claim attorney or claim agent was not a hindrance to the work, that it, in a sense, encouraged claims by the use of that title, particularly so when inquiries were sent out that called for replies. Some companies have changed the title. One of these is the Cleveland Railway, and the head of its department is called "Superintendent of the Accident Department." He then announced that W. F. Weh, who held that office with the Cleveland Railway, would next address the meeting. An abstract of his address follows:

The Title "Claim Agent" Persists

The speaker said that he had no decided opinions for or against the word "claim" or the title "claim agent" and naturally had a feeling of disinclination to argue in favor of anything which appeared to be more or less technical rather than practical. The change mentioned in the Cleveland department was made some six years ago, but while some benefit has undoubtedly resulted from it, statistics did not show any decrease in the number of claims as the result of this change. On the contrary claims of every nature have increased. Moreover, after six years of educational effort by the sixty-five people connected with the department, in addition to the wide circulation of letterheads and other printed material, the Cleveland public and those with whom the department does considerable business persist in speaking of the "claim department" and "claim agent."

Nevertheless every effort to suppress suggestions which encourage the making of claims is laudable. The word "claim" also has no place in accident prevention, and every one engaged in such a work should exercise the greatest care to avoid using the word or any reference to it. The following points stand out as against the use of the term:

First, the word "claim" stands for money to many minds, and may be highly misleading. It should be impressed on everybody that the accident department functions to ascertain the facts of an accident and has been created to deal impartially with every person who presents a legitimate loss.

Second, in many cases where grave doubt exists as to serious injury or the company's responsibility, investigation may quietly be made, but if an investigator announces to the injured person that he represents the "claim department" a different situation develops, and the idea of securing damages from the company is immediately suggested, so that the exact nature of the injury may not be disclosed until the trial.

At the conclusion of this address the president introduced J. W. Giltner, chief claim agent Northern Ohio Traction & Light Company, Akron, Ohio. An abstract of his address follows:

Acts of Management in Operation Which Affect Claims

A few years ago the number of personal injury and property damage claims on electric railways was comparatively insignificant. In many of the smaller companies a highly developed and efficiently organized claim department was practically unknown, and the officials of the company adjusted the most important losses for sums it would now be considered ridiculously small. Let us hope that the pendulum will again swing back.

If we would enjoy a favorable public opinion and thereby overcome prejudice we must command it by service to the public. Let it be granted that the management, by its policies toward employees, has secured from them the highest efficiency. Then it must, with as great care, secure and maintain equipment possessing the minimum of hazard. Birney safety cars and those of the Peter Witt type have greatly reduced the number of step accidents but have introduced a new type, that of passengers being caught in the doors, and it is possible that still further improvements could be made by reducing the amount of open floor space, by providing a more dependable door control and by inside stationary steps instead of outside movable ones. Good maintenance also is essential as a price of maximum safety, nor should the training and discipline of the platform men be forgotten. In fact, no other element in the operation of the street or interurban railway will minimize the number of accidents and therefore claims as will careful selection of men and their just discipline.

A paper on "Budgetary Procedure in Claims Expenditure" by John J. Reynolds of the Boston Elevated Railway was then presented. This was followed by an address on the psychology of a smile by Augustus Baker of the Associated Bureaus at Pittsburgh. Abstracts follow:

BUDGETRY PROCEDURE

The paper on this subject by John J. Reynolds, claim attorney Boston Elevated Railway, was one largely telling of the advantages of a budget for the claims department and answering objections to it. He said that in the first place the term "budget" was not exactly correct, because that word, in its strictest sense, implies careful estimates of both expenditure needs and probable income, while the budget for the claims department is principally on expenditures. In its preparation it is of course impossible to fix absolutely in advance of actual settlement the cost of accidents, but it is possible to estimate them, and the entire expenditure should not be made too low, as otherwise the claims executive may be deceived as to his real financial possession.

Obviously there should be some flexibility in the budget to take care of catastrophes or extraordinary happenings. Thus interpreted a budget is almost synonymous with efficiency, economy and lower costs. Care should be taken, however, not to defer payments due or those which if made will close a case economically and promptly. The budget also should not be considered absolutely inflexible and unchangeable, but if one is adopted, those responsible for its expenditures should keep advised of the amounts paid out and thus be better able to give valid reasons for unusual disbursements.

The Psychology of a Smile

According to Mr. Baker, with all the changes which have come over the world in modern times, the people of today are swayed by the same impulses and emotions as were those who lived in the time of Aristotle, who, it is said, wrote the first books on psychology. Psychology has been defined successively as the science of the soul, of the mind, of consciousness and of behavior. Actually, it seems a study of actions. Students of psychology are unable to tell us what causes the smile, but it is the leaven of mankind, which is universally understood. That a pleasant address, a cordiality in greeting, a frank, sincere and smiling countenance is an asset, there can be no doubt. It begets civility, good fellowship, courtesy and forbearance. It makes for sanity and safety. It is the antithesis of anger, an outward indication of our mental equilibrium. In business, in the workshop, in the church, in the court, wherever mankind may congregate, the opportuntiy to smile is always welcomed. Mr. Reynolds of the Boston Elevated Railway has said:

> It is very clear to me how important in the successful prosecution of claim work a smile is. I have yet to learn why more claims men do not cultivate and capitalize it. This may be done and still have the right sincerity, purposefulness, seriousness, earnestness and determination underneath. A smile keeps one in good spirits and it drives the frown from other faces too. It acts like sunshine, warming and brightening all it falls upon. It certainly will do no harm to remind claims men that in the ordinary man there is a disposition to playfulness, to smile. It is defective character to have no disposition for either in one's making. The successful claims man knows exactly when and how to smile and to be funny, and when and where to stop. There is little enough of play in the life of a busy claims man. Indeed, it is a very serious work, but on account of his very seriousness, we require some play to set it off. Many a difficult situation, many a

troublesome case becomes easier by the proper blend of a cheerful smile and earnestness. The day has gone when a proud, stern, severe, mirthless and smileless man should ever hope to be a successful claims man. A depressing solemnity and cheerlessness will never minimize accident costs.

After Mr. Baker had concluded his address, Mr. Rice announced that the association had secured copies of a variety of forms used in the claims departments of different companies. The meeting then adjourned for the day.

Tuesday Afternoon Session

Outstanding Features Were Two Symposiums, Respectively Dealing with the Effect Upon Claims of Accident Prevention and Automobile Accidents and the Consequent Claims—The General Subject of Accident Prevention Was Also Discussed

THE session on Tuesday afternoon opened with a talk on safety by W. H. Boyce, chairman of the T. & T. Association's committee on safety. He described the safety exhibit on the pier, which occupied seven sections, or 140 running feet of space, and displayed 1,100 sq.ft. of safety material.

President Rice then gave an introductory talk on the subject of safety, which, he said, is, or will be, the most important feature of claims work. "While we shall always have claims," he said, "it must be remembered that when accidents are prevented, claims are prevented. If 5 per cent of the money now paid out for claims was intelligently used in connection with accident prevention, it would produce a greater return than any other expenditure of a similar amount in the electric railway industry."

Referring to the results of safety work in Allegheny County, Pa., Mr. Rice said that the activities which have developed accident prevention have reduced fatal accidents over 50 per cent. On the traction lines, for instance, the number was reduced from ninety-three to thirty, the lowest in the history of the coroner's office. The president of the Yellow Cab Company stated that, as a result of the work, accidents had been reduced 85 per cent, and the casualty insurance premium of the company $12,000. Fares were reduced on account of this saving.

Mr. Rice stated further that a safety award made to the industrial plant in western Pennsylvania making the best safety record went to the H. H. Robertson Company, which operated 280,000 hours with 134 men without loss of time through accidents. The American Steel & Wire Company had only 244 hours lost time with 700 men working more than 2,000,000 hours. In the twelve counties comprising the western Pennsylvania division, the decrease in workmen's compensation in one year was in excess of $500,000.

The accident prevention work, in Mr. Rice's opinion, should be done by the claims men, but such work cannot be done by anyone under the title of "claim agent." It cannot be done by the company alone, but is a specialty. The highest man in connection with the company must actively support this work and have it radiate from him to the men on the job. He advised working through the local safety council organization because many organizations are active in this and the work is not advertised as coming from the railway company, which might rouse a certain prejudice.

Mr. Rice referred to the interview with him published in the issue of the *Electric Railway Journal* for July 22 as voicing his views on this subject. He also mentioned the safety epigrams in the issue of Sept. 9.

He then explained that the discussion would cover the four phases of this work, namely, organizing a local safety council, organizing the company's own employees for safety, preventing accident work without either of these special organizations, and results of accident prevention work. He called on B. W. Frauenthal, St. Louis, to read a paper by C. B. Hardin, St. Louis, Mo., which is abstracted below.

LOCAL SAFETY ORGANIZATIONS

In this paper Charles B. Hardin, United Railways of St. Louis, divided the subject into: Industrial safety, school safety and public safety, which he said might be referred to as traffic safety. Usually the first step in a campaign for community safety is a program on industrial safety, and this movement naturally extends to the other two branches. Preferably industrial safety should be conducted under a local safety council rather than to have the work undertaken individually by the various industries. School safety can be promoted without a great deal of expense through the industrial safety committee, as in a great majority of cities the membership of the school boards include several prominent industrial men. A desirable plan is to hold a local meeting of the school authorities and have some outstanding person, prominent in the promotion of school safety work, address the meeting.

Public safety includes both street safety and home hazards. Much can be done in the correction of fundamental causes of street accidents by the installation of safety zones, parking districts, proper lighting arrangements, etc. In St. Louis the Safety Council maintains a public safety engineer who gives his full time to the correction of physical hazards and has the authority of an officer of the law. The second part of public safety work is educational propaganda plus law enforcement.

The speaker listed the means of organizing a local safety council as follows: (1) Appoint a local committee of five persons to arrange for the organization; (2) call a meeting of the members of the National Safety Council in the territory concerned and lay before them a definite program of industrial safety work for their consideration and approval; (3) elect an executive committee composed of leading industrial men, arrange for weekly meetings and employ a secretary-manager; (4) organize school safety with the help of local and national school safety experts; (5) adopt a program of public safety, include in the personnel of the public safety committee representatives of all civic clubs and organizations and have monthly meetings; (6) enlarge the staff as necessary, as it is better to start with a small organization and build up than attempt too much and fail; (7) call on the National Safety Council officials for assistance and the help of experts on public and industrial safety and local organization.

The speaker outlined the organization of the St. Louis local council. The revenue is $24,500 a year. The principal contributors are factories, that pay local dues of 10 cents per employee, public utility companies, which pay 1 per cent of the net claims paid out for public accidents, and associations, which are assessed 5 or 10 per cent of their aggregate insurance coverage premiums. The council also has a membership of business firms and industries that pay dues of $10 a year and individuals who pay $1 a year. The results in St. Louis have been satisfactory.

By way of discussion of Mr. Hardin's paper, Mr. Rice said that in the United States there are some thirty cities having local safety councils with paid secretaries and organized as locals under the National Safety Council. St. Louis has probably the largest and strongest of these councils, and Mr. Hardin speaks with authority because he has been active in the St. Louis work and was formerly president of the local council.

Reinforcing some of Mr. Hardin's points, Mr. Rice said that in Pittsburgh the idea of safety had been sold to 150 supervisors and principals in the public schools, to 200 teachers in parochial schools and some forty principals of county schools. Indorsement was also secured from the state superintendent of public instruction, and accident prevention is now taught under a state law. The Governor has also highly indorsed the safety work, and an indorsement given by President Harding to the National Safety Council has also been utilized.

"When accident prevention is taught in the schools," said Mr. Rice, "there is reduction of from 6 to 15 per cent in fatal accidents. The greatest work for the future is to be done through the schools. In three years the work that has been carried on in Pittsburgh has resulted in a reduction of 1,500 fatal accidents in Allegheny County with a population of 2,500,000, within fifty-nine of the low record of the county. In Pittsburgh progress has been made in organizing a Safe Drivers' Club which is now putting on a membership campaign to raise $50,000."

Mr. Rice then pointed out that while his activities in this work have been as an individual and not as a representative of his company, the company is getting benefit from the fact that men trained in safety in other employments are naturally better employees when they secure work with the railway. He then called on Victor T. Noonan, Cleveland, Ohio, to speak on the organization of company employees for accident prevention.

ORGANIZING EMPLOYEES ALONG ACCIDENT PREVENTION LINES

Mr. Noonan said that his work on the Cleveland property, where he is superintendent of the department of accident prevention, is organized in co-operation with the local safety council; the men are organized also, and some work is done independent of all organizations. In the company the organization begins at the top, where there is an executive committee on accident prevention. This consists of the president, the vice-president and other executives to make up a total of seven. Its purpose is to supervise the work and to pass on recommendations regarding safety matters. Every important problem must be brought before the executive committee. The vice-president of the company is the chairman of the executive committee. Then there is a general committee on accident prevention, of which the general manager is chairman. This handles ordinary recommendations which come through the departments. Under this committee there is an operating committee through which the active co-operation of the men is secured. There are also departmental committees, the membership of which is changed every three months.

Twice a month the men make inspections on company time, taking an entire day. Inspections are thorough, including, in the transportation department for example, all of the details of cars which affect safety, the condition of the streets, etc. As a result from Jan. 1 up to Aug. 1 of this year more than 4,000 suggestions were received from the men.

Mr. Noonan said that in addition to the above he holds meetings of the men on company time at which he explains such matters as accident costs, causes of accidents, court procedure in accident cases, the importance of loyalty, courtesy, etc. The general committees are also called together every few months to promote a spirit of unity among the men from the standpoint of accident prevention.

Mr. Noonan deplored the use of the slogan "Safety First," saying that it is not taken seriously. The phrase "Be Careful" is better. It is positive; it tells something; it is one that should stick.

In addition to the committees, said Mr. Noonan, the Cleveland Railway's department of accident prevention has two safety inspectors, and expects to have more. These are employed from 6:30 a.m. to 12:30 a.m., taking turns about. Their duty is to assist the men in keeping the rules, and they make no reports except upon the opening of car doors while cars are in motion. The aim is to impress the men that the department is not doing police or spy duty. The policy is to treat the men fairly and squarely.

Mr. Noonan suggested that as an element in accident prevention everything possible be done to allay the fear of the men regarding the loss of their jobs and the danger of reaching old age without suitable financial provision. He said that he wanted to go farther than mere organization in accident prevention, which is not effective without the human touch. Accident prevention is the work of the good Samaritan in modern life.

ACCIDENT PREVENTION FROM THE PHYSICIAN'S STANDPOINT

Mr. Rice next called upon Dr. Hart E. Fisher, Chicago, to speak on the physician's part in accident prevention. Dr. Fisher began by referring to Mr. Noonan's plea for consideration of the humanitarian side of this work and said that this side also appeals to the physician. From the medical standpoint carelessness is regarded as a mental illness, and reference to certain things which are done by employees as carelessness is sure to antagonize them.

In selecting employees, said Dr. Fisher, it is not enough to pick men who will fit into given positions from the standpoint of the employment officer, but they must be examined by competent medical men. This means physicians who have first-hand knowledge of the kinds of work that the men will have to do.

On the Chicago Elevated Railroads, with which the speaker is connected, the practice is to turn down men with defective vision, because this is a potential cause of accidents. Employees are sometimes discharged for so-called carelessness, when the trouble is simply defective vision. It is not safe to depend upon correction of vision defects by glasses because these may be forgotten or broken. The vision must be good and there must be no color blindness.

Regarding this matter of color blindness, Dr. Fisher said men can sometimes pass the color test even if color blind because they have special ways of determining colors. For example, in signal work the position of a signal is a guide. Sometimes color blind men, by turning the head quickly, can detect the color for an instant.

Again, in transportation work defective hearing is a source of danger. A man in the service with defective hearing may be able to perform his duties by obtaining in other ways the information which ought to come through his sense of hearing. For instance, he may sense the mechanical vibration of a bell without hearing it. He may look out of a window and see that the passengers are all on the car, starting the car without hearing the signal bell. If men are permitted in the service with defects such as this, they should not be called careless if they have accidents.

Dr. Fisher then took up the mental factors which may cause accidents. Among these are grief, anger, mental distress caused by quick temper on the part of superiors. He summarized the situation by saying first that a prospective employee should first be physically competent to fill the position for which he is to be employed; second, after employment frequent medical surveys should be made to detect defects which have developed since the initial examination; third, an employee should be examined again before he returns to work after an injury or a serious illness. Employees should also be trained in first-aid work, not with the idea of making them doctors, but to enable them to care for themselves or an injured fellow employee, in case of an accident, until the physician can be summoned. It is well, also, to have a physician visit the shops and other buildings where men are employed to see if the conditions of temperature, lighting, etc., are conducive to safe work.

Dr. Fisher concluded with some remarks regarding the effect of the work of the claims department on public relations. He pointed out that if claims work is handled right many friends can be made for the railway company. The attitude of the claims department toward the physician is also important on account of his intimate relation with the patrons of the company.

Following Dr. Fisher's address came a symposium on the subject of accident prevention and claims.

Effect Upon Claims of Accident Prevention

Remarkable Results of Consistent and Persistent Educational Work Were Shown by Means of Testimony from a Number of Companies Which Have Taken Hold of Their Opportunities in the Right Spirit

MR. RICE next introduced D. B. Haskins, Chattanooga, Tenn., to open the round table discussion on accident prevention and claims. The substance of his remarks is given below:

REMARKS BY MR. HASKINS

Mr. Haskins started by saying that in this case, as in others, the results are commensurate with the efforts made. Local conditions as to the effect upon claims expenditures of organized accident prevention work affect the showing made on different properties. The real test is a comparison of conditions before such work was started and afterward, when organized accident prevention work has been carried on a sufficient length of time to establish itself.

On the Chattanooga property, for ten years preceding organized accident prevention work, the average yearly cost of the claims department was 12 per cent of the gross passenger revenues. In 1918 it ran as high as 18 per cent, a total of $156,327 for the year. Beginning with 1919, when organized accident prevention was in force, the expenditure was 11½ per cent.

The figure was cut down to 7½ per cent in 1920 and 4.4 per cent in 1921. During 1921 the amount spent for claims was $40,190. The current July report shows expenditures to date for this year of 3.45 per cent.

On May 1, 1918, there were 203 lawsuits pending in court amounting to $1,065,880, and 103 open claims on file. The July, 1922, report shows forty-seven lawsuits pending amounting to $285,450, with six claims outstanding.

Mr. Haskins said that this was not all that the company had accomplished, by any means. The overhead lines, the tracks, the cars and the schedules have all been improved. Good men have been made into better employees and the good will of the public has been cultivated. The claims department is helped by every successful effort in accident-prevention work. He said further that the most important phase of this work is not the financial one, but the humanitarian. This is brought home to one when an accident occurs within his own circle of acquaintance.

The next speaker was Neal W. Funk, Louisville, Ky., who was asked by Mr. Rice to show how claims are reduced by accident prevention.

CUTTING CLAIM COST THROUGH ACCIDENT PREVENTION

Mr. Funk began by explaining the importance of the claims man in the electric railway organization. He said that of all men employed in electric railway service he is the most trusted. The nature of his work is such that he must be trusted because he deals in intangible values of human life and limb. The claims man is also a judge, his slogan in settling claims being "not how cheap, but how fair." Any man with ethics other than this is not worthy of his high calling. The time has come, said Mr. Funk, when the claims director who expects to settle claims only is going to curl up and die. He must be a producer, and he can be such with a little extra energy expended in accident prevention work.

The claims director should have charge of all safety matters; in fact, if he knows more about the causes of accidents than anyone else in the organization, why should he not know best how to prevent them? The safety council with the claims director at its head is the way out of the obscurity which has always enveloped him.

Coming now to the experience of the Louisville Railway, Mr. Funk said that the claims and law departments eighteen months ago were costing this company 6½ per cent of its gross receipts. Realization of this fact caused the organization of a safety council. In a year following this step accident expense was reduced to 3½ per cent of gross receipts, saving about $150,000. There was less litigation under way than in twenty years. According to present prospects, the cost during the current year will not be over 3 per cent of the gross receipts.

Since the organization of the safety council there has not been a child killed or crippled on the property. In the year 1919-1920 seventeen persons were killed on the city lines, while in the following year the number was seven. During the first nine months of the present year only two persons were killed, and these involved little fault of the company. Since the organization of the safety council not a person has been injured on one of the fifty-eight grade crossings in Louisville.

Mr. Funk said that when the council was organized there was a lack of safety ideas on the property. Employees had no knowledge of the high duties under the law that an electric railway owed the public. The fact that the men were naturally careful was indicated by the fact that when crowds were handled accidents were few. The company inaugurated competition for low accident records, among the rewards being a monthly dinner to the carhouse with the fewest accidents per mile during the preceding month. J. P. Barnes, president of the company, acts as toastmaster at these. As an illustration of the results, one carhouse recently had a mileage of 25,000 without one accident reported during a month. Many safety suggestions are received from the men, and 90 per cent of these have been adopted.

REMARKS BY MR. EDWARDS

L. A. Edwards, Youngstown, Ohio, was next called on for some figures as to the results of accident prevention work by the Pennsylvania-Ohio Electric Company. He said that this company started a safety campaign early in 1920. As a result 1921 showed a decrease of 30 per cent in accidents and eight months of 1922, a decrease of 26 per cent over the same period for the preceding year. Casualties have decreased as follows: 1919, 26; 1920, 13; 1921, 4; 1922 (8 months), 2.

In addition to the statistics, Mr. Edwards said that accident prevention is important, first, from the broad and humane standpoint, but it also has an economic phase as illustrated by the above statistics. Experience generally throughout the country has proved that, where organized efforts have been made, accident prevention work has paid big dividends by reducing claims.

On the Pennsylvania-Ohio property monthly meetings of committees appointed from trainmen, linemen, and power-house men are held. The men are invited to hand in safety suggestions. These "intermediate committees" act on the suggestions or pass them on to the central safety committee.

Mr. Edwards illustrated how accident costs in public utilities have risen to staggering figures during the past few years. This is particularly true where there is a marked tendency to commercialize upon an accident; where solicitation of accident cases is common practise; where juries are only too ready to return verdicts highly inconsistent with loss or suffering sustained. The $1,500 jury of yesterday is the $5,000 and $20,000 jury of today. Similarly, the $100 claimant of yesterday is the $500 claimant of today.

While claims adjusters and investigators are invaluable to a property, said Mr. Edwards, it is important to look beyond the work of these men to accident prevention. Economy and good business should demand organized efforts in any industry, and especially in the electric railway industry, looking to this end. Accidents do not happen, they are caused.

REMARKS OF MR. OLDENBURG

Mr. Rice next called upon Charles Oldenburg, general claim agent Chicago & Interurban Traction Company, for remarks. Mr. Oldenburg said that the Bureau of Safety on that line had been functioning for two years and a half, and during that time there has been a notable decrease in accidents. Last year the bureau held twenty-four meetings with trainmen, thirteen with shop men, eleven with track and electrical men, and twelve with a central committee. At these meetings 492 recommendations were made, of which 444 were approved. Accidents as a whole were reduced 26 per cent, boarding and alighting accidents 49 per cent, and employee accidents 71 per cent. Eighty per cent of the automobile accidents were due to the fact that the automobiles ran into the rear or side of cars, ten to the fact that the automobiles pulled directly in front of the cars, and only 3 per cent were due to negligence of the railway employees. There is a law in Illinois, though not enforced, that automobile drivers must come to a full stop at or before coming to an extrahazardous railroad crossing.

During 1921 there were 606 deaths due directly to automobile accidents in Chicago and Cook County and only 345 fatal accidents due to the electric and steam railroads. Industrial fatal accidents numbered 261. This indicates that greater care should be taken by the state in issuing automobile drivers' licenses. The speaker's company has not had difficulty in this respect, as it has not had a single judgment entered against it for an automobile accident.

Mr. Rice then introduced Walter E. Robinson, Cincinnati, Ohio, who spoke on "Claims Department Practice Which May Encourage Claims." An abstract of this follows.

PAPER BY WALTER E. ROBINSON

Mr. Robinson said that it was his purpose to refer specifically to some evils in the line of this subject which have existed so long as to have become customs. The claims department, which is of comparatively recent origin, is a product of the complaints and criticisms arising from the operating and transportation branch of the industry. It is closely related to and a part of the transportation department. There are no hard and fast rules for solving the problems of the claims department and determining what its course should be. There should, however, be a more definite policy framed, and more effort made to standardize methods. If, said Mr. Robinson, the claims departments are indulging in practices which encourage claims, as the percentage of settlements for accidents would indicate, they are such as have aroused the hostility of the community as reflected in the attitude of the public mind.

The claims departments are influenced seemingly by a desire to popularize the department and to fulfill the expectations of the car riding public that any mishap occurring to them while passengers entitles them to pay.

Taking up the specific points of his topic, Mr. Robinson summarized them as follows:

Due to the practice of maintaining a force of outside adjusters, claims departments make entirely too many settlements without proper regard for those most entitled to consideration or for the industry itself. This reduces the department's function to a barter and trade basis and frequently opens the question of honesty and regularity of the entire transaction. Wholesale settlement of claims leaves the impression that the railway is an insurer against loss and injury resulting from its legitimate operation.

Another matter is the attitude on the part of some departments which discourages personal calls and encourages litigation, professional visits or summons or notice of suit by an officer of the court. A policy of isolation is unsatisfactory and irritates even those who are kindly disposed. Complaints should have the first call on attention and claims, imaginary or otherwise, are entitled to fair consideration.

It is also unwise to rush company surgeons to the scene of an accident or force their services on the injured, or near injured, immediately thereafter. This arouses suspicion and centers the patient's thoughts on the size of his claim.

It is a mistake to permit large numbers of suits to accumulate in a comparatively few offices, as this tends away from the handling of litigation on individual merit rather than on a bunching or wholesale basis.

Mr. Robinson closed with a word on the activities of claims departments following accidents. The haste with which settlements are attempted, the stock arguments advanced to induce settlement, the evidence of fear attending the departments' operations and the atmosphere of mystery which surrounds their movements are all unfortunate. The argument that it is necessary to do some of these things in certain localities to keep claimants from falling into the hands of lawyers is poorly founded. Is it a virtue to secure release for an injury for less than its worth, and a vice for a lawyer to try for more than its worth? Claimants should be given a chance to present their claims and know the company's method of dealing. In Cincinnati during the past year 80 per cent of all claims made against the company have been made in person at the company office.

President Rice next reported the following as the nominating committee: L. H. Butterworth, Boston, chairman; J. S. Kubu, Cleveland; C. M. McRoberts, Los Angeles; F. H. Warren, Chicago, and H. O. Allison, New Brighton, Pennsylvania.

Symposium on Automobile Accidents

Testimony from Several Parts of the United States and from Canada Indicates the Alarming and Increasing Seriousness of This Hazard—In Some Cities One-Half of All Accidents Now Involve Collisions with Automobiles

MR. RICE next referred to the symposium of papers which had been prepared on the subject of automobile accidents and called upon C. M. McRoberts, Los Angeles, to open the discussion. Mr. McRoberts spoke of the automobile problem in his city as probably greater than in the average, as evidenced by the fact that more than 65 per cent of the accidents are caused by automobiles. This is due in part to the fact that in Los Angeles the automobiles can be used during the entire year for pleasure purposes. Many tourists come to the city especially to spend their winters, bringing their automobiles with them. During four years the number of traffic accidents reported to the police department has trebled. In the first seven months of 1919 sixty persons were killed in traffic accidents on the streets, while for the first seven months of this year the number was 157.

In spite of the fact, said Mr. McRoberts, that this is the biggest single problem confronting the local railways, he had no definite solution for it. However, in Los Angeles, at least three organizations are having weekly meetings and discussions, formulating plans, and considering ordinances having to do with traffic congestion and traffic problems. The Los Angeles Railway is facing at this time the problem of getting its cars off the downtown streets of the city. The automobile congestion is becoming such as to make it impossible to get cars through the city during the rush hours. The company is facing the problem of some kind of terminal or loop. While the expense of widening the streets is staggering, this must come eventually.

In Mr. McRoberts' opinion the larger problem of public safety is in the hands of the people. If they appreciated the circumstances they would comply with traffic regulations. Co-operation of the public should be sought, through bulletins in the street cars, magazine articles, addresses before clubs and civic bodies, newspaper advertising, and such other channels of publicity as may be open. Public safety committees should be appointed wherever possible.

Among other things enumerated by Mr. McRoberts which electric railways could do in this matter is the securing of the passage of a law requiring drivers of all automobiles to be examined as to mental and physical fitness, and ability properly to operate motor vehicles on the streets and highways. There should be a maximum as well as a minimum age limit for all drivers.

Again, uniform traffic laws could be secured covering the operation of automobiles in all states. The rights and privileges of drivers should be clearly defined by law. It is now exceedingly difficult for a driver going from one state to another to comply with the law and not be a menace to others lawfully using the highways. There should be a uniform type of warning signs, and uniform methods of placing warning signs at dangerous points. A universal signal device notifying automobile drivers that they are approaching grade crossings would be helpful. Uniform laws covering rights of way, methods of signaling, etc., would also be of value.

The speaker also urged the passage of a law requiring the owners of motor vehicles to take out insurance policies in companies approved by the motor vehicle department, or the proper state department, the policies to cover not only insurance to pedestrians or others on the street, but to protect guests in automobiles. This would do much toward curbing reckless driving.

Another thing urged by Mr. McRoberts was a change in the law of imputable negligence. The general, although not universal rule, is that the negligence of the driver is not imputable to his passenger or guest. It is thought that the new rule should be as stated by the Supreme Court of Michigan in the case of Colborne vs. Detroit United Railway, 143 N.W., page 32, wherein the court said: "Where a person of mature years voluntarily enters the private conveyance of another to ride with him and by his contributory negligence is injured, she must be held to have adopted his conveyance for the time being as her own and to have assumed the risk of his negligence."

Another desirable ordinance is one prohibiting automobiles from driving on street car tracks in congested districts. There can be no question that the different automobile clubs and civic bodies generally are convinced that there should be a decided change in automobile and traffic laws and more rigid enforcement of them. The courts have been entirely too lenient with the traffic violator. Electric railways should get back of all prosecutions, cooperate with police departments and courts in every way, and see as far as possible that traffic ordinances and laws are obeyed. Rigid enforcement of traffic laws and ordinances does reduce accidents.

In some cities failure to enforce such ordinances will be excused on the ground that there are insufficient policemen. In these cases the police force must be increased.

Mr. McRoberts urged co-operation with automobile clubs, which will be found anxious to aid. So also will transfer companies, taxicab companies, dairies, department stores, etc. In cities where traffic congestion is heavy in the downtown districts co-operation with organizations urging street widening is desirable. Alleys should be constructed for the use of commercial vehicles in loading and unloading. Ordinances should be passed compelling pedestrians to move forward with vehicular traffic and prohibiting parking in the downtown districts during business hours.

Coming now to what can be done by the railway employees, Mr. McRoberts said that much of the burden of preventing traffic accidents must be borne by the men who operate the street cars. The highest type of men should be employed in train service. The claims department should co-operate in the training of men with a view to reducing accidents.

Mr. McRoberts said that he handles accidents like other investigations. The investigation should be made as soon after the accident as possible and should be thorough, covering every possible avenue of information. The investigator should be thoroughly familiar with the rules of law covering this class of accident. Immediately following the accident, before conditions have changed, the crossing at which the accident occurred should be photographed, showing all obstructions which might have prevented the party driving an automobile from seeing the approaching car. If possible, a photograph of the vehicle involved in the collision should be obtained.

A thorough investigation should be made of the location of the accident, and a careful canvass made of every house in the vicinity to secure signed statements from those who saw, or might have seen the accident. It is important, also, if others in the machine were injured besides the driver, to establish their relationship with the driver.

Where the claim investigator has fixed in his mind the rule of law affecting the possible liability of his company, it should be easy for him to collect all available evidence as to negligence or carelessness on the part of his company, as well as the parties in the automobile.

Mr. McRoberts said that in the adjustment of automobile cases he pays claims which are valid and declines to pay others, and where no personal injury is involved resolves all doubts in favor of the company which he represents. Where personal injury is involved it is often possible to co-operate with the driver or the insurance company involved. If an automobile accident has been thoroughly investigated promptly, the preparation of the case for trial is easy. The railway company wins its lawsuit because it prepares its cases with great care.

REMARKS BY E. M. RAVER, LINCOLN

The discussion was continued by E. M. Raver, Lincoln, Neb., who said that as a helpful means of preventing accidents his company, the Lincoln Traction Company, tries to cultivate an interest in accident causes. All employees are constantly reminded of the expense and suffering incident to automobile accidents. They are reminded that while the railways have certain rights in the streets, these are not superior rights. Thus if investigation develops the fact that the automobile driver has done everything possible to prevent the accident after the danger has become imminent, the claims department has but slight defense. Weekly meetings of heads of departments of the company are held for the consideration of accident reduction suggestions.

Accidents are immediately reported to the car dispatcher, who notifies the superintendent, the surgeon and, if there is a personal injury, the claims office. As soon as information reaches the last named, the investigation starts and no detail is overlooked. Included with the physical data collected are facts as to the standing of the damagee, his relatives and business associates, his probable legal adviser, his financial rating, and his record as a driver of motor vehicles.

The adjustment of claims, said Mr. Raver, is practically a matter of salesmanship. It is well to avoid making an offer of settlement until the claimant's idea as to what is expected has been obtained. Automobile accidents in which personal injuries have occurred are handled in Lincoln with greater care than those involving property damage. If after personal investigation there appears to be liability of the company, the settlement is made promptly if the demands are not unreasonable. In preparing a defense, in case a suit has been filed, the claims office stands ready to furnish counsel with a list of jurors who have served on traction cases during the preceding ten years. It appears that jurors who have served on damage cases and participated in adverse verdicts have a tendency to do the same thing again.

After the conclusion of Mr. Raver's remarks several papers were read by title. Abstracts of these follow:

PAPER BY E. J. PAIGE, BALTIMORE

The tremendous effect on the community of the automobile as a means of transportation, said Mr. Paige, was not at first fully realized, either from the standpoint of traffic or safety. The mushroom growth of the traffic has been so rapid that railways find themselves confronted with a serious situation without adequate means of regulation. In Baltimore, in 1912, only 2 per cent of the street railway accidents resulting in personal property damage or personal injury were due to the automobile, but in 1921 the figure was 25 per cent.

The remedy for this condition lies in education along proper lines, strict supervision and discipline. These will at least alleviate the difficulty. This work should not be confined to the street railway alone, but should reach the community at large through properly organized safety departments.

The Baltimore safety department was reorganized in 1919, and up to 1920 there had been a steady and alarming increase in automobile accidents. While the number has not since been decreased, as in other classes of accidents, the increase has been checked.

At first, said Mr. Paige, the efforts were directed almost exclusively to the company employees, but, through co-operation, the 75,000 automobile drivers have now been reached. In 1915 the cost of automobile accidents was 7 per cent of the total claims department expenditure, while in 1921 it was 18 per cent. In the first eight months of this year the amount was decreased to 15 per cent, due, it is believed, to the results of concentrated efforts along educational lines.

Experience in Baltimore has taught the importance of prompt investigation of automobile accidents, with an inspection by a competent inspector of the damage. The only cases called without investigation are those in which no property damage is reported.

Unless investigation discloses the fault of the railway company, the latter declines to settle and as a result has many suits filed growing out of automobile accidents. In 1921 this number amounted to 42 per cent of all suits filed. For the first eight months of 1922, while the company won 67 per cent of all suits tried, it won 85 per cent of all suits growing out of automobile accidents, and many of the verdicts for the claimants were for less than the damages proved.

The same policy has been followed with regard to insurance companies as with owners in subrogation claims. The insurance companies are reasonable when the position of the railway is understood. Experience of the company shows that best results in this work can be obtained by (1) effective and persistent safety efforts, (2) prompt and thorough investigation of all accidents, (3) prompt and fair adjustments of liability claims, (4) vigorous defense of those claims for which the company is not liable.

PAPER BY A. E. SHAW

A. E. Shaw, chief claim agent Montreal Tramways, said that in that city automobile accidents had gone up by leaps and bounds in the last few years until now more than 50 per cent of the accidents on the Montreal Tramways are hazards of that nature. Besides the 65,000 registered automobiles in the province there are many belonging to tourists. There is justification for the stand that all claims for damages to automobiles should be resisted with the exception of claims for damages when the automobile, going in the same direction, has been run into by the street car, or where the car has run off the track and thus caused damage. The subject can be divided into four parts: 1. Prevention of accidents. 2. Investigations. 3. Adjustment. 4. Defense.

In regard to prevention of accidents, the traffic laws might well be revised, but it is even more important that the present laws be enforced, and the claims department should bring infractions of these laws to the attention of the police. During 1920 forty-four arrests in one week were made of violation of the traffic laws at the instance of the railway superintendent, and the following week accidents between street cars and vehicles, outside of accidents at street intersections, were reduced 50 per cent. Uniform traffic laws are very much needed, and something should be done to compel automobile drivers to be acquainted with the traffic laws, such as to compel them to pass an examination. They should also be taught not to cross streets within a short distance of an approaching moving car or come in front of one, as there is the danger of collision owing to slippery rail condition, and they should give proper signals when an automobile is stalled on the track, etc.

The Montreal Tramways Company has adopted the policy of rendering accounts for damages to cars in collision with automobiles. This policy has had the effect of causing the chauffeurs of trucks to be more careful, as in many cases they have been compelled by their employers to pay the damage caused by their neglect and carelessness. All of the fault does not rest with the chauffeur and motormen should also receive more instructions in accident prevention, particularly the danger caused by a greasy rail.

Under the subject of "investigation," the speaker referred to the fact that witnesses on the street generally see more of an accident than the passengers. This is particularly true in regard to witnesses at the front of the car when the accident occurs at that end and in the rear of the car when the accident happens at the rear. Hence the employee should get names of witnesses among these bystanders. The past history of the injured party should also be ascertained, as some portion of his incapacity may be due to a previous accident. The police report should also be obtained and added to the file of evidence.

In the adjustment of automobile accidents, the personal element is fundamental. The successful adjuster should be endowed with common sense and be strictly fair to the claimant and to the company as well.

In the defense of an automobile case, information in reference to the records of chauffeurs is of great value, and all particulars about the persons who were the occupants of the automobile should be obtained. Evidence produced in court as to the distance at which an automobile can be stopped, proceeding at a certain speed, can often be used to advantage. Where the automobile was not carrying tail or front lights at the time of the accident, it is strong contributory negligence on the part of the owner.

PAPER BY MR. PRUGH

Charles B. Prugh, claim agent Columbus Railway, Power & Light Company, Columbus, Ohio, said that in 1921 45,000 automobile licenses had been secured in Franklin County, and thousands of other machines passed through Columbus weekly. Trainmen should be instructed in regard to sounding gongs, passing vehicles, location of dangerous intersections, etc., and weekly letters addressed to them and posted in the carhouses, showing the number of accidents occurring on the various divisions and calling attention as to how they might have been avoided, are sound propositions. The traffic supervisors can also point out to the men how to avoid collision.

During the past eighteen months 50 per cent of the accidents happening on the lines of the company have been with automobiles. There is no reason why such accidents should be investigated unless a claim is made, or the machine is damaged considerably or some one is seriously hurt. If investigation divides the responsibility, settlement may be made according to the findings, say from one-fifth to three-quarters of the repair bills. In nearly all accidents the company waits until claim is made before making an offer, and the same procedure is followed when suit is brought. The plaintiff's attorney must be the first to indicate a desire to compromise. Out of the last twenty automobile cases tried by the company only two verdicts were in favor of the plaintiff, and they were for small amounts. The other eighteen were either won by the company or settled out of court for nominal sums. The percentage of cost of automobile accidents, compared with the total outlay of the claims department of the company, for the eight months ended Aug. 31, was 28.8 per cent. The average cost per automobile accident for the same period was $5.11. For the eight months of 1922 the claims cost of the railway department of the company was 0.89 per cent of the gross railway revenue. Including light and power the percentage was 0.5 per cent. Local conditions, however, have a bearing on this percentage. Where there is a large foreign population, the percentage of claims and payment would probably be higher.

PAPER OF MR. WALTZ

The next paper was by V. J. Waltz, claim agent Community Traction Company, Toledo, Ohio. He said that auto deaths in ten American cities picked at random show increases in five and decreases only in those cities where safety campaigns have been in progress during the past two years as follows:

	1920	1921
New York	756	865
Chicago	542	668
Philadelphia	232	191
Detroit	240	134
St. Louis	102	97
Milwaukee	72	67
Rochester	37	38
Flint	52	25
Louisville	18	20
Grand Rapids	16	17

These figures include all kinds of accidents, not those caused by collisions between street cars and automobiles, but they show the necessity of inducing the automobile owners to drive safely. In Toledo the company has tried about everything it can think of to reduce this casualty list, such as school scouts, course of study in public and parochial schools, reorganization of the police traffic bureau, joint work with the local automobile club, systematic placarding of the front and rear of the street cars, and weekly talks at the carhouses to the platform men.

One of the best plans is the placing in all of the carhouses of what is called a "map reminder." A large map shows all of the car lines, and a careful check is made of the location of accidents, a circle being drawn at the point where the accident occurs, red if by day and black if by night. An "A" means an automobile accident. Other accidents are marked accordingly. These maps are posted once a month, and in the talks to platform men attention is constantly drawn to them, as they show the dangerous traffic corners. If it appears that vehicular accidents are occurring too frequently at any particular intersection, a slow order is issued for the particular point. If there is danger on a curve that the sweep of a car will bump either a person or a vehicle, a large warning sign to that effect is posted. This helps to prevent accidents and is also a weapon of defense as a warning has been posted at a dangerous corner.

In 1921 as compared with 1914, all kinds of accidents to the public were reduced from 3,008 to 2,295, the expenses from $149,225 to $69,729, and the percentage of gross revenue paid out for accidents from 7.818 to 2.35.

The method of investigating accidents is very similar to that described by some of the other speakers, though a special point is made to determine just when the auto was driven upon the track while the car was a certain distance away. Great reliance also is placed on interviews with witnesses as compared with mail investigation, and when the replies of the witness are written by the investigator instead of by the witness, it is the practice to have the answers brief and to have the witness write above his signature "I have read this statement, and it is correct."

PAPER BY MR. CONKLIN

George H. Conklin, claim agent Augusta-Aiken Railway & Electric Corporation, said that in a city with such wide streets as Augusta collisions between automobiles and trolley cars should be a rarity. The main street in Augusta is Broad Street, which is 160 ft. from curb to curb. Nearly all the automobile accidents on this street happen at the parking places, when the drivers carelessly go across the tracks. On other streets, the principal cause is cutting in front of the car. Forty-five per cent in number of all accidents of the company have to do with automobiles, though in expense the cost was only 14 per cent.

When a claim for automobile damage is made the claimant is told to have the repair work done on his own account, and if the railway company is liable it will settle with him. This allows the owner to think over the accident, and he usually recollects that he was primarily responsible and so does not push the claim. If he does, he will find that the company usually has taken the precaution to secure a list of witnesses to the accident who having seen it can explain how it actually occurred. But the company permits few automobile cases to reach the court house. If it is at fault it settles promptly. Where there has been personal injury the company has found little difficulty in settling the case by paying the property loss.

The company gives special attention in training its motormen, both old and new, to guard against automobile accidents by ringing the gong loudly before entering all cross streets, making "slow" crossings, etc. Space is given to the subject in the company publication, and warning signs are carried on the express car and sprinkling car. Two years ago when automobile accidents were very numerous the company called for help from the Chamber of Commerce, the City Council and the police. Some time previously the Council had appointed committees to see what was being done in other places regarding automobile traffic. As a result the "One Hundred Club" was formed, made up of representative citizens who agreed to report to a captain all violations of city ordinances by automobiles noticed by them. Secrecy was maintained as to the authorship of the report. This plan worked very well, and interest was only permitted to lag in it when the citizens generally began to travel in the proper direction, park in the designated place and otherwise obey the laws governing traffic.

Automobile accidents have also been reduced by the practice of having uniformed police at the three business corners to record offenders. These police are stationed in towers where they can observe the traffic well.

In concluding the Tuesday afternoon session, Mr. Rice called attention to the safety report of the Transportation & Traffic Association, copies of which had been distributed to the members present.

Wednesday Afternoon Session

Means for Circumventing the "Ambulance Chaser" Formed the Basis of Discussion at the Third Session of the Convention—The Contingent Fee Is a Source of Trouble in This Connection

THE Wednesday afternoon session of the Claims Association was begun with the presentation of four papers by W. W. Smithers, Joseph S. Kubu, John W. Yenson and A. E. Powell on the general subject of "Ambulance Chasers." Mr. Smithers' paper was presented in his absence by Mr. Hellmuth.

ABSTRACT OF PAPER BY W. W. SMITHERS

William W. Smithers, Philadelphia, in his paper on "The Ambulance Chasing Evil and the Remedy" described at length the practices followed by unscrupulous lawyers in securing and handling accident cases. He attributed responsibility for toleration of such conditions to the existence of the contingent fee contract. While showing how dangerous to the administration of justice is the contingent fee, he comes back to the confirming reality that we must concede the validity of a contingent fee contract between attorney and client, although it may contain every feature which our English forbears declared was champertous and constituted a menace to social order and the purity of our courts.

The courts have sanctioned contingent fees on the assumption that every lawyer is imbued with the high ethical ideals imbedded in the traditions of the profession. Mr. Smithers states that it is well known that such an assumption is unfounded in respect to many groups, for they deliberately debase their cloth and use the judicially expounded and reasoned term of contingent fee to justify a pure commercial gamble in broken bones and human blood.

As to the remedy Mr. Smithers said that there must be new laws of wider scope and of application differing from those applying for champerty and maintenance. Many men believe that regulation of all contingent fee contracts would thwart the evildoers. In that direction the Pennsylvania Bar Association worked for several years, and in 1919 drafted a proposed act requiring the contract to be sanctioned by the court and filed of record, thereby utilizing publicity as a preventive measure. However, no action on this was taken by the Legislature and there the matter stands. The principal objection made was that the proposed act, in attempting to regulate, gave a definite recognition to the propriety of such contracts. There is undoubtedly much force in that point.

A careful study of the whole question seems to indicate that legislation can be more effective if directed against the producing agencies; that is, the solicitor or runner. This was tried in New Jersey by an act passed in 1919 and is said to have had a favorable effect. It forbids any one who is not a lawyer soliciting upon a basis of compensation. It did not definitely prescribe a penalty and was not as comprehensive as it seems it could have been made. It has also been criticised because tacitly permitting lawyers themselves to do the prohibited thing. A bill identical with this was offered in the Pennsylvania Legislature in 1921, but was opposed by a group of lawyers engaged in the business, and after being amended in its vital points was even then allowed to die in committee.

At the Pennsylvania Bar Association last June there was presented the draft of an act along the same lines but embracing the solicitation of either criminal or personal injury cases, making it a misdemeanor and prescribing punishment by fine and imprisonment. It was approved and returned to a committee with instructions to have it offered at the coming meeting of the Legislature in January next. The substance of this act is to prohibit persons not admitted to the bar of any court of records in Pennsylvania, in certain cases, from soliciting any person in the state to retain any particular attorney to defend that person in any criminal prosecution or to institute or prosecute a suit for damages for wrongful act in which the person so soliciting shall by agreement receive from the person solicited, or from the attorney retained, any compensation whatever. Any person violating this act would be guilty of misdemeanor and upon conviction would be punishable by a fine not exceeding $500 or imprisonment not exceeding thirty days, or both. Furthermore, conviction for this offense would require the guilty person to repay to the party solicited the amount found by the court to have been so unlawfully received by the defendant and added as an additional fine at the time of sentence.

MR. KUBU DISCUSSES CLAIMS FRAUDS

In his paper, Joseph S. Kubu, former secretary of the Claims Association, described the devious methods and monstrous tactics used by the "ambulance chaser" to secure clients and manufacture exaggerated bases and claims. For sources of information this fellow peruses all police reports, scrutinizes the daily newspapers, has associated with him directly or indirectly persons of every tongue, organizes investigating and adjusting agencies, employs an occasional policeman who is unscrupulous, now and then succeeds in using an employee of the railway company itself, has agents and experienced scouts who discover the man who has had some sort of minor accident months or years before, fraternizes with some disgruntled doctor, and so on.

Having the information, the next step is to secure an audience with the injured person. In this respect, the ambulance chaser's methods have become practically a science. These men become very expert in their understanding of how to approach individuals. Sometimes the fearless audacity of an attorney will take him personally into the presence of the injured, but more frequently the way is paved through hired representatives. He then presumes upon the unsophistication of the prospective client and elaborates upon his own proficiency and successes in securing large awards of damages, while never failing to recite the heartless methods employed by the company where the client consents to deal directly with it. Finally convincing the client of the desirability of employing the particular lawyer in question, the injured person is forthwith induced to sign a contract which is an irrevocable agreement to pay to the attorney an unreasonably large proportion of what he may receive. Having this, the so-called lawyer then assumes an inflated sense of proprietorship and becomes dictatorial in outlining the course to pursue. He requires that the attending physician be dismissed and a substitute of his naming engaged instead. He goes to the railway company with an exorbitant claim, which the latter of course declines to make the basis of a settlement.

In course of time the case comes to trial. The very atmosphere of the court breathes an eager interest in the jury. Every individual who has assisted in building up the plaintiff's case is present, their evident purpose being to influence the jury and commend themselves as worthy of sharing in a large award. The real problem presented is the jury, the uncertainty of the final issue of a lawsuit, and every important matter connected with it has not escaped the thoughtful consideration of the ambulance chaser, nor has he failed to make all possible provision to influence everything in his favor.

Mr. Kubu then gave a number of illustrations of his experience to show the cunning and maliciousness with which these unscrupulous lawyers work.

MR. YENSON'S VIEW OF AMBULANCE CHASING

J. W. Yenson, New York City, in his paper on ambulance chasing, said that his experience had led him to the conclusion that the difference between the amount of money which the injured person eventually named as acceptable to him or her, and the demand of the ambulance chasing attorney, usually exorbitant, is the primary cause of litigation which is costly and altogether unnecessary. Many if not most of these claims would be settled amicably by the principals if left to themselves, assuming of course that the facts would justify the defendant in making an offer of settlement. It is a common occurrence for claimants and plaintiffs in cases of this character, realizing that they have been deceived, to call of their own volition at the claims department of the defendant company and beg that assistance be given in their attempt to induce their unsolicited counsel to withdraw. In New York it is necessary to contend with a coterie of a dozen attorneys, well known to each other. In every claim office at least one of them becomes active following any serious accident. These men are a disgrace to a noble profession and a thorn in the side of every claim agent.

Mr. Yenson then summarized the sources of information, citing traffic officers and patrolmen who keep attorneys' cards in their possession, hospital attendants, newspapers, etc. He also reviewed some of the methods employed to secure clients and place them in the position of having to sue.

He made the observation that with rare exception the lawyers who have been guilty of the unethical practices referred to are men of little legal ability, although some of them are possessed of unusual cunning and are highly ingenuous in devising perjurious theories of liabilities. A great many, possibly through fear, never try their own cases. They exact the largest fees, usually 50 per cent of the amount recovered, and it is a noteworthy fact that they will bring suit, regardless of whether or not a case is meritorious.

As a constructive suggestion Mr. Yenson gave it as his opinion that there should be closer co-operation among claim agents throughout the country in an effort to drive this class of lawyer out of the profession which he is disgracing, and thereby save thousands of dollars to carriers, besides greatly benefiting those who have unfortunately been injured. While they may in certain instances force a larger settlement, the injured person in most cases receives less as his share than he would have received by dealing directly with the company. The surest way to drive this pest out of business is through the bar associations. With possibly few exceptions, these organization are officered and controlled by the highest members of the profession, men who have the utmost contempt for this class of lawyer.

They are ready to act whenever sufficient information is laid before them. Another method is publicity, in order that the public may be enlightened as to the methods employed.

If we keep our own record clean in dealing with the injured, it should not be difficult to induce the managers and editors of the better class of newspapers to give prominent space now and then to the practices of these unscrupulous claim agitators.

CHAMPERTY AND THE LAWYER

Albert E. Powell of Squier, Sanders & Dempsey, Cleveland, presented a paper on the subject of "Champerty and the Lawyer," which reviewed the attitude of the courts toward the practice of soliciting for clients. He also quoted Canon 28 of the American Bar Association, which deals in very plain and disapproving terms with the feature of so-called soliciting. Referring to the contingent fee, Mr. Powell said that while closely knit to the solicited case, it is on a different basis. It is urged, and with force, that a poor litigant cannot have his rights determined and protected in an action at law unless an attorney is willing to take his case upon a contingent fee. Opposed to this consideration are others of weight. The whole question of contingent fees received the careful attention of the American Bar Association at one time, and when the canons of ethics of that association were being prepared, no one subject received greater consideration. It is said that 100 canons on the subject were formulated and submitted to the committee and reams of printed argument were offered. The canon finally adopted was a short one, No. 13, as follows:

"Contingent fees, where sanctioned by law, should be under the supervision of the court, in order that clients may be protected from unjust charges."

After the reading of these papers, President Rice said that, believing there are things that can be done to correct the ambulance chasing difficulty, he had taken the matter up with the American Medical Association and the American Bar Association. A letter from each of these associations was then quoted to indicate that both associations disapprove of such practices and endeavor to bring them into disrepute.

President Rice then called on R. R. Herrald, chairman executive committee of the International Claims Association, to discuss the problem from the standpoint of the casualty companies.

REMARKS BY R. R. HERRALD

In behalf of the International Claims Association, an association of accident claim adjusters, Mr. Herrald said that this association always stands ready and willing to give hearty co-operation to the railway claims association in any way that can be of mutual assistance, particularly in the matter of ambulance chasers. Referring to the difficulty of railways in securing medical examinations, he said that the insurance companies protect themselves in this matter by having a provision in the policies that the company shall have the right and opportunity to make an examination in any manner it may see fit of the insured. Mr. Herrald said that he had always had very good co-operation on the part of the claims departments of the public utilities, although he did not think that the latter availed themselves of this opportunity as much as they should. He presumed that the majority of the bureaus to which the railways belong subscribe to the Hooper-Holmes Bureau, that is, the information bureau of all accident risks. The moment an accident occurs in which an insurance company is interested, this action is reported to the Hooper-Holmes Bureau and by inquiry of that bureau it is possible to ascertain what previous accidents or injuries the particular person involved might have had.

President Rice heartily indorsed the suggestion of Mr. Herrald that use be made of the Hooper-Holmes Bureau, stating that he believed this to be the greatest defensive step that the Claims Association had ever taken, and he thought it would be more largely patronized if its usefulness became better understood. At this point he expected to hear from R. H. Doolittle, president of the Association of Railway Claim Agents, but he was not present. Mr. Rice said that this association had assured him of its desire and willingness to co-operate with the Claims Association and to give the electric railway men the benefit of any knowledge the steam railroad men had and to receive in return any suggestions, in order that some definite move might be adopted.

To bring out the local experience with ambulance chasers in several cities, President Rice then called on the claims men from New Orleans, Memphis, Tenn., and Waterloo, Iowa, which was as far as time permitted the discussion to be carried.

MR. KERNEN'S REMARKS

B. J. Kernen, New Orleans, said that the ambulance chaser was the least of the troubles in New Orleans. The company there has not fared badly with the courts either, except in the period immediately following the war, when the inability to get good labor was reflected in more accidents and a lowered standard of service. This gave the public a feeling of resentment and larger verdicts were awarded against the company in cases where the liability was uncertain. In Louisiana there are statutes under which damage suit lawyers seem to be particularly favored. One recognizes the contingent fee contract and permits the transfer of the claim to the attorney as security for the fee. It provides also that where the contract stipulates against a compromise without the consent of both attorney and client, a compromise with the client without the consent of the attorney does not protect the defendant and the suit may be prosecuted by the attorney as if no compromise had been made—this for the purpose of establishing the amount of the fee for which the attorney may have judgment against the defendant. The practice of the railway company has been that where demand is made through an attorney, settlement is made with the claimant only with the attorney's consent. It has been found that this rule has been productive of gratifying results.

Another statute permits the bringing of such suit *in forma pauperis* where the plaintiff produces two affidavits (usually easily secured) besides his own, if he is unable to advance the costs or furnish bonds therefor. The Supreme Court of Louisiana has construed this law to mean that the plaintiff may prosecute the suit not only in the trial court but also in the appellate court without payment of costs, and has also decided that even in those cases where the fee was on a contingent basis and the claim transferred to the attorney, the suit could be prosecuted through both courts without previous payment of costs.

There is also a statute granting to personal injury cases a preferential trial both in the district and the appellate courts; and another grants interest from the date of the service of the complaint on the defendant instead of from the date of judgment. Despite these unfavorable laws, there has been no material increase in this kind of litigation.

As a definite suggestion for restraining the practice of soliciting personal injury claims, Mr. Kernen said that in any legislation secured to curb the practice, the rights of both sides should be safeguarded, and the contingency charged by the attorney should be under the control of the court. If that could be accomplished, the practice of soliciting claims would soon cease. Objection might be made that such a law would be unconstitutional as interfering with the right to contract. Mr. Kernen was not prepared to say what force there is in that assertion, but gave it as his opinion that such a law would be constitutional. To support this opinion, he cited the fact that the fee of the attorney prosecuting pension claims is fixed by the act granting the pension, and that the workmen's compensation acts have somewhat curtailed the field of the procurer of personal injury claims.

Mr. Kernen said that laws punishing the solicitor of accident cases would not be enforced and that the only way surely to curtail the practice is to make it financially unprofitable.

EXPERIENCE IN MEMPHIS, TENN.

Roane Waring said that conditions in Memphis, Tenn., comprise ambulance chasing in its most developed form. He said he disagreed with a previous speaker that these ambulance chasers should be treated with tolerance. His idea was to handle such men without gloves. "A crook is a crook and my idea is that this fellow is a crook." Mr. Waring said that he thought the lawyers are more responsible for the troubles with ambulance chasers than anybody else, because they do not go after them sufficiently hard. He referred to the present practice in Memphis of handling all accident cases in the federal courts, on account of the company there being in the hands of receivers. In doing this it is arranged so that a number of cases that there is nothing in are sandwiched in between those of merit on which it has been impossible to agree on a settlement because the victim wanted too much. By the time the important case gets to the jury the latter has got a pretty general idea that the company is badly harassed, which is true.

Every effort is made by the company to avoid any evidence of trying to delay trial in any case. Another practice which has helped the company where an unscrupulous lawyer is involved is to move the federal court to make the lawyer give bond for costs, where the lawyer is interested in the litigation. The court sustains the company in this motion and the result is that the lawyer does not bring nearly as many trivial cases to court as he otherwise would. This has done more than anything in the experience of Mr. Waring to curtail this kind of litigation.

C. E. Pickett, Waterloo, Iowa, said he believes that special agents are just as necessary to defend this character of cases as lawyers are. As a result of following this plan, he cited several instances where unscrupulous lawyers and doctors in Waterloo had been forced to give up their practice and leave the city. In one case, three witnesses who testified in a lawsuit were sent to the penitentiary for ten years each for perjury. Mr. Pickett contended that it is up to everyone concerned with such a situation to meet it squarely, and if the attorneys on the other side are dishonest, to bring their dishonesty to the public and give it pitiless publicity. If the witnesses are perjurers, they should be sent to the penitentiary. Mr. Pickett stated that his company had not had an adverse verdict stand against it in twelve years. He emphasized again the importance of special agents as part of the work of a corporation lawyer. As a matter of policy he said that in handling these matters if there is a liability a company should settle, and if there is not a liability, it should fight.

Thursday Afternoon Session

The Closing Was Taken Up with Discussion of the Medical Testimony in Claims Cases, Together with a General Survey of the Claims Field—Revised Statement of Objects Was Adopted

AFTER the calling to order of the final session on Thursday afternoon by President Rice, William G. Marshall presented a chart on which 350 claims trials in which the Pittsburgh Railways had been a party were tabulated. In explaining the chart he said that the 350 cases were divided as follows: First, the average verdict was used in charting the various classifications. The various classifications were made by first dividing the cases among men, women and children. For each of these the cases were again divided among fatalities, dismemberment and other injuries. Each class of accident was then subdivided — for example, fatalities among married and single people, which in turn were divided as to class of work —labor, skilled labor, merchants, etc. Then laborers, for example, were divided into the ages of sixteen to twenty-one, twenty-one to thirty, thirty to fifty, and fifty plus; then each age was further subdivided as to nationality.

Following this discussion, the paper by William A. Challoner, Pittsburgh Railways, on the subject of "Medical Testimony in Defense of Litigation" was presented by the author.

THE MEDICAL POINT OF VIEW

He said that if medical testimony produced by the plaintiff is fair and honest, nothing is gained by the defendant in offering further testimony, or if the defendant's counsel is firmly convinced that no case has been made out in the law, he should offer no medical testimony. On the other hand, there are cases where such testimony is desirable. Some juries will believe that if the plaintiff's medical testimony is not refuted, the defendant's case is weak in other ways. The defendant must also often introduce medical testimony to hold down the damages to a point commensurate with the injury.

The medical man should preferably be of mature years and with considerable hospital experience, and he should give his testimony without showing prejudice. He should avoid where possible the use of technical language and should tell what his examination revealed rather than what it did not reveal. He should be present in court and hear all evidence on the injury, as his trained mind may sense the lack of connection between the symptoms and conditions described. It is not his duty to disagree with everything that the plaintiff's physician has testified to, but this does not mean that he is to answer only the questions put to him, and if he is sure of his ground he should be ready to deny the whole of the plaintiff's medical testimony with confidence and courage. Examples were given of claims defeated because of knowledge of the medical phases of the case.

Much depends on the charge of the trial judge, as the jury generally considers it more with a view to learn what the judge thinks of the facts than to get the rules from which the jury itself should find the facts. Hence it is of great importance that the medical testimony shall impress the judge himself.

The trial counsel and the physician should confer, so that the former will have a thorough understanding of the medical and surgical features of the case and know when to press a cross-examination of the plaintiff's physician and when not to. Great care should be taken when it is alleged that the plaintiff's condition is due to syphilitic infection. If possible, the case should be tried in such a way as to compel the plaintiff to make the first mention of that condition. Then it can be shown that its victims are often as innocent of personal wrongdoing as are sufferers from tuberculosis or typhoid fever.

Neither the medical men nor the trial counsel can afford to convey the impression that they regard themselves as in any way superior in intelligence to the jury.

DR. HALL ON CLAIMS INVOLVING WOMEN

The medical aspects of claims work as applied particularly to women involved in accidents were then treated in a paper presented by Dr. James Whitney Hall, a medico-legal expert of Chicago. The doctor said that because of the difference in anatomy, emotions, temperament and environment of the two sexes, conditions claimed as a result of an accident necessarily differ widely both as to subjective and objective symptoms. Women plaintiffs are far more prone to exaggerate than men. Then, too, the health of women is often supported by a slender thread, and a slight accident may produce greater and more serious results than in the case of the average man. It is generally recognized that a slight accident may do serious damage to a diseased or disabled person, while the same accident would injure but little, if any, one who is well. Hence, the added disability due to the accident is hard to estimate, especially with a woman, with the natural tendency to exaggerate.

The plaintiff's attorney in subjective complaint cases usually files a declaration averring that the plaintiff was entirely well and wholly normal prior to the accident. Then the proof of previous pathology and disability is not only valuable for the basis of amount of charges but has a strong tendency to discredit the plaintiff's entire case. Dr. Hall suggested that in considering any personal injury case where the pathological aspects are difficult to determine, it would seem that the only solution is a change in the present practice. He suggested that this change should constitute the practice of the appointment of a physician by the trial judge, another by the defendant, and a third by the plaintiff or his attorney, these three to make such examinations as they may in their judgment deem necessary to ascertain not only the exact condition of the plaintiff but the cause of the condition. This, in the doctor's opinion, would come closer to solving the trouble of arriving at the added disability caused by the accident than any other method.

At the present time, the defendant in Illinois is not permitted in any case to have a physician representing him make an examination without consent of the plantiff. The doctor said that such a law beyond all question is not only illogical, unfair and unbusinesslike, but absolutely ridiculous. He said it would be just as reasonable for a few merchants to attempt to sell a pair of shoes to an individual for a certain price without permitting the buyer to try them on.

In speaking of claims malingering, the doctor stated that this is not nearly as common among women as among men. In his twenty-five years of experience in medico-legal practice, he had had but one case in which he felt sure and was able to demonstrate that the plaintiff had no basis whatever for her claim. In other words, women exaggerate, but most of them have a foundation of some kind for the complaint originally, but there is no limit to what they can do in piling up evidence, and there is always some one ready to represent this woman if she wishes.

In recent years it has not been uncommon for one who is actually suffering from cancer or epilepsy and who has suffered some injury to make a claim that his condition is wholly the result of the injury. In view of the fact that the cause of these diseases has not been established, it does not satisfy a court or jury to have medical men, however competent and able in their profession, state that the condition did not come from external violence. The fact is almost equally true with regard to many other diseased conditions that are disabling, but in which the cause is known, namely, fecal infections, gallstones, peritonitis, appendicitis, hernia, etc. To answer such claims, it would appear that it can be successfully maintained that if the claim is true, all these conditions would be much more prevalent in industrial communities than they are in communities where trauma occurs but seldom. The converse is really true. In considering personal injury claims, public interest and the safety of life and limb should be paramount. At the same time the public should be given to understand as far as possible by publicity and other methods of information that every cent spent for dishonest claims is a waste which should be applied to the efficiency of the service, and that in the final analysis the public pays the claims. Dr. Hall then quoted Mason B. Starring in the comment that "those companies which have regarded the claims department as an aid to safe operation instead of a necessary evil are those which have gained the most in public approval and in net revenue."

At this point a paper on the medical defense of litigated claim was presented by Dr. John Leeming, medical counsel of the Chicago surface lines. As this paper is not yet available, it will be published in a later issue of the *Journal*. A pamphlet containing a digest of jury laws compiled by Walter M. Lindsay, Pittsburgh, was also presented.

J. H. Handlon, San Francisco, Calif., then presented a paper on "An Inspirational Review and Outline of the Probable Trend of Claims Work," which appears elsewhere in this issue.

At the conclusion of Mr. Handlon's paper, President Rice brought to the attention of the convention a proposed change in the statement of the objects of the association as included in the constitution and by-laws. Mr. Rice pointed out that the original statement of objects was so limited that, strictly speaking, all papers presented at this convention were contrary to the constitution. He said that the proposed new statement of purposes had been approved by nearly all of the past-presidents and that it was so stated as to give the members an opportunity to consider things along broader lines, and to attract some dignity and prestige to the association among the affiliated associations and others who may have transactions with the Claims Association. The new statement was thereupon unanimously adopted by the convention. This statement was published on page 329 of the Sept. 2 issue of *Electric Railway Journal*, and is republished on page 663 of this issue.

President Rice then brought before the convention his idea that it would be desirable to have some declaration of a code of ethics as a means of adding further prestige to the Claims Association. He said he had asked Russell A. Sears, who had been largely responsible for the drafting of Canon 28 of the American Bar Association's code of ethics, which deals with the practice of ambulance chasers, to prepare a suggested code of principles for the Claims Association. Mr. Sears was then called upon to present his work.

Mr. Sears pointed out that the matter was one of great importance which should be acted upon by a larger gathering than was then present as the meeting was drawing near to a close, and he therefore suggested that a committee be appointed to give consideration to a code of ethics and have a more definite code in readiness for discussion and action next year. A motion to this effect was made and carried.

Mr. Sears then took the opportunity to say that during the last fifteen years or more that he has been attending conventions of the Claims Association, he had never attended one that had done more good or shown a higher type of earnest effort, or a declaration of higher principles, and an endeavor to do what is right and live up to everything that is good, than the meeting this year.

Turning to President Rice, he said that he felt sure he spoke the sentiments of his associates when he voiced the gratitude felt to Mr. Rice for conceiving and carrying on the meeting. He then presented Mr. Rice with a token of the appreciation of his services in administering this splendid meeting.

After responding to the presentation, Mr. Rice reminded the convention that through an oversight no past-president's badge had been presented to J. J. Reynolds, Boston, who served the association preceding Mr. Rice. He thereupon handed Mr. Sears a past-president's badge and requested him to present it to Mr. Reynolds upon his return to Boston.

REPORT OF RESOLUTION COMMITTEE

A resolution expressing the loss of the association in the death of Louis Hoffman, formerly general attorney of the Public Service Railway of New Jersey, was adopted.

Another resolution adopted placed the Claims Association on record as approving the methods of promoting safety work and accident prevention as outlined at this convention, and urging the association to lend its best efforts to the conservation of property and life whenever and wherever there is an opportunity in this field of work.

Another resolution adopted provided for the appointment of a committee to study the automobile situation generally and to keep in touch with all matters bearing upon the subject and of interest to the association, for report at the next annual meeting.

Another resolution adopted provided for the appointment of a committee to study the subject of exorbitant contingent fees and ambulance chasing and to co-operate with all other associations to enforce the present laws prohibiting barratry, champerty and maintenance, and to urge legislative action in states with laws now inadequate.

NEW OFFICERS ELECTED

L. H. Butterworth, Boston, then presented the report of the nominating committee, whereupon the secretary was instructed to cast the unanimous ballot of the association, electing the following officers:

President, Wallace Muir, claim agent Kentucky Traction & Terminal Company, Lexington, Ky.

First vice-president, W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Second vice-president, H. D. Briggs, assistant general claim agent Public Service Railway, Newark, N. J.

Third vice-president, Joseph H. Handlon, claim agent Market Street Railway, San Francisco, Calif.

Secretary-treasurer, James W. Welsh, New York City.

In connection with the election of Mr. Welsh as secretary of the Claims Association, the nominating committee pointed out that it had made somewhat of a departure from precedent in this nomination and that the reason for the procedure is this: Mr. Welsh is secretary for the parent association and it was the desire of the American Association that he should also represent the various affiliated associations. Upon the express request of the American Association executive committee, the nomination of Mr. Welsh was made.

For members of the executive committee, the convention named the following:

Joseph S. Kubu, Cleveland; S. J. Herrell, Knoxville, Tenn.; T. B. Donnelly, Pittsburgh; L. F. Wynne, Atlanta, Ga., and the officers.

After installation of the new officers the meeting adjourned sine die.

Review and Probable Trend of Claims Work*

That the Tendency Is Toward Control of the Accident Situation Is Illustrated by Experience in San Francisco—At the Same Time the Claims Department Faces New Problems, While Old Ones Are Ever Present

By J. H. HANDLON
Claim Agent Market Street Railway
San Francisco, Calif.

THREE questions present themselves. What have claim agents accomplished in the past? How are they meeting the problems of today? What are their plans for the future?

In my mind the most conspicuous work we have accomplished in the past is to broaden the functions of the claim agent, so that not only does he endeavor amicably to dispose of the accident that has happened, but he deems it his duty to try to prevent the likelihood of such accidents again happening. And in my opinion, by far the most beneficial results in accident prevention have been accomplished by the care exercised in the selection and training of platform men, the just enforcement of discipline, the interest aroused in these men by safety propaganda continually presented, and the adoption of safety devices for our cars.

In the year 1908 the cars of the Market Street Railway carried but 21,672 passengers per accident and in the year 1921 they carried 32,860 passengers per accident—an increase of 11,188 passengers per accident or 51 per cent. During the year 1908 the cars of this company traveled 2,158 miles per accident and in the year 1921, 3,297 miles per accident—1,139 miles farther per accident, or a distance greater by 52 per cent.

In 1908 but 4 per cent of accidents involving the cars of this company were automobile accidents, whereas in 1921 more than 52 per cent of the accidents in which we were concerned were automobile accidents—an increase of 48 per cent. It is true, however, that there was some decrease in wagon accidents during this period. But this amounts to but approximately 20 per cent. Also, during this period cars were speeded up to meet a faster schedule, two additional tracks were placed on the principal thoroughfare, making Market Street, San Francisco, a four-track street. Traffic congestion has also increased due to the increase in number of automobiles to the point that there is now one for every seven persons resident in San Francisco.

We have never had a general safety committee among our employees, but we have created the thought that every employee is a member of the safety committee. The co-operation of the public in accident prevention has been enlisted by using the backs of transfers and the windows of cars for advertising purposes, and occasionally safety campaigns have been launched. Our work among our own employees has been by far the greatest factor in reducing accidents. I cannot urge too strongly that the claim agent or safety instructor be allowed to assist in the selection and training of platform men. I am given the opportunity of addressing all newly employed men after they have been in the service of the company for thirty days. Not only do I talk safety, giving illustrations of accidents and telling what to do when an accident occurs, how best to obtain witnesses, etc., but I take advantage of the opportunity to talk company loyalty and courtesy to passengers and to develop a personal acquaintanceship among the platform men. This often proves very valuable to the claims department.

Safety work among the public is always desirable, but it should be borne in mind that the action of the public cannot be controlled as can the actions of the employees of the company.

Another lesson we have learned is the wisdom of not soliciting injured persons to file claims as was often done by immediately calling upon the injured person when an accident occurs, regardless of the extent of the injury or the cause of the accident. Fourteen years ago in the face of considerable criticism I adopted the policy of not calling on injured persons unless the injury was sustained solely through negligence on the part of the company, and even such cases were ignored if the injuries appeared to be of a trifling nature. In the latter type of case, a quiet investigation is made to see if the injured person is up and about his duties.

What has been the result of this

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*Abstract of paper presented before American Electric Railway Claims Association convention, Chicago, Oct. 5, 1922.

policy? In 1908 more than 25 per cent of all accidents we had developed into claims, and in 1921 but 15 per cent—a decrease of 10 per cent. Or in other words, if we had continued the policy of operating the claims department like a fire department, hastening out in fear and trembling as soon as a report of an accident was secured, there is a likelihood that we would now have 40 per cent more claims than we actually have.

What about the ambulance chaser? you may ask. Does he not solicit the case before the company hears from the injured person?

Well we have had that pest of society to deal with again and again. If it is not local talent, then we have the recent arrival from another state who starts in to open our eyes. We have by various means closed the doors of the receiving hospitals, the city and county general hospital, and the private hospitals to him. His record elsewhere is investigated, traps are set for him, even using the services of employees who similate injuries. The Bar Association is kept informed of his activities and methods, and the influence of that body is used to discourage ambulance chasing. By adroit methods, publicity is given to his tactics, and his advertisements offering free legal advice are used against him. When the condition has grown too acute, the ambulance chaser has been secretly competed against, and his unjust methods thus exposed to the claimant, who is usually disposed to be fair. When an ambulance chaser does present a claim, I usually make him a "slap in the face" offer, and compel him to file suit.

We have sometimes been able to use these ambulance chasers in gathering facts relative to accidents that do not concern the railway company, for example, where a reckless automobile driver has injured a person who has just alighted from a street car, or a person awaiting to board a street car. Such services become valuable in inducing the person injured by the street car to deal directly with the company, and the ambulance chaser is only too glad to render that service for the benefit he derives. Today, so far as my employees are concerned, we are almost free from the annoyance of ambulance chasers, who now make the object of their activities largely the unfortunate individual who is injured by an automobile.

Closer co-operation between the operating and medical departments has been developed in recent years, and the operating department is also kept better informed on various accidents, their location, kind, cost, and where responsibility rests.

PROBLEMS OF TODAY AND THE FUTURE

Some of our problems today are the frequency of automobile accidents, the ease with which the automobile passenger injured by collision of the automobile with a street car can recover for his injuries from the street car company; the woman juror; the need of securing co-operation of lawyers so that their clients will give the claim department an opportunity to adjust the claim before suit is filed; the exorbitant and unreasonable claims paid by adjusters for automobile insurance companies; the handling of claims of females with subjective complaints, etc.

Automobile accidents will decrease in number when a physical examination as to hearing, sight, and ability to operate an automobile in an emergency is required of all applicants for a license; when there is a minimum and maximum age limit for chauffeurs; when there are uniform traffic laws enforced by imprisonment of the driver, or by sequestering the automobile for a period of time; when automobile owners must carry insurance or furnish bonds sufficient to indemnify the injured person; when automobile insurance companies have a classified rate for automobile drivers dependent upon their experience and reputation and record for driving; when the public becomes aroused to the fact that the automobile is the most dangerous weapon ever placed in the hands of mankind.

As for the woman juror, it has been our experience that she applies the same reasoning power, the same im**partial judgment, that a male juror does. Of course, women jurors are sometimes swayed by their sympathy when the accident has brought about a train of pitiable conditions. But what male jury is not? On the other hand, women jurors are inclined to be very skeptical of a woman who alleges a subjective complaint resulting from an accident.**

Lawyers will be disposed to deal directly with the claims department if they can be relieved of much of the annoyance of handling the details of a claim. Hence we have established the policy in San Francisco of having an investigator call at the lawyer's office, should he write or telephone presenting a claim, and the duty of this investigator is to facilitate the matter of interviewing the claimant, securing statement from the claimant's witness, arranging for a physical examination of the claimant, and making appraisement of damaged clothing, automobile or other property, the securing of the original bills of expense, etc.

Whenever the opportunity presents itself, executive officers or adjusters of automobile insurance companies should be shown what an unwise plan it is to make lavish expenditures in the adjustment of claims.

Selection and Training of Employees*

The Author Gives Details of the Methods Used Recently by His Company and Contributes Many Practical Comments on the Report of the Committee on Personnel and Training of Transportation Employees Presented at the Chicago Convention

By M. McCANTS
Assistant General Manager Market Street Railway,
San Francisco, Calif.

THE report of the committee on personnel and training of transportation department employees contains many practical suggestions, but I am pleased far more by the ideal which underlay the activity of the committee, that is, the research ideal. Research, which in the past has been almost entirely devoted to the materials and methods of handling materials, is here directed toward the human units of our organizations and the processes by which the proper units may be selected and trained for co-ordinated and efficient work.

Much of the progress which we hope to make within the next decade will depend directly upon discovering and applying the fundamental principles of human behavior. Because this committee has concerned itself with the human phases of our organizations I look for real progress in the immediate future.

THE FUNDAMENTAL PURPOSES OF EMPLOYMENT

One of the fundamental purposes of the employment process is to select men who shall prove competent on the job. Those who do employing for the transportation departments must be unprejudiced and must not permit themselves to be diverted from the primary purposes of selection.

The second chief purpose of employment technique is to select men who will stay on the job. Some men could make good on the job but do not care to do so. Men who are superior to the job should not be hired at all.

We cannot neglect or ignore either purpose in selecting platform men, but I am inclined to believe that the greater emphasis should be laid upon selecting men who will stick.

Too often the men who do the hiring use intuitional methods. They "size men up"; they "have a hunch" that a certain applicant will make good. As a matter of fact, some employment managers have, through long experience, developed certain unconscious methods whereby they "size up" the applicants. If these methods could be made definite and set down on paper, analyzed and tested, even these men could become more skillful.

The ideal employment official is one who sets down in black and white the qualifications of the man he hires. He watches the employee go through the training process to see how quickly he grasps his duties. He makes a record of the employee's ultimate skill on the job, of his loyalty to the company, of

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*Abstract of discussion on report of committee on personnel and training of transportation department employees at the annual convention of the American Electric Railway Transportation & Traffic Association, Chicago, Oct. 2-5, 1922.

his ability to rise to more responsible jobs. He notes how long the employee remains with the company, and finally he compares all these records to learn if possible which of the employee's qualifications at the time of employment had any bearing on his later career on the job.

It is only by constant and careful study that we shall be able to select the employment methods that do work, and to eliminate the elements which have no value.

SOME PRAISEWORTHY FEATURES OF THE REPORT

The committee report lists the advantages and the disadvantages of the two platform jobs so that the applicant will be more likely to understand the nature of the job he is seeking. This is important; too many men are hired with only the vaguest ideas of the work they will be required to do.

A careful discussion of the merits of the job with the applicant ought to cut down turnover by eliminating outright those who had not considered the disadvantages of platform work. Further, the applicant who accepts the job will be less likely to give it up later if he feels that he has thoroughly considered the situation before accepting. In the third place, the applicant will be impressed by the carefulness and fairness with which the employment work is done and this he will remember favorably whether he is hired or not.

Another commendable suggestion is that certain qualities of the applicant should be scrutinized and recorded by the interviewer. Even if the specific items suggested are not all essential, the important thing is that the interviewer must record a great many items of the applicant's qualifications on a data sheet, thereby accumulating facts which he may use later to determine which were of real value.

VALUE OF PSYCHOLOGICAL TESTS

Much of the report was devoted to psychological tests. I am in sympathy with the efforts of the committee in this direction, for they indicate a definite attempt to provide a means to measure the qualifications of applicants for employment. The results obtained by tests can be made a matter of record, and any effort to establish definite records is commendable. I wish, however, to indicate some general principles which must be followed in the use of tests if research efforts are to be co-operative and helpful.

First, we must not try to test too many different sorts of ability. If a man stands high in general intelligence he usually stands high in each of the special abilities. Therefore, any general intelligence test will measure the other qualities at the same time and almost equally well.

Second, if any psychological tests are to have wide use by employment managers, they must be so devised that the employment manager can apply them with a fair amount of study and instruction.

Third, short tests should be used. It would take too much time and energy of the employment manager to give all the tests which the committee suggests.

Fourth, tests should be easy to score. Many of those suggested in the report are hard to score. We ought to have only those tests to which the answers are either right or wrong.

Fifth, definite directions for the tests are needed. The report does not include directions for giving the tests. If one company uses one set of directions and another company uses another set, the results will not be comparable.

Sixth, high scores are not necessarily desirable. It may be possible to hire men who are superior to the job and who would soon become dissatisfied and leave. Although it is wise to carry on research and accumulate many facts about applicants and employees, it is equally wise not to jump at hasty conclusions concerning these facts.

RESEARCH RESULTS OF THE MARKET STREET RAILWAY

The Market Street Railway management, almost two years ago, became interested in learning whether motormen applicants could be selected more carefully, so as to cut down the number and the cost of accidents. We asked our various division superintendents to fill out questionnaires which would commit them to certain definite opinions concerning the qualifications necessary in motormen. We found, however, that the superintendents did not agree even on some things which we felt to be fundamental.

We then selected a group of the best motormen in the company and one of the poorest motormen and proceeded to make a careful analysis to find what traits, if any, distinguished one group from the other. We could not find that it made any difference whether they were married or single, nor did their previous occupations seem to bear any relation to their value as motormen. Complexion, color of eyes, color of hair, size and traits which usually impress the man who does the employing, seem not to have any value in marking off the best from the poorest motormen. However, our analysis seemed to show that men of North European ancestry are to be preferred, whether native Americans or not. It also seemed best to hire men younger than thirty-seven or thirty-eight, who have not many dependents.

INTELLIGENCE TESTS USED

Next we used the army intelligence tests on these best and poorest motormen. To those men with fair schooling we gave "army alpha" and to the others "army beta." The group of best motormen, containing twenty-four in all, made scores of from 26 per cent to 98 per cent. That is, the lowest score was better than the least intelligent 26 per cent of our general adult population could make, while the highest score was better than 98 per cent of our adult Americans could make. Of the twenty-three motormen in the other group, fourteen made scores below 26 per cent, while the other nine made as good scores as the men of the first group. These facts seemed to indicate then that men falling into the lowest one-fourth of our general population as regards intelligence are not good motorman material.

To reinforce our conclusion, however, we tested twenty-one motormen who had taken at least five days more than the ordinary period to "break in." Twelve of them fell below 26 per cent on the test. However, some of the men who were apparently unintelligent, and therefore took a long time to "break in," had actually developed into competent platform men. The findings with these slow learners left us in considerable doubt, so that we went at the problem in a still different manner.

APPLICANTS TESTED BY ORIGINAL METHOD

During the latter half of 1921 we gave to all platform men entering our service, until ninety had been tested, an intelligence test devised for our own special use. It was so constructed that all the employment manager had to do was to hand out the test booklet to the applicant and keep record on the time required to complete the test. We shall be pleased to have other companies use our test to check the results we obtained.

Recently we had our division superintendents rate all employees who had taken this test. When we compared the test scores with the superintendents' ratings we could draw no sweeping conclusions. For example, there was a greater tendency for motormen making the high test scores to quit the service than those making the low test scores; while among the conductors those making the lower test scores seemed to be more prone to quit. It would be unwise to say that this would always hold, for it may be possible to get motormen more interested in their jobs by more careful "breaking in" and follow-up, by wise use of house organs and other personnel methods. It may also be that the conductors testing lowest showed a greater tendency to drop out because they were not trained, in the best way, to perform their duties.

The division superintendents rated these ninety men as "above average," "average" or "below average." Of the men who are still in the service of the company, those who were rated "above average" made higher scores in the test than those who were rated "average"; and those who were rated "average" stood higher in the tests than those who were rated "below average." But the differences in test scores among these three groups were not large, and there were several exceptions, so that I cannot make any sweeping assertions concerning the value of test scores in selecting men for platform work. We need many more facts collected under different conditions before we can draw any definite conclusions.

GENERAL CONCLUSIONS ON TESTS

I shall venture to make a general statement as to our experience with these tests, even if I have to depend a little upon my own opinion rather than upon data. I believe that the brightest men as tested can, and usually do, develop into somewhat better platform men than those who stand lower on the tests, although they do not always care to develop into better men. The problem is to get the brighter men to want to make good on the job and to stay with it. The use of tests will probably aid the employment manager to eliminate the extremely unintelligent but the value of tests beyond that point will be conditioned largely by the methods employed in training the men.

The brightest men do not always become interested in their work or care to stay with it and, therefore, I am not sure that the brightest men should necessarily be chosen. But if we can improve our training methods we may be able to develop a situation where tests will have a much greater value than they seem to have at present.

Training should be not restricted to platform work. Our foremen, division officials and minor executives, all need training. Training of the real sort ought to make a considerable cut in the cost of turnover.

Certain phases of training are well cared for by our company magazine. The employees all feel the magazine is truly their own and contribute liberally to it. We have used it to offer good suggestions in railroading and to talk common sense in economics and government; but we never preach. We make a definite attempt to give recognition to good work of our employees and we use the pages liberally for this purpose.

At present there is a distinct need for instructors who are really trained for their jobs. We executives are largely to blame for this. The sooner we take pains to train our instructors carefully for their duties, the sooner will we cut down turnover among students, probationers and regular platform men, and the sooner will we have better operating service.

It is reasonable to assume that there is a one best way in which instruction should be given. When that way is agreed upon all instructors should adhere to it. Training manuals should be developed which shall include the topics in which the students are to be trained and which will indicate the best ways to present these topics. There should be training conferences for the instructional staff at which the various pedagogical problems should be seriously and thoroughly discussed.

Too much of the training that is being done is not closely supervised by the higher executives. There should be a constant flow to the higher executives of reports on student progress.

I have tried to indicate that there is a crying need for co-operative research by the member companies of this association. Let us have research for the selection of platform men; research which will not only help pay dividends but which will result in better-placed and happier employees. But above all, let us have research which is far-reaching and co-ordinated. This association could very well afford to map out a definite field of research and could parcel out among its members the bits of work to be done by each so that the results might be brought together and reliable conclusions might be drawn.

The association could arrange for one company to be used as a sort of laboratory in which intensive research could be done, with reports rendered back so that all companies might be benefited in a very practical way. I feel certain that if the report of this committee has accomplished but one purpose, it will have been extremely worth while, that is, to direct the attention of the association toward the seriousness of the problem of the human units which make up its organizations and the great need for definite organized research for the selection and placement and proper training of these human units.

APPENDIX

Mr. McCants' paper was accompanied by an extended appendix giving the results of studies made on the qualifications for motormen under the direction of the research committee of the Market Street Railway. An abstract of this appendix will be published by itself in an early issue of this paper.

National Association of Railway and Utilities Commissioners

THE annual convention of the National Association of Railway and Utilities Commissioners, which was postponed from Sept. 26-28, 1922, will be held Nov. 14-16, 1922, at Detroit, Mich., with headquarters at the Hotel Tuller. The date was changed owing to the coal strikes and the appointment of many state commissioners as coal administrators. The call for the convention declares that inherent in our system of government is dual control—federal and state—and the difficulty of harmonizing these functions has been, in no other field of public activity, so pronounced, perhaps, as in the regulation of railroads. For years the state commissions have had to resist the gradual encroachment of the federal power in the fixing of rates within a state to conform to the level of interstate rates, and the tendency in this direction must be checked. The call points out the decision of the United States Supreme Court in the Wisconsin rate case and the co-operation between federal and state authorities there proposed. The I.C.C. and the National Association have agreed upon a tentative program to make such co-operation effective and the chairman of the Interstate Commerce Commission will address the Detroit convention on such a plan. This address will be on the afternoon of Nov. 14, to be followed by a discussion of possible changes in the transportation act.

On Wednesday morning there will be a symposium on "What Constitutes Sound Public Policy in Telephone Regulation." On Thursday morning representatives of "the regulated" have been invited to address the convention. They will include Henry L. Doherty, who will discourse on "Gas"; M. H. Aylesworth, who will deliver an address on "Public Relations"; Martin J. Insull, who will talk on utility problems, and Frank J. Smith, who will speak of the furnishing of light and power in New York.

On the afternoon of Wednesday there will be a round-table discussion on "State and Federal Regulation in Connection with Depreciation." On Wednesday evening there will be a round-table discussion on "Rural Extensions of Electric Light and Power Service."

Among the committee reports to be presented will be those on public ownership and operation, safety of operation of public utility companies, service of public utility companies, public utility rates, statistics and accounts of public utility companies, valuation, state and federal legislation, motor vehicle transportation and litigation.

A.S.M.I. to Admit Utility Engineers

AT THE twenty-eighth annual convention of the American Society for Municipal Improvements, held in Cleveland during the first week of October, the constitution was amended so as to admit engineers of public utility companies to active membership in the society. This matter is commented on editorially in this week's issue of the *Electric Railway Journal.*

The purpose of this revision of the constitution is to provide for closer co-operation between municipal and electric railway engineers, in particular, and it is the hope of the electric railway men who have fostered this change that electric railways generally will be represented by at least one engineer each in the A.S.M.I. membership. The membership fee is $7.50 per year. The secretary of the society is C. C. Brown, St. Petersburg, Fla.

Rail Welding Discussed at Chicago

A MEETING of the committee on welded rail joints of the American Welding Society was held on the Municipal Pier at Chicago, on Thursday, Oct. 5. E. M. T. Ryder, Third Avenue Railway System, New York City, vice-chairman of the committee, presided.

Methods for making tests on full-sized specimens were discussed. H. F. A. Kleinschmidt of the Lorain Steel Company exhibited a drawing and described the fittings necessary for holding and gripping the test rail sections in order to make tensile tests in the Emery testing machine at the Bureau of Standards in Washington. The present plan is to test girder rails of 7-in. section only.

H. M. Steward, Boston Elevated Railway, described the bending tests that he has been conducting. A discussion followed as to the machines available for making the required bending tests. Prof. D. D. Ewing, Purdue

University, told of the machines available at the university and described some tests that he has been conducting.

Methods of testing welded rail joints, as suggested by the United States Bureau of Standards, Washington, D. C., were cutlined by Dr. H. L. Whittemore. These included suggested methods for making tests of conductivity, tension tests, bending tests, and impact, hardness and abrasion tests. In regard to making impact tests which will duplicate service conditions, Dr. Whittemore said that an instrument for this purpose has been devised and the co-operation of the Bureau of Public Roads can undoubtedly be obtained, as it is now investigating impact on roads. Methods of making microscopic examination and chemical analysis were also outlined.

C. H. Clark, Cleveland Railway, described a proposed testing machine for testing joints which will approximate actual service conditions. This machine has not been developed yet and was only offered as a suggestion of a possible method.

A program of investigations to determine the present state of the art in making welded rail joints was outlined by Mr. Ryder. A numbering system that has been worked out, together with instructions to the steel companies furnishing rail, to the railways which prepare test specimens and to the laboratories making the tests was also presented.

There was considerable discussion as to methods to be used in preparing the test samples, and it was the general opinion that these should be prepared under such actual conditions as are encountered in making welds in track under actual service conditions.

A condensed statement of replies received to a questionnaire on base plates was distributed to members of the committee.

Fall Meeting of Electric Power Club

THE Electric Power Club will assemble at the Grove Park Inn, Asheville, N. C., for a four-day meeting from Oct. 30 to Nov. 2. The first few hours of the convention will be occupied by numerous committee meetings. A general session will be held on the evening of Oct. 30; section and division meetings on the mornings of Oct. 31 and Nov. 1; and general sessions on the evening of Oct. 31 and the morning of Nov. 2. The proceedings, while covering principally the problems of the manufacturer, will contain much of interest to the user of electric motors.

American Association News

Report of Committee of One Hundred

THE report of the committee of one hundred at the Chicago convention said that its call for funds to carry on the work in the past year had met a very generous response and more than $45,000 was pledged and collected for carrying on the work. On Sept. 27, $14,797.19 still remained in the treasury, against which there are August expenses of about $2,500. The advertising section, for whose work the funds were raised, has been in active operation since Jan. 1, 1922, the American Electric Railway Association advancing funds for the payment of bills until such time as the committee was able to discharge the obligations itself.

The advertising section has obtained the publication of a large amount of educational information in the daily newspapers and periodicals for the electric railway industry, has prepared and distributed a large amount of printed advertising material dealing with electric railway situations of national interest, and has rendered personal services in special cases to many individual companies. Service is given to all electric railway companies by the advertising section regardless of whether they are members of the association or not.

The committee concluded its report with the statement that it feels its work of education and information has been extremely valuable in creating a greater feeling of confidence on the part of the public in the electric railway situation and that it should be continued. The committee has every confidence that the necessary funds will be provided as in the past when necessity requires and urges that every organization and management in the industry, members and non-members, all make the fullest possible utilization of the service irrespective of whether they have contributed to the funds.

Shall the Mid-Year Conference Be Held in California?

AS was noted in the report of the first meeting of the new executive committee, held in Chicago on Thursday, Oct. 5 (see *Electric Railway Journal*, Oct. 7, 1922, page 580), an urgent invitation was presented by the California Electric Railway Association to hold the 1923 mid-winter conference in California. The executive committee discussed the question at length and finally advised its subjects and meetings committee "to give serious consideration" to the California invitation. Invitation was also received to hold the conference in Washington, D. C.

California members join with the rest of the association in desiring the conference to be a success, if held in California, and success depends in part at least on attendance.

It is with a special emphasis therefore, that electric railway men are urged to consider Secretary Welsh's request for an expression of opinion which will help the subjects and meetings committee decide what to do. If a copy of the letter, quoted below, has been received, it should be answered at once. If not, Mr. Welsh should be advised of members' wishes anyway.

LETTER OF SECRETARY WELSH

Oct. 18, 1922.

TO MEMBER COMPANIES:

Gentlemen: A very cordial invitation has been extended to the association by the California Electric Railway Association to hold our next mid-year meeting in the early part of 1923 on the Pacific Coast.

This invitation was presented personally by W. R. Alberger, at the last meeting of the executive committee in Chicago. I am inclosing herewith an abstract of his remarks, setting forth some reasons why the selection of the Pacific Coast would be desirable.

This matter has been referred to the incoming committee on meetings and subjects in order that it may consider this question more intelligently. I have been instructed to ask you whether you would favor holding the mid-year meeting at San Francisco, and if this location is chosen, whether your company would be represented and if so by how many delegates. Your prompt response will be greatly appreciated, since if it is decided to go to the Coast, preparations must be made well in advance.

Yours very truly,
JAMES W. WELSH,
Executive Secretary.

W. R. ALBERGER'S INVITATION

The recent meeting of the executive committee of the California Electric Railway Association authorized me to extend to the American Electric Railway Association an invitation to hold the 1923 mid-winter meeting in California.

We have figured out that a trip could be made out there without any great loss of time to the members who come from the East. At that season of the year California is at its best. It is after our winter rains; the country is green, covered with wild flowers and everything is beautiful. We have a wonderful state and all that kind of thing, and I can say this, and promise this to you, that if you do come, we will see to it that you have a fine trip through California; you will see everything that is at all interesting and you will have a good time.

Our suggestion would be to go directly to San Francisco from Chicago, as a starting point, putting in a day or two there; then for a little recreation and the formal meeting and banquet, our boys have suggested Hotel Del Monte. We have also a golf course on the shores of the wonderful Monterey Bay, and some of the leading golf experts and professionals of the world play there; in fact, Barnes, who was out there recently, lost his game, he said, because he was watching the scenery too much. Del Monte is the pleasure ground of California. It has more attractions than any other place in the West, and more of a variety. Then it would be suggested that the journey be continued on over night to Los Angeles and San Diego; a trip over into Old Mexico, and then home, with a side trip to the Grand Canyon.

In regard to rates we believe that we can secure from the Transcontinental Passenger Association a special rate. At that time of the year the heavy winter traffic is over. We believe we could get a special rate of at most one and a half times the one way fare. We are very anxious to have the conference out there.

We have nineteen privately owned electric railways in California; eleven of those railways are members of this association; five of them are the largest companies in California.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

More Subways Proposed

New York Body Plans Staten Island Route, Brooklyn-Queens Line and Washington Heights Extension

The New York Transit Commission announced on Oct. 13 the submission to the Board of Estimate of New York City of the routes, maps and general plan of further new subway routes included in the commission's program of May last, including the extension of the Broadway subway of the Brooklyn Rapid Transit Company from Fifty-ninth Street and Seventh Avenue to Washington Heights, and the Staten Island tunnel connection from Brooklyn, and the Brooklyn-Queens crosstown subway. The Board of Estimate set Oct. 20 for the hearings required by law to be held "within ten days of the date of submission."

The series of routes covering the Washington Heights extension present a radical departure from the commission's plan of May. That plan included the new trunk subway and feeders, known as the "Eighth Avenue line" extending north and south from 181st Street and Washington Heights, by way of Fort Washington Avenue, Amsterdam Avenue, Eighth Avenue and Hudson Street to a new general transfer station at Chambers Street. The B. R. T. extension, as then projected, was terminated at 155th Street and Eighth Avenue, in Harlem.

SMALL ADDITIONAL COST INVOLVED

The consideration of the needs of Washington Heights for additional transit, as explained by representatives of that section at the time the original plan was presented, induced the commission to have new studies made.

These studies have developed that, at a relatively small additional cost, the B. R. T. line could be made more effective and serve a much larger community by being continued up St. Nicholas Avenue from 155th Street to a point where connections can be made either by spur tracks or passageways to the Eighth Avenue trunk line north, as well as to the existing Interborough line, which turns out of Broadway into St. Nicholas Avenue at 168th Street.

The question of the selection of the best route to Staten Island has had the attention of the commission for several months. It has been convinced, through the studies made, that the best interests of all concerned will be served, both from the engineering and traffic standpoints, by the Narrows route, from Fort Hamilton to Pennsylvania Avenue, Rosebank, S. I. Plans for the extension of the Fourth Avenue subway in Brooklyn from its present terminus at Sixty-sixth Street to Ninety-fifth Street, Fort Hamilton, have already been authorized. This is a link in what will become the main Staten Island line.

The new route, beginning at the terminus of the Fort Hamilton extension, will extend as a two-track subway or tunnel southwesterly and westerly, under private property and streets, to the Shore road at Ninety-seventh Street. It will then cross the Narrows with a curve toward the Staten Island shore, turning under Pennsylvania Avenue to a point in the existing right of way of the Staten Island Rapid Transit Railroad.

Provision is also made in the route description for two branches in the Borough of Richmond, both leaving Pennsylvania Avenue at a point near New York Avenue and turning north and south, respectively, to points at which connection can conveniently be made at the north with the tracks in the South Beach branch of the Staten Island Rapid Transit Railroad and at the south at or near Belair Road with the tracks of the same system.

Alternative profile maps have been prepared covering the method of construction on the Staten Island side. Under Pennsylvania Avenue, as far as Reynolds Street, the line will be in subway or tunnel, whence it may be continued either in subway or open cut tunnel to Southside Boulevard, or as an elevated road from Fox Street in order to effect a crossing over the existing railroad right of way at that point. Both branches would be practically subway to their point of connection with the existing tracks.

The building of the B. R. T. extension north of Fifty-ninth Street and under Central Park West will pave the way for the permanent removal of the surface railroad tracks through this section. In the $218,000,000 five-year construction plan presented by the commission in May, the B. R. T. extension north was included at an estimated cost of $26,500,000. This figure will remain unchanged as far as the building of the line to 155th Street is concerned. No estimates have been made for the new Washington Heights portion.

Wages Settled.—The wage agreement between the Boston & Worcester Street Railway, Framingham, Mass., and its employees has been agreed upon without arbitration. Uniformed employees are to receive the present wage of 54 cents an hour until March 1, 1923. From March 1 to Oct. 1, 1923, the rate will be 53 cents an hour. Wages of other employees will be reduced 1 cent an hour on March 1.

Rapid Transit Urged for Detroit

The subject of rapid transit for the city of Detroit has again been brought up for consideration. Mayor Couzens has announced to the City Council that he considers a rapid transit system is the next step in carrying out the city's transportation program. The Mayor in addressing the Council stated that now that the city has a unified system of surface lines, and with traffic conditions growing more difficult, the time has come when the city should formulate a rapid transit program.

An appropriation of $50,000 in the 1923 budget has been agreed to by the Council following the recent consideration of the question, that sum to be used to pay for preliminary investigations. The work is to be started within a few weeks and a report made to the Council next year.

Councilmen in discussing the question indicated that tube subways or a dip system would be favored for the downtown section and that elevated lines would not be tolerated by residents on the main thoroughfares where rapid transit is most needed. Other paralleling side streets where elevated lines could be built do not penetrate directly the districts where rapid transit is most needed. It was pointed out by the members of the Council, also, that a comprehensive subway system would be too expensive for the city to undertake at the present time and it was agreed that subways should be built in Woodward Avenue and Michigan Avenue.

Wage Increases Under Consideration

At a meeting of the Springfield, Mass., trolley men Oct. 17 the matter of seeking a wage increase upon the expiration, on Dec. 31, of the existing contract with the Springfield Street Railway was considered. Demands in preparation by a joint committee of employees of the Springfield and Worcester companies are said to include restoration of pay rates in force prior to the readjustment made effective March 1 this year and certain changes in the working conditions. By the latest change the pay of blue uniform men was cut 10 cents an hour, the present rate providing for 40 cents an hour for the first three months service, 53 cents for the ensuing nine months and 58 cents an hour thereafter.

Under the agreement sixty days notice is required of either side seeking new terms. The Springfield company has as yet made no statement of its attitude in the matter, but General Manager H. M. Flanders personally indicated that a demand for an increase of pay would be unjustified.

New Grant Proposed

Twenty-Year Franchise for Rockford City Traction to Go Before Council —Improvements Promised

A new franchise ordinance for the Rockford (Ill.) City Traction Company is to be submitted to the City Council. Thirty days after the passage of the ordinance the company must file with the city clerk of Rockford its written acceptance. Upon failure to do this the ordinance becomes null and void and of no effect.

The franchise calls for a twenty-year grant authorizing the company to operate on all streets, avenues, highways, bridges and public ways within the city limits of Rockford upon which the car lines of the company are now in operation. Tracks are to be laid in the center of the streets and avenues in all cases unless otherwise directed by the City Council and in the case of double tracks upon such streets and avenues, the tracks shall be laid at such distance from the center of the streets as shall make the center point between the two tracks the center of the street, and in such manner as to leave a distance of at least 10 ft. between the track centers, and said tracks cannot be laid within 12 ft. of the curb line unless permission be first obtained from the City Council.

On the question of paving, Section 12 of the ordinance requires the company, after the city of Rockford has paved or repaved any of the streets on which the company operates, to relay its tracks at its own expense and to hereafter maintain the space between the rails of the track and 1 ft. on each side of the track, and the space between the track where there is a double track laid, except where an individual is the occasion for the repair work. The city reserves the right to order removal of track whenever necessary for purposes of public improvement and in this event the expense shall be borne by the railway company except when the removal is made on behalf of some company or private individual, the cost in this case being borne by said company or individual.

Abandonment of any street or streets occupied under the terms is prohibited unless permission is given by the Illinois Commerce Commission or such other authority as may be constituted by law.

A section in the franchise ordinance provides for the company's maintaining an efficient service with an agreement on the part of the company to make such changes and improvements as may be ordered from time to time by the Illinois Commerce Commission.

The section of the grant dealing with the matter of fares reads as follows:

> The rate of fare for any continuous and regular trip from one extreme point to another on any of the lines of said grantee, including transfers from one of the lines to another, shall be such a rate as shall be established from time to time by the Illinois Commerce Commission, or by any other authority delegated from time to time by the Legislature of the State of Illinois to fix rates for public utilities, including the City Council of the City of Rockford, if by act of the Legislature the City Councils of the cities are authorized to fix rate of public utilities.

On the matter of free transportation the ordinance stipulates that certain city officials who shall have this privilege must wear badges, the numbers of which must be reported in writing to the traction management.

An important provision of the grant gives to the city of Rockford the right to take over the traction system, which shall include any bus system operated, at the end of twenty years or before the expiration of the grant upon the terms and provisions of an act which made such provision. This act was passed by the General Assembly of the State of Illinois, approved June 26, 1913, and in force July 1, 1913. In the event this act, entitled "An act to authorize cities to acquire, construct, own and to lease or operate Public Utilities, and to provide the means therefor," is adopted the city shall pay to the grantee a sum equal to the then present value of such property as a going concern. In case the city and the traction company are unable to agree on the value of the property which the city proposes to acquire the value may at the option of the city be determined by arbitration. The decision of a majority of said arbitrators shall be binding upon the parties.

Immediately upon the passage and acceptance of this ordinance the Rockford City Traction Company will lay a new double track with necessary switches so that two separate and distinct car lines can be operated from the center of Rockford to the factory district and southeast part of Rockford. Work on other relaying of tracks and paving is promised by the company to be started as soon as practical after the passage of the ordinance.

Bus Service to Continue Pending Appeal

The Board of Estimate of New York on Oct. 16 unanimously agreed by resolution adopted to issue 400 revocable permits to owners of buses to operate on thirty-three routes in Manhattan and The Bronx. This action was taken at the suggestion of Commissioner of Plant and Structures Grover Whalen at a special meeting of the board to cover the present emergency whereby 200,000 persons would be inconvenienced daily by threatened cessation of the bus service on those lines because of an injunction obtained from Supreme Court Justice Mullan.

Corporation Counsel O'Brien announced to the board later in the day that Justice Mullan had suspended the operation of the injunction on the strength of the board's resolution and pending the trial of the case, which had been appealed by the city. This will permit continuation of the bus service on the various routes affected, provided the applicants for permits also obtain from the Transit Commission a temporary certificate of necessity and convenience, which the commission had assured in advance would be granted.

Explains Rate Base Increase

Former Receiver O'Keefe, of the New Orleans Railway & Light Company, New Orleans, La., recently absorbed by the New Orleans Public Service Corporation, has submitted a special report to Commissioner Paul Maloney in which he shows that there has been an increase of $4,746,869 in the rate base of the company during the last twenty months. Commissioner Maloney objected, however, to the inclusion of $436,748 in the rate base, as given in the report of Niles & Niles, expert accountants, and after several days of conference, this sum was taken out, making the changed figure $4,310,121. Thus the rate base has been increased from the original amount of $44,700,000 to $49,010,121.

The receiver shows that this increase was due to the investment of funds derived from the sale of receiver's certificates and to the fact that the earnings of the company were permitted to stay in the company in lieu of the flotation of additional securities.

In commenting upon the financial condition of the company, the receiver said that the strong cash position of the company was due largely to the fact that the amount of uncollected bills had been materially reduced and that the amount of the inventory of materials and supplies was also smaller, due to the continued policy of careful purchasing and avoidance of unnecessary duplication.

Amendments in San Diego Meet with Approval and Disapproval

The proposed amendment to the charter of the city of San Diego designed to relieve the San Diego (Calif.) Electric Railway of the obligation to pave between its tracks on future construction work was defeated at the special election held Oct. 10, by a majority of 458. The unofficial returns reported on the vote were: For, 6,504; against, 8,962. The referendum ordinance granting the company a franchise for a line on Sixteenth Street between Broadway and Market Street was carried by a favorable majority of 59. The unofficial totals were in this case: For, 7,187; against, 7,129.

The company had put on an educational campaign for a month preceding the election, both through the newspapers and by circulars and public exhibits, designed to explain the proposed measures.

The Sixteenth Street franchise, which had been refused the company by the City Council some months ago and referred to the people by a petition initiated by the company, will become effective immediately following the official canvass of the votes, it is said.

No announcement has come from company officials, but it has been intimated that the proposed charter amendment, or a similar one, may be again submitted at the regular city election next spring. These issues in San Diego have been referred to previously in the *Electric Railway Journal.*

Fund Being Raised for Electrification

Evidence of further activities to electrify the Union Pacific Line entering Glendale, Calif., is shown by efforts of residents in Glendale, Montrose and La Crescenta in uniting to raise $25,000. This sum when added to the $100,000 that has been promised by the Union Pacific System and the Glendale & Montrose Railway will be devoted to the electification of the old Los Angeles & Salt Lake Railroad line (now owned by the Union Pacific) from Glendale Avenue and Broadway in Glendale to its connection with the Los Angeles Railway Corporation's trolley line at the junction of San Fernando Boulevard and Verdugo Road.

It is expected that the electrification of the old steam road line will give patrons direct connection with the cars of the Los Angeles Railway, with the privilege of a universal transfer to any point on that system, all for the one fare. It is anticipated that it will also reduce the present fare between Glendale and Los Angeles 20 to 33⅓ per cent and will furnish two lines of car service in place of the present single interurban line of the Pacific Electric.

Approximately $20,000 has already been raised, and it is expected that the remainder will shortly be forthcoming.

Veterans' Association Meets

The first annual banquet of the Veterans' Association of the Wheeling (W. Va.) Traction Company was held at the Windsor Hotel with fifty veterans of twenty or more years standing in the company's service in attendance. Robert Earp, president of the association, acted as toastmaster. Emmett E. Erskin, a veteran, delivered an address in which he compared the first cars of the system with those of the present day.

C. P. Billings, vice-president of the West Penn System, delivered an address and presented service buttons to the men in the employ of the company twenty years or more. The buttons are of gold and enamel and bear the words "Twenty Years Service" and "Wheeling Traction Company" with the motto, "Service, Speed, Safety."

The Veterans' Association was formed on July 12 with the employees of twenty years standing as the instigators.

Another Interurban Proposed

Following the recent adoption of plans for electrifying the division of the Missouri, Kansas & Texas Railroad, between Dallas and Denton, 32 miles, and its operation as an interurban line by the Texas Electric Railway interests, steps have been taken to establish another interurban line out of Dallas, with Greenville as the proposed terminus. This is to be obtained by electrifying the St. Louis Southwestern Railroad between the two points, about 45 miles.

Daniel Updegrove, president of the St. Louis Southwestern, with headquarters in St. Louis, has expressed a willingness to enter into negotiations with C. W. Hobson, Dallas, and associates, representing the Texas Electric Railway interests, with the view of converting the Dallas to Greenville division into an electric interurban line. The City Commission has also interested itself in the proposition. The electric power for operating both lines will be furnished by the Texas Power & Light Company, an allied corporation of the Texas Electric Railway. The former company has a power transmission system that extends from the Red River to Taylor, more than 300 miles and covering a big scope of territory of East Texas. It plans to extend its electric power system to Austin and San Antonio.

Offers to Arbitrate St. John Questions

J. J. Bodell, Providence, R. I., representing the firm of Sanderson & Porter of New York City and holders of the common stock of the New Brunswick Power Company, operating the street railway in St. John, N. B., and suburban communities, offered to submit to a board of arbitration the issues in dispute between the company and the city. These are whether the company or the city shall distribute the hydro-electric current in St. John from the hydro-electric station of the New Brunswick Electric Commission; and the price asked for the assets of the company in a proposed sale to the city. The proposal for arbitration was placed before the City Council and defeated by four votes to one. The only member of the board to vote in favor of arbitration was Mayor McLellan.

Employees Start Pension Fund Association

Organization of a Pension Fund Association has been undertaken by the employees of the Indianapolis (Ind.) Street Railway. Officials of the company are assisting in working out the details of the plan which interlocks with a sick and disability benefit fund that has been in effect for the last eight years and is a step in a plan to establish a guaranty for the employees of the company to make employment a safe vocation, beneficial socially and economically. The company has no part in the association except to help put it on a working basis and to assist in its administration. With the support and control in the hands of the employees, the membership also is limited to employees of the company. The management of the association is in the hands of a board of directors, selected by ballot, one from each station and department. The association now has a membership of more than 700. The pension fund for old age and disability purposes is being established by the payment of dues of $1 a month from each member. Details as to the age limit for service, or disability from age and percentage pension payments based on length of service are to be worked out before the organization is completed.

News Notes

Dismisses Complaint.—The Pennsylvania Public Service Commission has dismissed the complaint against the Dubois Traction Company, the United Traction Company and the State Highway Department. It holds that it has no jurisdiction to compel the removal of a track from the west side of a street to the center and to pave with concrete between the rails. No crossing is involved. The complaint was filed by Sandy Township, adjacent to the city of Dubois.

Unusual Ending to Wage Issue.—The Gary & Southern Traction Company, operating between Gary and Crown Point, Ind., recently announced a wage reduction amounting to 10 cents an hour as a necessary step in the continued operation of the road. The employees explained that they could not accept the proposed cut but agreed to assume one-fourth of the cut. The result was that the Chambers of Commerce of both Gary and Crown Point, together with the company, assumed the other three-fourths reduction.

Shortage of Men Noted.—The attention of William Jerome Kuerts, Street Railway Commissioner, has been directed to the difficulty the Cincinnati (Ohio) Traction Company is having in getting men to operate its cars. For the first time since the war the traction company's waiting lists at the various carhouses have become exhausted and the company has been compelled to advertise for men. It is believed that the expense connected with being outfitted for such a position has something to do with the shortage of men.

Seek Provision for Subway Route.—A resolution calling upon Mayor George P. Carrel's Committee on Street Railroads of Cincinnati, Ohio, to embody in any recommendations it may make on the traction situation a provision for a definite understanding between the city of Cincinnati, Cincinnati Street Railway and the Cincinnati Traction Company as to the future of the canal subway route has been received by Mayor Carrel from the Federated Improvement Association. Under the resolution the committee is asked to embody in any proposed amendments a contract between the three agencies under which the traction company would bind itself to purchase the subway at a definite price, or to lease it at a definite price, and then operate the loop when completed. The resolution was presented by Eli Frankenstein, attorney, and adopted by the association at its last meeting.

Financial and Corporate

I. R. T. Case Heard

Commission Reserves Decision on Application for New Security Issues Under Reorganization Plan

The New York Transit Commission on Oct. 17 reserved decision on the application of the Interborough Rapid Transit Company for authority to pledge $27,570,000 bonds as security for ten-year 7 per cent gold notes, to pledge $32,032,000 of bonds as security for an issue of ten-year 7 per cent gold notes, to issue $34,330,000 of 7 per cent notes, and for authority to issue $10,500,000 of 6 per cent gold notes.

There was no opposition to the applications. Only a handful of persons were present. Assistant Corporation Counsel Edgar J. Kohler, representing the city, asked for certain conditions to be provided by the commission if it approves the applications. These provided for a 5-cent fare and representation of the city on the voting trust under the reorganization plan. Chairman McAneny assured Mr. Kohler that the city was amply protected as regards the 5-cent fare, and the other points he had made would be duly taken under advisement.

PLAN EXPLAINED

Grayson M.-P. Murphy and A. N. Anderson, head of the bond department of J. P. Morgan & Company, both testified as to the desirability of the applications being granted as being part of the reorganization plan. Colonel Murphy, who is chairman of the Interborough-Metropolitan bondholders' committee and chairman of the syndicate which will market the $10 000,000 notes issue, told how the syndicate had fixed 5½ per cent as its commission.

The two bond issues are asked as the pledged security for the $32,032,000 issue of 7 per cent notes which will supplant the 8 per cent note issue which had been extended from September of 1921, to Sept. 1, of this year. The smaller issue is a brand new issue and will be devoted to the paying off arrears to the Manhattan elevated lines, to the purchase of 350 new cars and other necessary outlays and obligations.

James L. Quackenbush, counsel for the Interborough Rapid Transit Company, in opening the proceedings recounted the company's difficulties in the past few years and how the present plan of adjustment had been brought about in strenuous efforts made to avoid a receivership of the company. He said that the extension of the notes asked for would get rid of the receivership proceedings still before the Federal Court. The $10,000,000 gold notes would go to pay arrears due to the Manhattan elevated line, buy 350 new cars and meet other expenses. The 8 per cent notes, amounting to $38,144,400, would be replaced by the ten-year 7 per cent upon paying 10 per cent in cash, leaving the security the same as at present and giving the noteholders the chance of converting their notes into pledged bonds at 80 for the first three years, 85 for the next three years, and then 90.

Judge Julius M. Mayer in the Federal District Court at New York, on Oct. 13, confirmed the sale of 339,128 shares of the capital stock of the Interborough Rapid Transit Company, disposed of at public auction on Oct. 10 by James Sheffield, trustee in bankruptcy and special master of the Interborough Consolidated Company, to a committee representing 92 per cent of corporation's shareholders for $1,760,000.

Protest was submitted by Alvin I. Hobbs in behalf of the dissenting shareholders. Judge Mayer, confirming the sale, declared the interest of all stockholders was equally protected, and that he believed the sale to be the only solution for those holding the stock eventually to realize return on it.

The hearing on the application for a receivership for the Interborough brought, about a year ago, by the Centinental Securities Company of which Clarence H. Venner is the head, has been postponed again by Judge Julius M. Mayer in the Federal District Court. Acting upon a stipulation entered into by all parties to the suit, Judge Mayer set the hearing for Oct. 24.

Voting Trust for Interborough Stock

In order to carry out the provisions of the plan of readjustment of the affairs of the Interborough Rapid Transit Company, New York, N. Y., calling for the election of directors to represent the public authorities, a voting trust has been established consisting of Grayson M.-P. Murphy, Guy E. Tripp and Frank L. Polk. The voting trust is to continue in force until Oct. 1, 1927.

After the plan of readjustment has been declared operative it is proposed to increase the number of directors from fifteen to eighteen. Of this number nine are to be designated by a committee representing stockholders, three by the Transit Commission, three by the committee representing the Interborough first 5 per cent bonds and three by a committee representing Manhattan Railway shareholders.

For stock of the Interborough, which is now in the hands of trustees, voting trust certificates or scrip to the aggregate par of $33,912,800 will be issued and distributed among holders of the Interborough-Metropolitan 4½ per cent bondholders participating in the plan.

Receivership Lifted

Columbus, Newark & Zanesville a Going Line—Rate Question to Be Given Immediate Consideration

Receivership of the Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, formerly a part of the Ohio Electric Railway system, was dissolved by Federal Judge John E. Sater at Columbus, Ohio, on Oct. 11. The company has been reorganized and is now operating as a going concern according to John S. Bleecker, vice-president and general manager of the road. Officers of the reorganized company are President, Charles Day, of Day & Zimmermann, Philadelphia; J. S. Bleecker, vice-president and general manager; F. A. Healy, secretary and treasurer.

In addition to the traction lines between Columbus, Newark and Zanesville, the company operates the Columbus, Buckeye Lake & Newark Traction Company and the Zanesville Light & Power Company, which supplies railway service, light and power to Zanesville, as well as electric railway service in the city of Newark. General offices of the company are located in Springfield, Ohio, in conjunction with the general offices of the Indiana, Columbus & Eastern Traction Company, which was also a part of the former Ohio Electric system.

P. A. Berry, Columbus, served as receiver for the company which was operated under the direction of Day & Zimmerman, Philadelphia public utility operators, and continues under the same general management with Mr. Bleecker as active directing head.

Mr. Bleecker announced that the company will at once take up with city officials of Newark and Zanesville proposals affecting the operation of the lines in those two cities, especially as regards the matter of rates, in an effort to avoid some of the difficulties which forced the company into the hands of a receiver two years ago.

Mr. Bleecker said that the traction company's physical condition has been bettered by the expenditure of about $150,000 for improvement of properties during the period.

Outstanding bonds of the company total $4,704,000 which represents first and second mortgages on the property. Prospects for immediate payment of interest on the bonds are not very bright, Mr. Bleecker said, but he voiced confidence that eventually payment would be made.

Receiver Berry expected to file his final report in the federal court on Oct. 20.

Operates Under New Name.—The Lake Superior District Power Company has taken over the Ironwood & Bessemer Railway & Light Company, the Ashland Light, Power & Street Railway and the Big Falls Water Power Company. The railway property in Ironwood, Mich., is now operating under the name of the Lake Superior District Power Company.

Reorganization Progress Made in St. Louis

Interests at Work There See Need for Valuation Around $75,000,000—Securities Now Outstanding Total $103,000,000—North American Company Controlling Common Stock Expected to Participate in Readjustment

COMMITTEES of security holders of United Railways, St. Louis, in frequent conferences, have about concluded that in order to lift the receivership and reorganize, it will be necessary to have a valuation around $75,000,000 and a new franchise for a long term. Appeal may be made to the Missouri Legislature in January in the interest of the company, in addition to the negotiations with the city for proper franchises.

In a general way it is understood that the reorganizers are basing their figures on a Public Service Commission valuation of at least $65,000,000 with the idea of adjusting their estimate to whatever valuation is fixed. A general estimate of $5,000,000 is made of the amount needed for immediate improvements, making the total estimated capital under a reorganization something like $70,000,000, not including a possible commission of 10 per cent for reorganization and floating the new bonds. With all the necessary allowances made the capital would be increased to something like $77,000,000 according to one financier, but this would be reduced to approximately $73,000,000 after allowing for the amount of cash now held by the company.

The belief is current that the North American Company would be willing to finance the reorganization, taking over the railways. Recently the North American through the Union Electric incorporated as the North American Edison Company in Missouri with a capital stock of $90,000,000 and has pending negotiations for the purchase of the East St. Louis & Suburban Railway lines. This with the control of the Keokuk dam and the construction of an $8,500,000 power plant, will add to the financial standing of the North American in St. Louis.

The great problem facing the North American or any other concern that takes over the United Railways is the stock adjustment. According to a statement made some time ago by Colonel A. T. Perkins, manager for the receiver, the stock and bonds outstanding amount to $103,000,000.

Steps in the reorganization, after a valuation has been determined by the Public Service Commission, probably will take the following course:

> Applications for a franchise for fifty years or the enactment of legislation giving the company the right to use the streets for an indeterminate period, with the city reserving the right to take over the company at any time in consideration of reimbursement of the investors on the basis of the fixed valuation.
>
> Foreclosure on the United Railway 4 per cent bonds by agreement of all interests.
>
> A bond issue of about $15,000,000 to take up the $6,000,000 of underlying bonds and $4,300,000 of receivership certificates; the remainder, $4,700,000, to provide for improvements and extensions of service and other essential costs.
>
> A second bond issue, possibly of $30,000,000, to take up the other bonds.
>
> Issuance of necessary preferred and common stock.

It is expected that holders of the underlying bonds and receivership certificates will receive dollar for dollar. The other investors will take losses in proportion to the difference between the fixed valuation as finally made and the capitalization, which is about $103,000,000.

Actual control of the United Railways will be involved in the reorganization. Control is now vested in the North American Company, by virtue of that company owning 200,000 shares of the common stock and controlling other securities sufficient to give it a majority in the directorate. It is said that North American can muster enough votes at any time to give it eight of the eleven directors.

The directors and their interests are:

R. L. Warner, Boston, and John F. Dulles, New York, representing the 200,000 shares of North American.

John I. Beggs, Milwaukee, and his son-in-law, Richard McCulloch, St. Louis, former president of the company, who have large holdings of Transit 5's, United 4's and some preferred stock.

J. K. Newman, New Orleans, and F. O. Watts and A. J. Siegel, St. Louis, representing large preferred stock interests.

Murray Carleton, St. Louis, United 4's and preferred.

Henry S. Priest, St. Louis, Transit 5's.

Alanson D. Brown, St. Louis, Transit 5's and preferred.

A. L. Shapleigh, St. Louis, representing the corporation but not a security holder except for one share of stock to qualify him for the directorate.

The foregoing directors are usually grouped in voting as follows: Warner, Dulles, Beggs and McCulloch, for North American interests: Watts, Siegel and Newman for the preferred stock investors; Carleton, Priest and Brown, for the Transit 5's, and Shapleigh, neutral.

The committee at work on the plan of reorganization is headed by Mr. Watts and is composed of the following other men: Breckinridge Jones and John Shepley, representing United 4's ; G. W. Wilson, Transit 5's; Judge Priest Transit 5's for Philadelphia interests; Herman Stifel, Suburbans; Mr. Watts, preferred stock; Mr. Shapleigh, the corporation, and Henry H. Pierce, New York, the common shares.

The North American is said to have paid $4.000.000 for its common stock. In addition it has $1,300,000 invested in bonds of the Cass Avenue lines and $1,000,000 in the Lindell Railway's extension bonds, giving it a total cash investment of $6,300,000.

A successful reorganization of the company, said Mr. Watts, who is president of the First National Bank, St. Louis, must contemplate the expenditure of from $2,000,000 to $4,000,000 in improvements and extension of service as investors would be reluctant to put new money into the railways in their present condition. Mr. Watts said:

> There must also be a new franchise, preferably one giving a right to use the streets for an indeterminate period, with the city having the option to take over the company at any time on condition that investors be reimbursed on the basis of the valuation to be fixed by the Missouri Public Service Commission. This valuation ought to be around $75,000,000. Anything under that will make it difficult to refinance. I do not see where capital could be obtained on a valuation of $50,000,000 or $60,000,000. I would not put a dollar into the enterprise on such a low valuation.
>
> Bonds on a low valuation would carry a high rate of interest, which would be very costly to the farepayers of St. Louis. For example, bonds bearing interest of an average of 7 per cent would have to be issued on a $60,000,000 valuation, whereas 6 per cent securities would do for a $70,000,000 or $75,000,000 valuation. It is an incontrovertible fact that the public eventually pays for everything, and this difference of 1 per cent in interest on $60,000,000 would be $600,000 a year. The public should be saved this burden.

Rolla Wells, receiver, has held several conferences with the reorganization committee. He says any reorganization must contemplate a long-time franchise, street car service at cost and the construction of a subway in the not far distant future from the downtown district to Vandeventer Avenue or beyond to relieve the growing traffic congestion.

Mr. Wells favors a valuation just to the investors. While he would not say what he thought it ought to be, he said that $64,671,281.14 of actual cash had been invested in the properties since the consolidation of 1899. He added that this figure does not include any allowance for the expenses incident to the consolidation of the independent properties into the United Railways in 1899—costs which, he said, probably would bring the total investment to $75,000,000 or $78,000,000.

The bankers point out that any reorganization must be based on the valuation to be fixed, and nothing definite can be accomplished, until the Public Service Commission acts.

When this is likely to be, none would hazard a guess, but it is expected that the commission will act within the next few months.

Expert accountants for the State Public Service Commission in a report made to the commission on July 27, 1920, placed the valuation of the United Railways property at $47,035,120.61. At that time, the United Railways records showed a book value of $101,436,776.

J. L. Harrop, chief engineer for the commission, reported to the commission, Feb. 10, 1921, that the reproduction value of the United Railway property, in services of the public within the city, would be $47,254,355. He stated that the cost, depreciated to represent the physical condition of the property at that time, was $34,285,531.

An inventory made for the United Railways by W. B. Bennett, Milwaukee, submitted to the commission Oct. 21, 1921, stated that the actual cost of the property, as constituted Sept. 30, 1921, was $52,249,166, and that the replacement cost of the property would be $103,637,556. F. W. Doolittle, employed by the company, figured the property and plant account of the United Railways, as of Dec. 31, 1920, at $101,916,798.

C. E. Smith, consulting engineer for the city, testifying before the State Commission, gave his estimate of the entire value of the United Railways property as $40,000,000. He said he gave great weight to actual cost, less depreciation, and to the book value less the depreciation reserve, and that he did not consider the face value of stocks and bonds. The valuation fixed by the State Board of Equalization for the company's state taxes for 1922 was $44,267,880.

Receiver Appointed for Chicago & Interurban

Cement roads and the advent of the automobile truck have brought about the doom of the Chicago & Interurban Traction Company, according to a voluntary petition filed on Oct. 11, leading to the liquidation of the affairs of the $3,000,000 concern. The interurban railway runs from Sixty-third and Halsted Streets, Chicago, to Kankakee, Ill. W. W. Crawford, secretary of the company, who has been connected with the property for a good many years, has been named receiver.

Exactions of union labor are also given as a contributing factor in the collapse. The company has announced that it plans to put a lower wage scale into effect on Oct. 16 and the employees of the company have voted not to accept the wage reduction offered. However, it is expected that the new scale, which averages 64 cents an hour, will receive further consideration by the men. The employees of the company are members of the union to which the men of the Chicago Surface Lines belong and they have been paid the union scale without regard to the earning ability of the road.

In July the company defaulted in the payment of interest on $1,896,000 of corporate bonds, according to the petition, and a power and light bill for $75,000 fell due at the same time. The report for the fiscal year ended December, 1921, showed that the company fell short by about $2,000 of meeting its operating expenses of $412,000. With interest and taxes the total deficit was $116,463. The proposed wage reduction will mean a decrease in operating expenses annually of about $30,000 and will give the company a fighting chance for recovery.

The towns of Blue Island, Harvey, Glenwood, Chicago Heights, Crete, Monse, and Bradley are affected by the receivership of the Chicago & Interurban. The road passes through all of them and for some of the towns it furnishes the principal means for transportation. Some of the spurs of the Kankakee line had already been discontinued and it is possible that the decision of the receiver may result in a discontinuance of the entire service. The present receivership is the fourth since 1893.

Detroit United Resumes Cash Dividends

At a recent meeting in New York of the directors of the Detroit (Mich.) United Railway an announcement was made that dividends had been resumed again on a basis of 6 per cent. The resumption comes after eighteen months, the last cash dividend having been paid in March, 1921. Then three stock dividends of 2½ per cent were declared, but only the first was allowed to be paid by the State Utilities Commission. The Detroit United Railway paid 5 per cent in 1912, advanced the rate to 6 per cent in 1913, 7 per cent in 1916 and 8 per cent in 1917, maintaining this rate until March of last year.

Authority for Private Sale Sought

Application for authority to sell at private sale the property of the Springfield Terminal & Railway Company, operating the Springfield, Troy & Piqua Traction line in Ohio, was filed on Oct. 18 in the Federal Court at Cincinnati. The application was made by receivers George H. Whysall and Williams Harman. It is the result of vain efforts to dispose of the properties of the line. An order was entered by the court directing a hearing before Federal Judge John E. Sater in Columbus on Oct. 26 on the application. The receivers in their petition allege the property is being operated at a loss and that continued operation will result in future losses.

Prospects for B. R. T. Reorganization Improved

So many conflicting rumors have been current about the proposed reorganization and readjustment of the Brooklyn Rapid Transit System that Federal Judge Mayer has deemed it appropriate to state what is in progress. The court agrees that it is desirable, of course, that the receivership should be ended as soon as practicable; but explains that the various legal and financial problems are different in many respects from those which were presented by the Interborough Rapid Transit Company situation.

The B. R. T. consists not only of subway and elevated roads but also of surface roads and thus the groups of security holders and creditors who must be consulted before any plan is finally presented are more numerous than in the case of the Interborough.

In discussing the matter the court said in part:

> The question involved has been under study for some time and outlines of plans for reorganization are now being prepared by different groups. These proposed plans when drafted will be the subject matter of conference and, in due course, the situation will be taken up with the Transit Commission.
>
> In view of what was said by the court and various counsel at the hearing at the beginning of the receivership, the court has no doubt that any plan ultimately submitted will make just provisions for claims of tort creditors, that is, death or personal injury claims.
>
> While the court has fully appreciated the hardship suffered in many instances by tort creditors, the delay in disposing of these claims has been due to the legal complications necessarily incident to the receivership. It is hoped, however, that these creditors will not sell their claims to speculators. Not only are the interests of the tort creditors receiving the attention of the court, but from early in the receivership the tort creditors' committee has been untiring in its efforts to secure a just and fair distribution of these claims.
>
> Fortunately the increase in the net earning of the B. R. T. system has made the winding up of the receivership a practical question and, while it is impossible to predict when that result will be attained, the time has come when efforts to that end have been seriously undertaken.

Dividends Resumed After Two Years

The directors of the Nashville Railway & Light Company, Nashville, Tenn., have authorized preferred and common stock dividend payments. B. C. Edgar, vice-president and general manager, says that no dividends have been paid since 1919 as all net earnings had been used for rehabilitation purposes. The payment of these dividends have been made possible at this time, he says, by the recent Tennessee financing. This financing, which effected the consolidation of the companies controlled by the Tennessee Railway, Light & Power Company, has been followed in these columns.

Finance Terminal Building

The Salt Lake Terminal Company, Salt Lake City, Utah, expects to offer shortly $150,000 of 6 per cent first mortgage bonds to finance the construction of the proposed electric railway terminal at South Temple and West Temple Streets. The bonds are a part of a $1,000,000 issue authorized some time ago for the perfection of terminal facilities for the Bamberger Electric and the Salt Lake & Utah Railroads in Salt Lake City. Of the amount authorized $350,000 has been issued and the contempleted action will bring the amount outstanding to $500,000.

The bonds mature on June 1, 1935, carry interest at 6 per cent, payable semi-annually, June 1 and Dec. 1, and are first mortgage bonds on the holdings of the Terminal Company. Also they are guaranteed, both as to principal and interest, by the Bamberger Electric and Salt Lake & Utah Railroads, whose combined average earnings for the past five years, after all operating and fixed charges and taxes, amount to $185,000 annually.

Reorganization Plan Explained

In the opinion of E. A. Robert, president of the Quebec (Can.) Tramways, a reorganization of the property is needed in the interest of both the security holders and customers. Five objectives would be sought in effecting such reorganization. They are: (1) To alter the present system of dividing the various branches of the company's business; (2) to facilitate the progressive expansion of the company's business; (3) to enable the company to extend considerably its activities; (4) to provide means for economically financing extensions and developments; (5) to enable the reorganization of the enterprise to be effected in the best interests of the public and the security holders of the company. He said that a detailed survey of all branches of the company's activities had been made to determine what its real needs were and that the above requirements had been decided upon as a necessity in the furnishing of efficient service. He said that as a preliminary step an application would be made at the forthcoming session of the Legislature in Quebec for the incorporation of three companies, the Quebec Power Company, the Quebec Gas Company and the Quebec Tramways Company.

Fewer Passengers Carried in September

The Public Service Railway, Newark, N. J., carried a total of 34,032,864 passengers in September, this being 337,291 fewer than the number carried during August, when the company reported a total of 34,370,155, it was shown in a report filed in the Federal Court at Trenton. During November, 1921, when the first report was filed under the order of Oct. 17 last, the company carried a total of 31,842,317. The number of passengers paying the base fare of 8 cents in September totaled 12,321,709, as compared with 12,380,801 for the preceding month. The number of tickets or tokens sold in September at the rate of four for 30 cents was 13,988,502, compared with 14,231,338 in the preceding month. The number of transfers issued in September for 1 cent each was 5,831,990, compared with 6,014,142 for the preceding month.

Bankers Purchase Utah Securities

The Utah Securities Corporation has sold to the Electric Bond & Share Company and Hayden, Stone & Company $2,200,000 par value of Utah Power & Light Company 7 per cent preferred stock. The proceeds of this sale, with moneys on hand in the treasury, will pay off the $6,952,000 of Utah Securities 6s which have just matured. This will retire the last of the total issue, which was $27,790,000, leaving Utah Securities Corporation free from funded debt and floating debt. It has no preferred stock and has a substantial cash balance in its treasury. The Utah Securities Corporation now owns $3,099,000 of the second preferred 7 per cent stock and the entire $30,000,000 common stock of the Utah Power & Light Company. The electric light and power and the gas properties of the Utah Light & Traction Company are leased to and operated by the Utah Power & Light Company.

Financial News Notes

Issue Approved.—Issuance of $36,000 of 6 per cent serial promissory notes by the Trenton & Mercer County Traction Corporation, Trenton, N. J., has been approved by the New Jersey Board of Public Utility Commissioners. To secure the notes a chattel mortgage issued to the Mechanics National Bank of Trenton was also approved.

Wants to Issue Bonds.—The Electric Short Line Railway of Minnesota recently filed with the Interstate Commerce Commission an application for authority to issue $660,000 in fifteen-year 5 per cent bonds, which, with other funds, will enable the road to build 44 miles of new line extending west from Hutchinson, Minn., toward Clara City.

Balance of Income Increases.—The Reading Transit & Light Company, Reading, Pa., for the year ended Aug. 31, 1922, reports an operating revenue of $2,940,505, against $3,013,791 for the year ended Aug. 31, 1921. The balance of net income for the 1922 period after deducting the dividend provision on preferred stock was $214,520, against $55,471 in 1921.

$583,658 Surplus.—The gross earnings of the Republic Railway & Light Company and subsidiaries, Youngstown, Ohio, for the twelve months ended Aug. 31, 1922, were $7,510,670, against $7,913,685 for the twelve months ended Aug. 31, 1921. The 1922 balance for depreciation, dividends and surplus amounted to $583,658, against $253,508 for the period ended Aug. 31 a year ago.

Net Income Increased.—The Philadelphia (Pa.) Rapid Transit Company increased its net income from $980,543 for the nine months to Sept. 30, 1921, to $1,365,129 for the same period this year. Passenger revenue showed a decrease, the 1921 figure amounting to $30,825,268, against $30,645,611 for January-September, 1922. The total passengers carried for the nine months of 1922 were 623,972,005, against 622,163,877 for the same period a year ago.

Foreclosure Sale Fixed for Nov. 15.—The property of the Maumee Valley Railways & Light Company, of which R. G. Mills, cashier of the Home Savings Bank, is receiver, will be sold at sheriff's sale at Toledo on Nov. 15. The company leases its rolling stock and buys power from Toledo Edison Company, and other central station companies in this neighborhood. It operates a line on both sides of the Maumee River Valley connecting Toledo with the towns of Maumee and Perrysburg.

Talk of Abandoning Line.—There is a possibility that Bucyrus may lose the Cleveland & Southwestern line running between Bucyrus and Galion. C. E. McKisson, attorney for the receiver, was in conference with the County Commissioners at Bucyrus regarding a new franchise for the line. The commissioners were ready to grant the franchise, but reserved the right to fix the fare as in the old franchise between Bucyrus and Galion. It is understood McKisson told them that if they did not waive this right the road between Bucyrus and Galion would be abandoned.

Interurbans Valued at $30,785,000.—According to the *Wall Street Journal* the Michigan Utilities Commission has appraised the 626 miles of Detroit United Railway interurban lines less depreciation at $30,785,000. It is said the commission expects to use these figures as a base for rate making at the hearings to begin next month. The report of the company as of Dec. 31, 1921, carried all its property at $59,502,000. Thirty lines were since sold to the city for $19,850,000 leaving property appraised by the commission at $39,000,000 on basis of last balance sheet.

Change Made in Assessed Valuation.—The State Tax Commission, at the suggestion of the State Board of Equalization of Missouri, has made reduction to some extent in the assessed valuation of the Springfield (Mo.) Traction Company. The reduction, it was stated, was made because of a misapprehension on the part of the commission as to the length of time the fifty cars of the company have been in service. The commission has valued these at $4,000 each on the theory that they had been in service only a year or two. Later it was shown that with few exceptions the cars have been in service twelve years. The change in assessment will make a difference in the total taxes that the Springfield company will have to pay.

Mortgage Bonds Offered.—A syndicate headed by the Guaranty Company of New York and including Harris, Forbes & Company, Halsey, Stuart & Company, Inc., and Brown Brothers & Company, is offering $7,000,000 Pennsylvania Power & Light Company first and refunding mortgage bonds, series BB, 5 per cent, to be dated Oct. 1, 1922, and due Oct. 1, 1952. The bonds are offered at 92¾ and interest, to yield about 5½ per cent. The company operates electric power and light and gas properties in an extensive territory in Eastern Pennsylvania and has taken over the Lycoming-Edison Light Company, the Williamsport Electric Company, the Jersey Shore Electric Company, the Jersey Shore Street Railway, the Lock Haven Electric Lighting System and the Montoursville Passenger Railway.

Traffic and Transportation

Ordinance Recommended

A Proposed Amendment to Franchise of Virginia Railway & Power Company Calls for Six-Cent Fare

The committee on streets of the City Council of Richmond, Va., has recommended the adoption of an ordinance amending the franchise of the Virginia Railway & Power Company to discontinue the sale of certain tickets and to charge a fare of not more than 6 cents for each passenger. After the ordinance has been advertised for ten days it may be acted upon by the Common Council of the City Council. If adopted by the Common Council it may then be considered by any meeting of the Board of Aldermen called for the purpose after such adoption or at its first regular meeting after adoption by the Common Council.

TICKET PROVISIONS REVIEWED

The ordinance authorizes the Virginia Railway & Power Company for and during the period of three months next ensuing after the approval of the ordinance to discontinue the sale of two labor tickets for 5 cents, good from 6 a.m. to 7 a.m., Monday to Saturday inclusive, and to discontinue the sale of six tickets for 25 cents, good from 6 a.m. to 8 a.m., Monday to Saturday inclusive, and to charge, except as herein provided, a fare of not more than 6 cents for each passenger. The second provision says that the company shall continue the universal transfer system and the sale and acceptance of the so-called school tickets to be sold and delivered to pupils as required under its present franchises, and shall provide for the sale on its cars of five tickets for 30 cents and at its office books of fifty tickets for $3. A provision stipulates that any and all tickets sold by the company at the rate of two for 5 cents or at the rate of six for 25 cents and in the hands of the public at the time the ordinance takes effect shall be valid and shall entitle the passenger to all rights guaranteed by provisions of the original franchise under which the ticket was sold.

None of the provisions of the ordinance are to become effective until the Virginia Railway & Power Company has filed with the City Clerk its acceptance of all provisions.

According to Section 4 of the proposed ordinance the terms and provisions of the ordinance shall automatically expire three months from the date of the approval without action on the part of the city of Richmond or upon the grant by the city to the company and the acceptance by the company of a new blanket franchise covering its present lines in the city of Richmond, if such grant and acceptance happen during such three months and prior to the expiration thereof, and upon the expiration of this ordinance the said company and its successors shall thereupon be bound by all of the provisions of the franchise now owned or under such blanket franchise as the case may be, provided the company recognizes as a condition the obligation imposed by a franchise now owned by it in South Richmond as to paving prescribed by sections of an ordinance of the city of Manchester. Section 6 explains the object of this ordinance as follows:

> 6. The intent of this ordinance is to grant the rights and privileges authorized by it for three months after its approval or until the grant and acceptance of a blanket franchise within such three months as aforesaid, and during that period to suspend but not repeal, the provisions contained in the various street railway franchises owned and operated by the Virginia Railway & Power Company, which are in conflict with the provisions contained in this ordinance, but it is especially ordained that at the expiration of the said period the provisions of the existing franchises owned and operated by the Virginia Railway & Power Company, which are so suspended, shall automatically be and become binding upon the said company, its successors and assigns, unless a new blanket franchise has been granted and accepted as aforesaid, in which case the company shall at the expiration of said period be bound by the provisions of such blanket franchise; provided, however, that the said company in consideration of the rights and privileges granted by this ordinance hereby recognizes and admits as one of the conditions and obligations imposed upon it under the street railway franchises now owned by it in South Richmond, the obligation and duty as to paying imposed and prescribed by Sections 3 and 4 of an ordinance of the city of Manchester, approved Oct. 9, 1885, as amended, respectively, on April 12, 1900, and Nov. 12, 1895, which said amendments appear as Sections 3 and 4 of Chapter 73 of the ordinances of the city of Manchester of 1905.

Pass Sales Increase in Tacoma

Weekly pass sales on the lines of the Tacoma Railway & Power Company, Tacoma, Wash., have been as follows:

First week, July 24-30	7,007
Second week, July 31-Aug. 6	8,380
Third week, Aug. 7-13	8,251
Fourth week, Aug. 14-20	8,400
Fifth week, Aug. 21-27	8,551
Sixth week, Aug. 28-Sept. 3	8,689
Seventh week, Sept. 4-10	8,286
Eighth week, Sept. 11-17	9.189
Ninth week, Sept. 18-24	9,342
Tenth week, Sept. 25-Oct. 1	9,747
Eleventh week, Oct. 2-8	9,748

The following table covers the first seven weeks operation with the pass.

Average ride per pass per week	27.59
Average ride per pass per day	3.94
Average ride per pass per weekday	4.07
Average ride per pass per Sunday	3.15
Apparent average revenue per ride on pass	3.62c.
Average fare per ride on pass (including allowance for transfers)	4.71c.

Patrons of the company have expressed their appreciation of the advantages of the pass in many ways and it is anticipated that within a few weeks the 10,000 mark in passes sold will be reached. It is said that the company expects to continue the pass at least through the winter. Reference has been made previously in the *Electric Railway Journal* to the fact that twenty-five buses are being operated at a 5-cent fare in Tacoma in competition with the lines of the railway.

Seven-Cent Fare Charge Upheld

The New York State Court of Appeals has unanimously affirmed the decision of the Appellate Division of the Supreme Court sustaining the right of the Public Service Commission to establish a 7-cent fare on the local lines of the International Railway in Buffalo. George Clinton, Sr., retained by the city as special counsel in the proceedings, says he will appeal to the United States Supreme Court to test the validity of the franchise held by the International fixing a 5-cent fare. It is declared that it may be a year before the case reaches the United States Supreme Court. The municipal authorities hold that in view of the franchise limitations the commission has no authority to grant a 7-cent fare.

United Railways Contemplates Bus Operation

Receiver Wells of the United Railways, St. Louis, Mo., is contemplating the use of buses in lieu of extensions of certain lines into several suburban districts, which have become congested, and which he is unable to reach with trolley lines under the receivership. A formal protest was recently filed by Manager A. T. Perkins of the United Railways against the granting of a permit by the Board of Public Service of St. Louis to the United States Bus Transit Corporation for the operation of motor buses on downtown and cross streets now occupied by the tracks of the railway.

In protesting Receiver Wells said that the railway desired to promote transportation which would result in increased comfort, convenience and economy to the people of St. Louis, but that the granting of such permit would have the effect of decreasing the comfort of the majority of the people. He said that the bus line would "cut into the cream of the business" and would make it less possible for the United Railways to maintain service at a uniform reasonable fare on all its lines. It was also cited that the United Railways paved the streets between its tracks, and on either side of the rails, and it was predicted that the bus company would use this paving without any adequate compensation to the city.

Bus Feeder Proposed for Alhambra

A survey has just been made by the passenger traffic manager of the Pacific Electric Railway with the City Manager of Alhambra, Calif., a suburban city of some 14,000 population, and served by two of the interurban electric lines of the Pacific Electric Railway. The survey was made with a view of establishing two possible motor bus lines to be operated in the city of Alhambra as feeders for the railway's lines.

It was stated by the railway representative that he would recommend at once the establishment of the local bus lines, and when such service was authorized by the directors of the company, then immediate application would be made to the State Railroad Commission for permission to put the service into effect.

The initial equipment would consist of three modern motor buses, to be operated on a 6-cent local fare, with the privilege of transfer to the cars of the electric line. Two routes for the buses are proposed. This bus service is not intended to interfere with any proposed intercity service, and according to the city officials would not require a franchise, only a permit to operate being necessary.

Fares Cut in Wheeling

Fare reductions ranging from 6 to 25 per cent, and the elimination of the present zoning plan, have been announced by G. S. Wills, general manager of the Wheeling (W. Va.) Traction Company. The order affects the entire system. It will not be adopted, however, until the new schedule of tariffs has been approved by the State Commission. This may not be until December.

The "nickel ride," abolished in 1920, will return, according to the statement issued by the company, when tickets are purchased, otherwise the cash fare in the city will be 8 cents.

The company admits in the statement that the new rates resulted from the belief that if the fares were lowered patronage would increase. In the event the experiment in lower fares fails to stimulate travel, application will be made by the company for increased tariffs.

As a further effort to induce use of the cars by the public, special strip tickets for 50 cents, good for ten rides, will be placed on sale by the company. These tickets may be used at any hour and without restrictions as to destination.

In conjunction with the movement started by the railway came the announcement from the Ultimate Bus Company that its schedule of fares would be reduced to meet the new rates of the railway.

Mayor of Seattle Gives View on Weekly Pass

Mayor E. J. Brown of Seattle, Wash., in considering means of reducing carfare on the Seattle Municipal Railway to 5 cents, is investigating the weekly pass system. In this respect he said:

> The city must not take any step which will not be in accord with its obligations to the holders of the $15,000,000 of street railway bonds, but I am inclined to think that 5-cent fare without transfers will now bring a greater revenue than the 8⅓-cent fare, especially if we could combine a 5-cent fare with the weekly $1 pass system.
>
> Such passes would be good for rides on all lines while they are effective. This plan would make the railway so convenient and inexpensive that people could not afford not to ride on city street cars. We would regain our short haul business, and much of the business we have lost to private automobiles. These questions, however, are matters for the City Council to decide.

Cincinnati Prepares for One-Man Car Operation

Cincinnati's first one-man cars will be on the tracks of the Cincinnati (Ohio) Traction Company within the next month. That announcement has been made by William Jerome Kuertz, Street Railway Commissioner. At a conference between the street railway commissioner and officials of the company recently the statement was made by Walter Draper, vice-president, that before the end of the present year seventy-five one-man cars would be in operation in Cincinnati.

The seventy-five cars are now under construction in the shops of the Cincinnati Car Company at Winton Place. They will be of a type that may be operated either by one man or a crew of two. There is a likelihood that they will be operated as one-man cars during the "lean" hours of the day and night and as two-man cars during the rush hours. The cars are of the very newest type, Mr. Kuertz stated, and will be found to be a big improvement over the cars now in operation. The overhead system of the traction company is being prepared for the new cars by readjusting the wires to eliminate pull-downs as much as possible. This will save the motorman, who will also be required to act as conductor, a great deal of trouble. A. Benham, general manager of the traction company, said that it has not been determined as yet on what lines the one-man cars will be first operated.

Men employed to operate one-man cars will receive 5 cents an hour additional.

No Announcement on One-Man Territory Extension

B. E. Tilton, vice-president and general manager of the New York State Railways, Syracuse, N. Y., would not disclose any information on enlarging the one-man car territory in his city. He did say that until he had seen a copy of the commission's order approving of one-man cars and had had an opportunity to study the order with President Hamilton no announcement would be made. It is expected that many lines now operating with two-men cars will be changed to one man. The order of the commission was reviewed in the *Electric Railway Journal* issue of Sept. 30.

Candidates Quizzed on Fare Question

Candidates for office in the approaching election in Connecticut have been asked to state their views on the 5-cent fare question in New Haven. The questionnaire, sent out by the Grand Avenue Business Men's Association of New Haven, asks for the candidate's view on the necessity of business methods in public utilities, the wiping out by the public of a deficiency when the public receives no benefit of surplus over agreed earning rate, and on the establishment of a bureau of statistics which would gather reports independently for the state. The fourth question asked is: "What is your purpose (if elected) relative to the high cost of trolley fares in the State of Connecticut whose charges are in excess of any other State in the country?"

The questionnaire was signed by Charles E. Griffith, who recently stated that the Connecticut Company was showing discrimination in not reducing its fares in New Haven. This was a reply to a statement by Lucius S. Storrs, president of the company, that the Grand Avenue residents had shown selfishness in their demand for a rerouting of cars.

Transportation News Notes

One-Man Cars on More Lines.—Commissioner Cann of Toledo recently announced that one-man cars would be placed in operation on the Cherry Street and East Broadway lines of the Community Traction Company on Oct. 16. The cars will be of the pay-enter type with both entrance and exit at the front end. One-man cars have been in use on the Bancroft line more than three months.

Freight Service Resumed.—Trolley freight service between Allentown and Philadelphia, suspended more than a year ago when the Philadelphia (Pa.) Rapid Transit Company abrogated its agreement with the Lehigh Valley Transit Company, has been resumed. It is understood that while the Philadelphia Rapid Transit Company was not an active participant in the new arrangement, it has leased its freight stations in Philadelphia to the Public Service Transportation Company, which will co-operate with the Lehigh Valley company. The Public Service Commission has approved the arrangement.

Protest Fare Charges.—Corporation Counsel Wilbur of Portland, Me., has forwarded a petition to the Public Utilities Commission protesting against the high rates charged by the Cumberland County Power & Light Company. The present charge on the railway division of the Cumberland County Power & Light Company is an 8-cent coupon rate with a 10-cent cash fare. It is expected that the City Council of South Portland will be asked to join in fight for reduced fares. In answer to the complaint of the special committee of the city government seeking a reduction in fares the company has filed a statement with the Public Utilities Commission asking a dismissal of the charges. The company claims that even the present fare schedule is not sufficient to provide a fair return. Further, the railway claims that there has been no change of conditions in connection with the operation of the system that warrants a reduction in rates.

Personal Mention

Salina Road Successful

W. E. Smither Continues as Manager There Under Change in Control, First Since 1911

Kansas has a little electric road that has long been almost entirely a family affair. The property is located at Salina. There are only 7.25 miles of track, but the road stands high, very high, with the public. Among the principal owners of the property for a decade now have been H. C. Smither and W. E. Smither, the one president and the other secretary-treasurer and general manager. Recently, however, along came J. J. Wiesendanger looking for a paying investment. He hadn't far to seek and now Mr. Wiesendanger controls the Salina Street Railway and is its president. With a true eye to the main chance Mr. Wiesendanger has announced that W. E. Smither will continue in the job that he has so acceptably filled for many years.

And why shouldn't he? The Salina company has never increased its fare beyond 5 cents. Moreover, the road has been operated profitably. Salina has only about 15,000 inhabitants. The town is fairly well spread out. It is only twelve blocks, however, from the union station to the business center. Mr. Smither's philosophy was that so far as Salina was concerned local folks figured a nickel was just a nickel and that they would pay a nickel to ride a few blocks, but would not pay any more. In fact, the real thrifty among the company's patrons—and Kansas is a place of thrift—ride for a fraction more than 4½ cents, for the company sells tickets at the rate of twenty-two for $1 and a $5 book of tickets for $4.50. Although the fare was kept constant, the pay of the employees was raised from 15 and 20 cents an hour, the rate in effect before the war, to 35 and 40 cents an hour. These are only some of the facts. Most important, perhaps, of all as recording the measure of success of the company is the record of the payment of a dividend of 8 per cent in 1921 on the $160,000 of stock of the company.

A road with only nine cars is certainly not in luck when the jitneys arrive on the streets. These pests didn't overlook Salina. When the jitney began to develop as a possible rival of the Salina Street Railway, officials of the company did not seek to bar them from the streets. The Smither management tried out the jitneys as an adjunct of the railway company's business. A motor bus operated along a main street in Salina, paralleling one of the car lines part of the distance, but running beyond that line's terminus to the Country Club. Now a motor bus is being operated on a half-hour schedule to a section of the city not reached by the railway lines. Bus fares are 10 cents. The buses are said not to be making any money, but they have proved a valuable adjunct and have kept the good will of the public for the railway.

H. C. Smither bought the line in 1911. It then consisted of a gasoline motor car and a narrow gage track, built with 30 lb. rails. The original line operated from the old railroad station to Kansas Wesleyan University, 3 miles. Since then it has been entirely rebuilt, equipped for electric operation and extended considerably.

When called seven years ago by his father to enter the traction business, Warren E. Smither—for that is the full name of the secretary, treasurer and general manager of the Salina Street Railway—was a farmer. He had been a bank clerk a short time. That comprised his business experience. The elder Mr. Smither said to his son: "You start in now to learn the railway business, because some day you're going to have to manage this line."

W. E. SMITHER

Learning from the ground up, Mr. Smither put in a year at the carhouse as a laborer—washing cars, repairing brakes, building track, fighting the battles of keeping cars running in big snowstorms.

Mr. Smither was twenty-six years old then. He knows everything connected with the operation of his small traction company. Undoubtedly one of the major items in the success of the 5-cent fare in Salina is Mr. Smither's self-imposed apprenticeship and the direct contact he maintains now with every activity. He sees personally that everything needed is done rightly.

As secretary-treasurer of the board of directors, Mr. Smither is no mere figurehead. He collects fares from the cash boxes on the cars. In fact, it is said that he performs all the duties of a company treasurer, purchasing agent, general manager, lineman, bookkeeper, shopman, motorman—anything, wherever needed most.

Wallace Muir, Lexington Lawyer, to Lead Claims Association

Wallace Muir, attorney in Lexington, Ky., will direct the destinies of the American Electric Railway Claims Association for the coming year. Mr. Muir was elected president at the final meeting of the association in Chicago on Oct. 5.

A long list of accomplishments in the legal, political and electric railway world is attached to Mr. Muir's name. He is a well-known personage in the association, for since 1911 he has attended all except one of the association meetings, has served on several committees, including the executive committee, and filled the chairs of first, second and third vice-president. He thus proves himself interested in activities of all electric railways, though his special allegiance is to the Kentucky Traction & Terminal Company. He has general supervision of the claims department of this company and tries all cases for it. He is connected in the same way with the Kentucky Utilities Company, Lexington. This work he has carried on since 1911.

Mr. Muir was born near Lexington, and at an early age moved to the city, where he has since continuously resided. He attended the State University at Lexington for three years, then took up the study of law at Washington & Lee University, Lexington, Va., and in 1900 was graduated from Central University of Richmond, Ky., now Center College, Danville.

After graduation he entered the law office of Bronston & Allen, which was one of the leading law firms of Kentucky. Later he opened private offices in Lexington. He has enjoyed a large practice and has been associated with some of the leading cases in Kentucky during the last ten years. In addition to his private practice he has served as city attorney and city solicitor and commonwealth's attorney of the Twenty-second Judicial District.

Mr. Gaboury on Long Leave of Absence

Arthur Gaboury, superintendent of the Montreal (Que.) Tramways, has been granted a long leave of absence in order to allow him to recuperate his health. His condition has improved, but further rest is necessary to obtain a complete cure. Provisionally, A. J. Gadoua, formerly claims agent, has been appointed to act as superintendent, and C. H. Shaw, formerly assistant to Mr. Gaboury, has been appointed assistant superintendent of transportation, with supervision over the movement of passenger and freight traffic.

Mr. Gaboury, after completing his college course at St. Laurent, entered the employ of the Montreal Street Railway in 1894 as conductor and later served as motorman, thereby gaining a practical knowledge of the transportation business. In 1901 he was appointed assistant inspector, and soon thereafter became depot clerk of the central carhouse. A few months later he was transferred to the new carhouse on St. Denis Boulevard, as chief clerk, having charge of the suburban line to Sault au Recollet.

In 1903 the claims department was separately organized, and Mr. Gaboury was put in charge as claims agent, which position he retained until 1906, when he was made assistant superintendent. A year later he was appointed superintendent, which position he has held to the present time.

Mr. Gaboury was president of the Canadian Electric Railway Association in 1920, and is now treasurer of the association. In the affairs of the American Electric Railway Association Mr. Gaboury has always been active and at the recent meeting in Chicago he was made second vice-president of the Transportation & Traffic Association.

B. F. Bardo Promoted

B. F. Bardo, formerly engineer of power plants of the New York, New Haven & Hartford Railroad, has been appointed superintendent of electric transmission. He will be in charge of operation and maintenance of the wire plant between New York and Cedar Hill. His headquarters will be at Cos Cob, Conn. Mr. Bardo has been with the New Haven since 1914, when he entered the office of the superintendent of power. A year later he was appointed inspector of power plants, and in November, 1917, was made engineer of power plants. He was graduated from Cornell University in 1913 with the degree of mechanical engineer. For more than a year, and until he joined the New Haven company, he was in the testing department of the General Electric Company at Schenectady, N. Y., and Pittsfield, Mass. Mr. Bardo was born in Wilkes-Barre, Pa., in 1889.

Dr. Stratton President of Boston Technical School

Samuel Wesley Stratton, for twenty-one years director of the Bureau of Standards in Washington, D. C., was elected president of the Massachusetts Institute of Technology on Oct. 11. Dr. Stratton, before joining the Standards Bureau, was a professor of physics at the University of Chicago. Under his leadership the bureau has grown from a small office of weights and measures, with three or four employees, to a large organization, with a staff of more than 900 employees. A dozen buildings are now needed to house the bureau, which is the largest government laboratory in the world. The bureau is now a center of scientific research for many government purchasing departments and for industry. Miniature manufacturing plants of textiles, ceramics, glass and paper have been established to determine the best industrial processes.

Dr. Stratton was graduated from the University of Illinois in 1884. The honorary degree of doctor of engineering has been conferred on him by the University of Illinois, the University of Pittsburgh, the University of Cambridge and by Yale University.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Glasgow Rail Contract Awarded to American Company

A proposal by Glasgow Tramways committee to accept a tender at £15,325 by the United States Steel Products Company was confirmed by the Town Council on Aug. 24, but not until the matter had been debated for a long time. The English tenderers were three Sheffield firms, Hadfields, Edgar Allen & Company and the Titan Trackwork Company, their lowest offer being £18,262. The English tenders were within a few hundred pounds of each other.

The Labor members of the Council objected to the order going to America as they alleged that the conditions of employment in the United States did not comply with the Glasgow Corporations fair wages clause. It was also contended that in view of the large amount of unemployment the work should be kept at home.

In support of the recommendation it was stated that the committee had received from the United States Steel Products Company a guarantee as to hours of work and wages paid. Bailie McWhirr, chairman of the Tramways Committee, in urging that the lowest tender should be accepted, said that the conditions and wages were better in the American than in the English steel works. As to relieving unemployment, the question was asked: Why should Glasgow pay £3,000 to help the working people of Sheffield? The offer made by the American firm was accepted by thirty-three votes to thirty-one.

1,500,000 Volts Generated

Further advances in the generation of extremely high electric potentials have been announced by the High Voltage Engineering Laboratory of the Pittsfield Works of the General Electric Company, Schenectady, N. Y. Several combinations of voltages have been obtained and studied for the first time, the highest being 1,500,000 volts, which is half again as much as that recorded in this laboratory a year ago.

In this combination one terminal with 1,000,000 volts was connected above ground and the other with 500,000 volts below ground.

One million two hundred and fifty thousand volts, single-phase, was also produced and 1,000,000 volts, three phase, with neutral grounded.

A million and a half volts arced between needle points 14 ft. apart. One million volts, three phase, formed a blazing triangle 9 ft. on a side between needle points.

Such advances, the Pittsburgh laboratory said, are not only of importance in electrical research and the design of apparatus for the more economical transmission of electric power over long distances but also open up new fields of research for the physicist, astronomer and physician.

Increased Industrial Activity Seen in Demand for Surplus Freight Cars

According to reports just received by the American Railway Association from the railroads of the country all the surplus freight cars have been needed to move business. This growing demand for transportation facilities presents a situation the like of which has not been noted since November, 1920, and is due to increased industrial activity.

For the week ended Sept. 15, according to reports filed, the railroads had pending requests from shippers for 85,906 freight cars which could not be immediately filled. This was an increase of 18,007 cars over the number on Sept. 8. Within the same time there was a decrease from 43,168 to 4,476 in the number of surplus freight cars that are scattered throughout the country.

Fourteen Substations at Work

The contract for building the fourth automatic substation of the Los Angeles (Cal.) Railway is to be awarded soon. The new station will be located on Hobart Street. A 1,000-kw. converter manufactured by the General Electric Company, will be installed.

Completion of the West Adams unit will give four automatic substations on the system. The first one was placed in the company's Vernon yards. With the other stations that require the attention of operators, the company will have fourteen substations generating power necessary for street car service.

Metal, Coal and Material Prices

Metals—New York	Oct. 17, 1922
Copper, electrolytic, cents per lb	13.812
Copper wire base, cents per lb	15.625
Lead, cents per lb	6.55
Zinc, cents per lb	7.175
Tin, Straits, cents per lb	34.875
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.625
Somerset mine run, Boston, net tons	4.30
Pittsburgh mine run, Pittsburgh, net tons	3.625
Franklin, Ill., screenings, Chicago, net tons	3.25
Central, Ill., screenings, Chicago, net tons	2.375
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	6.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl lots), N.Y., cents per gal.	91.50
White lead, (100-lb. keg), N.Y., cents per lb.	11.625
Turpentine, (bbl. lots), N.Y., per gal.	$1.45

Rolling Stock

Louisville (Ky.) Railway is very busy in its shops just now in converting a lot of its old single-truck cars into one-man cars. Deliveries on the large order for cars placed a few weeks ago are expected to start shortly.

United Electric Railways, Providence, R. I., has placed an order with the Osgood Bradley Car Company, Worcester, Mass., for 100 cars at an average cost of $12,000 a car. A few months ago the railway at Providence placed an order for fifty cars with the same manufacturer.

Reading Transit & Light Company, Reading, Pa., is constructing in its own carhouse an all-steel framework car designed for both city and suburban service. This modern light-weight car will probably serve as a standard whenever additional equipment is required in the future.

Track and Roadway

Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, has about completed the work of renewing the road bed between Toledo and Port Clinton.

Philadelphia, Pa.—The City Council's transportation committee has authorized the extension of a trolley line on Ogontz Avenue from Champlost Avenue to Old York Road.

Los Angeles (Cal.) Railway has started the reconstruction of Spring Street between First Street and the Temple Block. New ties, ballast and rail will be installed.

Public Service Railway, Newark, N. J., will change the grade and relay the tracks on High Street, Burlington. In Harrison the company will lay asphalt between the tracks on Harrison Avenue.

Fort Wayne, Ind.—The Board of Public Works has signed the Indiana Service Corporation franchise for a single track line on Putnam Street and has referred the matter to the City Council for action.

Eastern Texas Electric Company, Beaumont, Tex., is building an extension of its lines on Magnolia Avenue to the grounds of the East Texas Fair Association. The extension will be completed in time for the fair this fall, it is announced by officials of the company.

Houston (Tex.) Electric Company has been denied permission to extend its Studewood car line north on Reagan Street through Woodland Heights. The City Council expressed a willingness to grant permission for the extension to be built out Watson Street, one block west of Reagan.

Dallas (Tex.) Railway will work over numerous street crossings in carrying out an agreement made with the Dallas Automobile Club, according to Richard Meriwether, vice-president and general manager. Automobile drivers had complained that certain street crossings were rough and made automobile travel difficult and unpleasant.

Cincinnati & Dayton (Ohio) Traction Company through George P. Sohngen, receiver, has been authorized by the Ohio State Court of Appeals to expend $1,500 for the construction of a temporary bridge over the Two-Mile Creek near Hamilton, Ohio, so that cars of the traction company can be run through without the transferring of passengers and freight. The old bridge was washed away during the recent high water.

Power Houses, Shops and Buildings

Jacksonville (Fla.) Traction Company is installing oil burning equipment at its power plant on Riverside Avenue.

Boston (Mass.) Elevated Railway is erecting a small carhouse on P Street.

Public Service Railway, Newark, N. J., contemplates the erection of a new carhouse at Harrison.

Boston (Mass.) Elevated Railway has awarded the contract to the National Engineering Corporation, Boston, to erect a three-story 120 x 41-ft. reinforced concrete storehouse building on George Street and Sullivan Square, Boston.

Interstate Public Service Company, Indianapolis, Ind., is making extensive improvements in its power distribution system on the interurban line between Indianapolis and Louisville, according to L. M. Brown, general superintendent. A new automatic substation has been installed at Langdon, 10 miles south of Indianapolis, and another of the same type, costing $30,000 will be installed at Azalia, 10 miles north of Seymour, Ind. The manually operated substation at Reddington, Ind., will be moved to Southport, Ind., and consolidated with the one in operation there at this time. More even distribution of current is the object of the company in making the changes. The substations will feed in current taken from the transmission system.

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., recently began the operation of a new General Electric 30,000-kw. turbo-generator at the Lakeside power station. This unit brings the capacity of the station up to 70,000 kw., the two turbines in the original plant being of 20,000-kw. capacity. This new unit represents an investment of approximately $1,500,000. The new structure consists of the turbine house and the switch house, both being additions to the first unit, extending the westerly part of the original building to the south. In building the original unit provision was made for boiler capacity and water service, fuel capacity and handling apparatus for a plant of 200,000 kw. capacity, so no new extension was needed to that part of the plant.

Trade Notes

Walter S. McKee has resigned as vice-president and director of the American Manganese Steel Company and will develop the business of the Inland Engineering Company of Chicago, of which he is president.

Maine Concrete Railroad Tie Company, Corinna, Me., has recently been incorporated under the laws of Maine, to manufacture concrete railway ties, etc. The capital stock of the concern is $10,000. Sidney S. Smith, has been chosen president; H. C. Milliken, treasurer; and Jason F. Small, secretary.

Johns-Pratt Company, Hartford, Conn., manufacturers of Noark fuses and protective devices, Vulcabeston packing and Insulation and Johns-Pratt molded products, announces the appointment of George V. W. Ingham as eastern sales manger for the Electrical Division. He will make his headquarters at the New York office of the company in the Liggett Building, 41 East Forty-second Street. Mr. Ingham is well known in the electrical wiring device field, having held until recently the position of Eastern sales manager of the Bryant Electric Company, with which he was associated for eleven years. Prior to that Mr. Ingham was associated with Pass & Seymour, Inc., as western sales agent.

New Advertising Literature

Herman H. Sticht & Company, New York, N. Y., has issued Bulletin No. 115 descriptive of The Standco Megohmer.

Worcester Brush & Scraper Company, Worcester, Mass., has issued a catalog describing its high grade engineer supplies, foundry supplies, etc.

Pyrene Manufacturing Company, Newark, N. J., has issued Bulletin No. 3, describing the Parker process which changes the surface of any kind of iron or steel so that the rust problem is eliminated.

American Abrasive Metals Company, New York, N. Y., sales representative for the United States and Canada of the Carborundum Anti-Slip Tile, has issued a catalog describing in detail the new non-slip tile for walking surfaces. A specification guide for the setting of the tile both in new and repair work, together with size and shapes table of standard sizes and prices of the same, is included in the catalog.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a new publication, reprint 125, incorporating an address on light-weight interurban cars delivered before the Central Electric Railway Association convention, by F. E. Wynne, manager of the Railway Equipment Engineering Department. The publication discusses the advantages of the use of light-weight cars for interurban service over the heavier type of double-truck cars.

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Government Ownership in France Assailed in Chamber of Deputies

THOSE who profess to believe that government ownership and operation of public utilities provides the best public service will find scant comfort in the report of a special committee of the French Chamber of Deputies announced this week in Paris. Immediate sale of the French government telephone system to some private organization is recommended so that the people may have the benefit of the development which comes from private initiative.

France has frequently been referred to as a shining example of government ownership of utilities. But now, coming on top of the well-known move to replace the government-operated railroads in private hands, the recommendation to do likewise with her telephones is somewhat of a shock to public ownership advocates. Particularly must this be true when it is read that the telephone system is admittedly the worst in the world; that it is in the grip of a political organization with numbers of useless politically appointed employees; that its operation is such as to discourage additional patronage and that if France wants real telephone service it must turn to private initiative, which alone has shown itself capable of developing utility service to the best interest of the customer.

The report is made not from theory but after extensive investigation of telephone service in the United States, Sweden and Norway. It is thus not only a tribute to the utility service of the United States but also a studied conclusion based on fact. It recommends a privately owned and operated system subject to government regulation like the scheme followed in the United States.

Experience Has Shown State Ownership of Utilities Is Undesirable

CONTRIBUTING materially to knowledge on the advisability of state ownership of water powers, which is now being advocated in several states, is a recent address by P. S. Arkwright, president of the Georgia Railway & Power Company, Atlanta, Ga. The occasion was the meeting of the Association of Edison Illuminating Companies at White Sulphur Springs a couple of weeks ago. An abstract of the address appeared in the Oct. 21 issue of *Electrical World.* It is of interest to electric railway men because of the fundamental principles involved.

Stated briefly Mr. Arkwright pointed out these facts: In the middle of the last century various states, in their endeavor and anxiety to develop railroad communication within their borders, built railroads by the use of state funds and state credit. Practical experience with public operation, with the attendant political patronage, proved conclusively to all of these states the inefficiency, the impracticability of successful government operation. In other words, it failed and the roads were sold or leased. Eleven of the states repudiated their debts. Finally every state in the Union, except Connecticut, Massachusetts, New Hampshire and Vermont, provided, either by constitutional clause or amendment, a definite prohibition against any similar future use of state funds and credit, setting forth the principle of the use of public funds for necessary governmental functions. Consequently, all attempts to authorize state ownership of water powers or other commercial enterprises today will require in most states a constitutional amendment to open gates which were once judiciously closed.

There Can Be Standardization Without Stifling Initiative

IN THE FIELD of electric railway engineering, committees and individuals are striving to bring better order out of what was once chaos in the design of rails, special trackwork, track details, car parts, car bodies, overhead construction and details, etc. In spite of this, designs in some parts of the field are being modified more actively at present than ever before; in other words, what the mathematician would call the "rate of change" in design has a high present value. Does this mean that the efforts of the standardizers are in vain? Have they been wasting their time these many years? The answer is, emphatically, No! They should be encouraged in every way to keep up the good work, for they are exerting a restraining influence upon unnecessary invention—or useless differentiation—and will gradually evolve a body of standards that almost everybody will accept.

Superficially, there seems to be a conflict between standardization and invention. One tends to stabilize things, the other to change them. One seems to discourage ingenuity and originality, the other to stimulate them. An association after years of study no sooner selects, say, some rail sections which seem adapted to track requirements, when along come a number of new designs. An attempt is made to select certain uniform features in car design, while new designs are popping up over night. What does all this mean? It means, on the one hand, that the work of standardization is not stifling originality. It means, on the other, that much deference is still paid to time-honored "local conditions." It does not mean, however, that the standards are not exerting a powerful influence. There is no means of knowing what "local conditions" would have done with designs without this wholesome restraint. And the effects of "local conditions" are not all bad, because they have often furnished the stimulus needed to cure some widespread ailment and produced something worth standardizing later.

It would be unfortunate if the more progressive engineers in the electric railway industry were divided into two extreme groups respectively of standardizers and inventors, with a neutral group of followers in between. It would be far better for all to be striving for that state of mind which welcomes progress in both directions. That is, the ideal engineer is one who will strive to assist in the standardizing of all that is inherently standardizable, while still being alert to improve the standards through use and to fill in the gaps by the aid of invention. Like legislators and lawyers, some engineers lean toward codification; others, like social reformers, are interested most in reformation. Both types are useful, to themselves, to each other and to the neutrals. The standardizer should, however, expend his effort principally on widely used products of simple character; while the inventor should make the widest possible use of all available standards. As far as possible each should absorb the spirit of the other.

New Methods in the Selection of Employees

SO MUCH depends, both in safety of operation and financial results of an electric railway, on the proper selection of employees that it seems strange so little attention has been given to the subject from a scientific point until recently. For many years the matter was left on small systems to the superintendent of transportation and on large systems to an employment agent, who, except for an examination for physical requirements and references as to character, depended largely upon his judgment as to the men to be engaged for the positions of motormen and conductors. Those who were most successful in choosing among the applicants for jobs were considered "good judges of character," but they had few methods which they could explain to others as to the way in which they exercised their judgment, except to say that their decision was based largely upon the appearance of the applicant, his method of replying to simple questions, and possibly a few mental rules which each person charged with this work had drafted for his own guidance.

Probably the first serious efforts in this country to lay down more definite methods to guide in the selection of employees were made by Martin J. Insull, when general manager of the Louisville & Northern Railway & Lighting Company, some ten years ago. Mr. Insull became impressed with the occurrence at times of what he called "man failure" among electric railway operatives, and in a letter to this paper published Feb. 17, 1912, urged that a fund be raised large enough so that the problem could be studied from a scientific point of view at some of the well-known universities which have given special attention to psychological investigations. Shortly thereafter he got in touch with Professor Münsterberg, then professor of psychology at Harvard University, who had been giving considerable attention to psychological research as applied to the selection of employees, and some work was done along the lines of the scientific selection of platform men on the Boston Elevated Railway system, but Professor Münsterberg's death put an end to these experiments.

The need for quickly and systematically determining the most eligible candidates for promotion in the army at the time of the war greatly stimulated the study of this question and, as most people know, various tests were prepared and applied under the direction of the division of psychology of the Medical Department, United States Army. They proved so successful that they or modifications of them have gradually become introduced in industry, and the reports last year and this year of the committee on personnel and training of transportation employees of the Transportation & Traffic Association have greatly stimulated interest in the subject in the electric railway industry.

The most extended investigations into the subject, with the possible exception of those of Professor Münsterberg in 1912, are those recently conducted by the Market Street Railway of San Francisco, referred to briefly in the paper by Mr. McCants in the last issue of this paper and given more detail in this issue, where tests were made of a number of men on the system. The results thus obtained were supplemented by personal information furnished by the division superintendents. The industry is to be congratulated on the production of these records, for they afford a practical demonstration of how to go about the application of more scientific methods in hiring trainmen.

Broadly speaking, they are more instructive from what they disprove than from what they prove. "Good motormen," to quote the report, "are not born, but are made of good substantial human material." So far as this survey goes, the best qualifications for a good motorman are intelligence, health and contentment, the last including absence of domestic and financial worry—homely virtues these, but the foundation of good citizenship.

The investigations at San Francisco have been largely along the lines of oral and written tests, and in this respect they differ from some of those used abroad and the apparatus of Professor Münsterberg, which provide for measuring the physical reaction to events similar to those which would be experienced on a car. The difference is interesting and the trials at San Francisco should be only the beginning of the study of this topic. Further information is greatly needed.

Large System vs. Individual Operators in City Transportation

THE hearings now being conducted by the New York Transit Commission on bus operation have brought out a number of interesting facts and several charges of graft. Whether or not these are correct, one point at least has been clearly shown. That is the great superiority of regular and regulated transportation service over that conducted by individuals under little or no regulation and with uncertain financial responsibility. According to the testimony, there has been greater crowding on the buses than ever there was on the subway, and lines have been leased to operators who had little capital so that there is now a total of more than a million dollars in potential damage claims against the city. Probably one of the reasons that there has been intolerable crowding of buses in the rush hours is that an adequate number of buses to handle the peak load would increase the difficulty for the individual owners to make profits on account of the resulting surplus of buses in non-rush hours.

Some of these troubles come about, probably, because it is more difficult to control a large number of independent operators than one large company, and it is obvious that the latter can introduce more scientific and reliable operation and better discipline than is usually practicable for a large number of individual operators. Incidentally, this constitutes one advantage on the side of the city for electric railway operation. Electric cars have to be part of a co-ordinated system, which is not necessary with buses.

Dayton Operates Large Light-Weight One-Man Cars

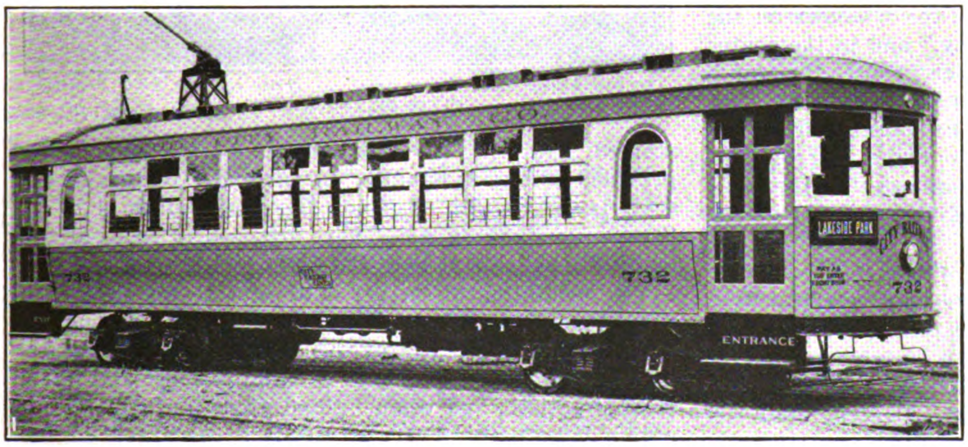
New Cars, 42 Ft. Over All, with a Seating Capacity of Fifty-one and with a Weight of Less than 500 Lb. per Passenger Seat, Are Operated Satisfactorily by One Man

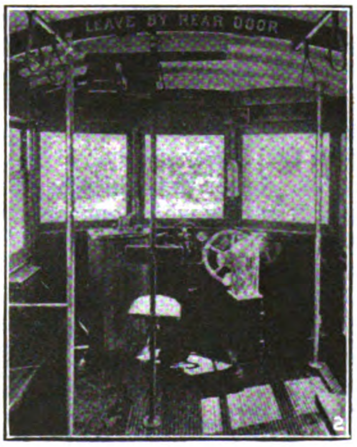
THE City Railway Company of Dayton, Ohio, has recently placed in service fifteen new one-man cars, which provide large seating capacity with exceptionally light-weight construction. Advantage has been taken of the experience gained by other companies operating one-man cars to incorporate in this new rolling stock all of the advantages and at the same time eliminate some of the points which have appeared somewhat questionable. Painted in colors of dark and light yellow, these cars present a very attractive appearance, and due to the oval top windows at each end present somewhat the appearance of an interurban car. When compared with other cars operated by the City Railway Line, they appear somewhat lower due to their having 26-in. diameter wheels and an arch roof, which also lends to the low appearance.

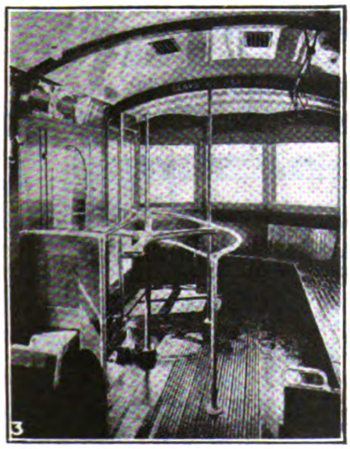
The extreme width of these cars is 8 ft. 4⅜ in., but the sides are curved inward below the rail belt to a narrower width, which is of advantage, particularly in Dayton at points where parking of automobiles limits the clearances for cars to a very low amount. Another noticeable feature of the exterior of these cars is the stationary steps. The management of the railway feels that this type of step causes fewer boarding and alighting accidents. Certainly they are less expensive to maintain than a folding step. The step construction is such that the outside edge of the step is in line with the upper side of the car body, so that no additional clearance is necessary. As all the lines in Dayton are arranged for loop operation, these cars are single end, which also has simplified the construction to a marked degree, and one side of the car is entirely without doors or steps. The low car made it necessary to elevate the trolley stand, and in mounting this the construction which has become quite familiar on Birney cars is used.

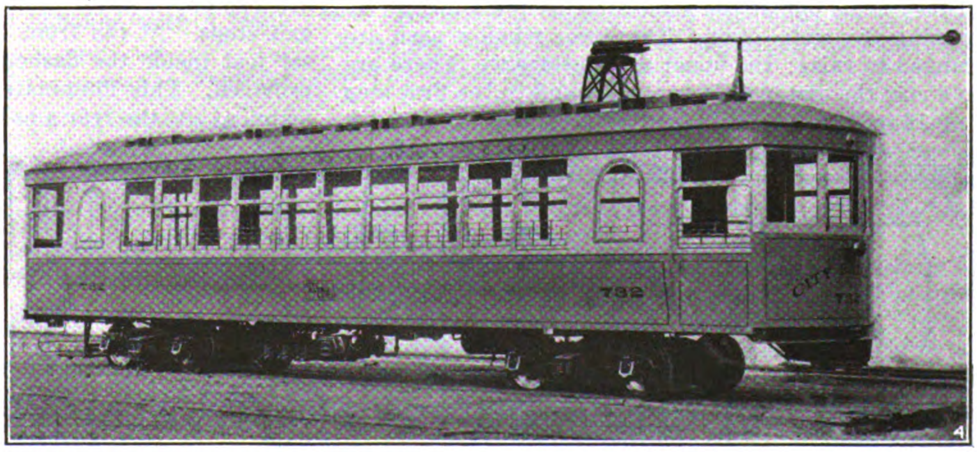
GENERAL DIMENSIONS AND DETAILS OF DAYTON CAR CONSTRUCTION

Length over dashers	41 ft. 11 in.
Length over body	33 ft. 3 in.
Length of platform	4 ft. 4 in.
Rail to top of trolley board	10 ft. 5 11/16 in.
Rail to bottom of side sill	28 11/16 in.
Rail to step	16 in.
Step to platform	14 in.
Ramp in car floor	2½ in.
Post centers	30 in.
Clear height inside	7 ft. 3 in.
Extreme width	8 ft. 4⅜ in.
Bumper extension	2 in.
Width of seats	36 in.
Width of aisle	25 in.
Door opening	36 in.
Truck centers	23 ft. 9 in.
Wheelbase	5 ft. 0 in.
Diameter of wheels	26 in.
Seating capacity	51
Weight, completely equipped	25,300 lb.

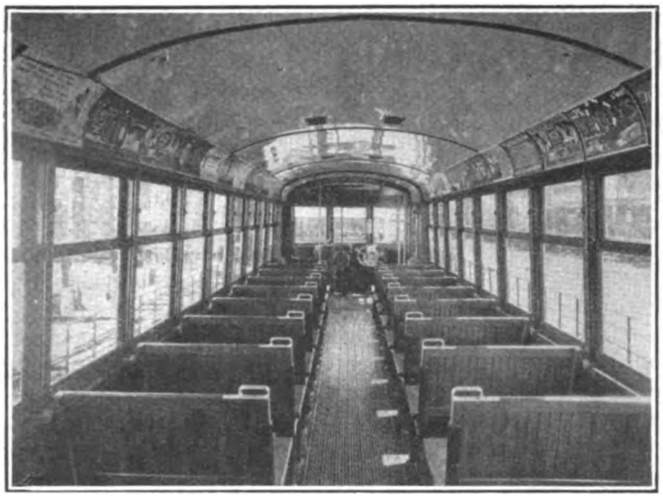








NO. 1—SIDE OF CAR WITH ENTRANCE AND EXIT DOORS. NO. 2—OPERATING END OF CAR. NO. 3—TURNSTILE INSTALLATION AT EXIT DOOR. NO. 4—SIDE OF CAR WITHOUT DOORS



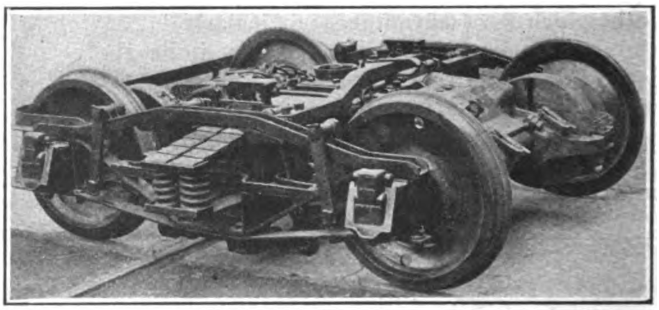
INTERIOR AND SEATING ARRANGEMENT, LOOKING TOWARD OPERATING END

These cars are operated as pay-as-you-enter, with the rear door used as an exit. As a barrier to prevent entrance at the rear door, each car has a Syracuse car turnstile, furnished by the Turnstile Car Corporation, Syracuse, N. Y. However, since the introduction of this type of car in Dayton, the traveling public has become so familiar with the method of entrance and exit that observation shows practically no attempt being made to enter the rear door. The various painted signs have also proved of advantage in directing passengers. On the front end at the right-hand side is a sign reading "Pay as You Enter Front Door." Above the front step is the word "Entrance," and above the step of the rear door is the word "Exit." The lettering of the cars has been kept as simple as possible. Above the windows on the side is "The City Railway Company," and in the center below the windows is a square which incloses the words "City Railway Lines." The words "City Railway" also appear in a semi-circle over the headlight and underneath the trolley catcher at the front and rear ends of the car. Other than this the numbers are the only additional lettering which appear at each end and also on the sides at both ends.

A feature of the construction which is of extreme interest to those maintaining car equipment is that used for the windows. A metal strip runs down between the windows of each pair. This can be readily removed and thus the windows can be lifted out. The window guards which extend up to a height of about half the lower window are also held in place by this construction, and they come out at the same time as the windows by loosening the metal strip. The lower window sash are arranged to raise; the upper are stationary. There are two steps, the distance from the ground to the first step being 16 in. and from this step to the platform 14 in. A ramp in the car vestibule of 2¼ in. is also used. A liberal door opening of 36 in. is provided. Sliding doors operated by pneumatic door engines are used.

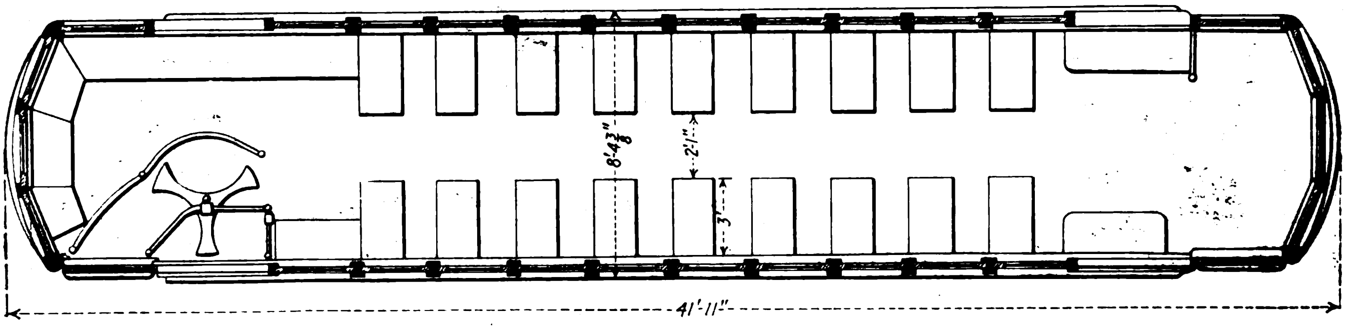
A vertical white metal pipe stanchion is provided just inside the door opening which is of convenience to passengers boarding and alighting. On the entrance end just to the right of the operator is a short pipe stanchion on which is mounted a fare box. This is used only as a fare box support and does not extend to the roof. Another pipe stanchion a little farther toward the car body serves as a support for the motorman's seat and is provided with a back. This stanchion extends to the roof and the upper part is fitted with a support for a curtain, which is arranged to pull down back of the operator, so as to shield the windows from the glare of light inside the car body. Another pipe stanchion is provided at the front end just at the end of the left-hand longitudinal seat. The car trimmings are of aluminum and white metal stanchions are used throughout.

At the rear of the car stationary seats are provided along the left-hand side and extending around the end, the space at the other side being occupied by the turnstile and a pipe railing for directing the flow of passengers as they leave the car. The seats are a cherry stained, flat type, the aisle corners of the back being provided with grab handles. A particular feature of the seats is their width of 36 in. The aisle width is 25 in. Straps for standing passengers are used in front of the longitudinal seats at both the front and rear of the car.



TYPE OF TRUCK USED

The headlining of the car is of agasote fastened with cherry molding, and the illumination of the car body is furnished by ten lamps of the 50-watt mill-type series, burning 120-volt. This type of lamp is short and has a frosted bottom, and when lighted gives uniform illumination and presents a very attractive appearance. Lights are also provided for illuminating both the entrance and exit steps. At the front a single lamp with a shade is set just inside the dasher at the floor level in a space provided. This illuminates the step in a very effective manner. At the rear a bank of five lamps is located over



FLOOR PLAN OF DAYTON ONE-MAN CAR

the doorway. With lights in this position, the step is not only illuminated but also the street surface at the car door.

The City Railway of Dayton is changing a number of its cars from hot air to the electric system of heating. The heater equipment consists of thirteen cross-seat and three panel heaters. Type 405-EB Gold Car Heating & Lighting Company's heaters are used. These heaters have interchangeable elements, supports and coils. They are of a two-coil type, both coils being alike. An additional vestibule heater located just to the left of the operator is also used. This is a Gold Type 144-E 600-volt, 1,200-watt heater. Gold Car Heating & Lighting Company's thermostatic control is also used for the heaters and the coils are arranged in two circuits. The control provides for all heaters being cut in and out at the same time, and should the thermostatic control become inoperative, heat is shut off from the car, so that notice of the trouble will be given immediately in order that it can be repaired.

The safety devices are the same as have been used by the Eastern Massachusetts Street Railway for a considerable time. An emergency cord which runs through the car is provided, and pulling this cord trips the circuit breaker, operates the emergency valve so as to apply the air brakes and balances the air pressure in the door engines so that the doors can be opened by hand if desired.

The trucks are the Cincinnati Car Company's arch-bar combination elliptic and coil spring type. Each truck is equipped with two GE-264 motors, which makes four motors per car. K 35-HH control is used. The air brakes are Westinghouse and a DH-16 compressor is used. The trucks are also provided with Gould slack adjusters.

Other features of the equipment include a Cleveland fare box, Hunter destination signs, Gebhart safety door signal equipment, Consolidated Car Heating Company's buzzers, H. B. life guards and O. B. type trolley catchers. The cars were built by the Cincinnati Car Company and are of all-steel construction. An accompanying table gives some of the principal dimensions.

Car Cleaning on the Illinois Traction System

The Car Cleaning Is Carried Out on a Regular Program Whose Details Are Given—The Work Is Done by the Transportation Department

By J. B. Hughey

Superintendent Sleeping and Parlor Cars, Illinois Traction System

WE OF the Illinois Traction System think that one of the very important features of passenger service on electric railways is clean, comfortable cars. For this reason early in 1914 a car cleaning department was established to take over the cleaning of cars formerly done by the operating department. The primary business of the car cleaning department is to keep all cars, stations, etc., clean. At the more important terminals both day and night shifts are kept, each shift working under a foreman who gets his instructions from the head of the department.

Each foreman is permitted to select his own men and is held responsible for the condition of the cars departing on his shift. The department is supervised by the writer, in addition to his other duties. The work of the car cleaning department described below is that followed on all passenger cars, not simply on the sleeping and parlor cars.

Each car cleaning foreman is supplied with a blank form as follows:

"....................Terminal
Date........................
Report of work done on car No......which was
a layover at this station from.....M. to.....M.

1. Were the spittoons removed and cleaned?..... How many on car?..........
2. Floor of car well swept?.............. (A2) Then mopped?..........
3. Windows cleaned inside and outside?..........
4. Interior woodwork and lamp globes wiped and dusted?..........
5. Were parcel racks cleared of papers, etc., and dusted?..........
6. Was water cooler emptied, cleaned, refilled and replaced?..........
7. All inside partition glass cleaned?...... (A7) Hopper washed?..........
8. Floor of toilet room swept and scrubbed..........
9. Motorman's cab cleaned and supplied with clean spittoon?..........
10. Was the stove room thoroughly cleaned?..........
11. Were seat pedestals wiped off with oiled waste?.....
12. Were seat covers turned, changed or adjusted? State which..........
13. Were the platforms and trap doors swept and scrubbed?..........
14. Was the car wiped or washed down on the outside? State which..........
15. Were the steps cleaned?......... (A15) Glass in folding door cleaned?..........
16. Did you make a personal inspection of this car to see that it was clean and in proper shape for service?......
17. What time was the inspection made?..............

Remarks..
....
....

Each foreman is required to fill out one of these forms for each car that is a layover for more than three hours in his terminal, and if all items above mentioned are not done, the reason must be given on a separate paper which is to be attached to the report of the car in question. All reports, together with time slips for each employee, are sent to the office of the superintendent. The work in detail is as follows:

THE WORK IN DETAIL

1. The spittoons are removed and washed in a strong solution of Creo-Sul disinfectant by means of a bucket and short handle brush. A small portion of disinfectant is left in each spittoon.

2. The floors of the cars are swept dry, except in cases where they are to go out right away. Then the sweeping compound is sprinkled on the floor. In all cases a few windows are raised on each side so as to let the air in and dust out. All hair No. 16 or No. 14 push brushes are used.

3. The windows are cleaned with Bon-Ami, applied with sponge, when they need it, but are always wiped off with clean dry waste when the cars are cleaned.

4. The interior woodwork and lamp globes are wiped and dusted on all of the cars which are all-night or all-day layovers. If the cars seem particularly to need it, this cleaning is done regardless of the length of the layover time.

5. The parcel racks are given attention on every car cleaned.

6. The water cooler of every layover car is emptied and washed out. It is steamed at regular intervals and is filled with fresh water and clean ice a short time before it is set for the reception of passengers.

7. The partition glass is cleaned when this work is needed.

7A. The hopper bowls are washed out on all layover cars. A strong solution of Creo-Sul and a special hopper cleaning brush are used.

8. The floors of the toilet rooms are of course swept when the other parts of the cars are swept, and when a scrubbing is needed, it is given with a broom and plenty of strong disinfected water. We give this work a number on the blank so that the foreman in his general inspection will have to look at it to answer the question truthfully.

9. The motorman's cab is cleaned and always supplied with a clean spittoon.

10. The stove rooms have to have special attention to keep papers, fuel, etc., that are thrown behind them on the road cleaned out.

11. The seat pedestals are wiped off with lightly oiled waste when they look dull. It brightens them up and they look much better.

12. By seat covers, we mean what are sometimes called "tidies." They are 27 in. wide and are tied over the seat backs so as to keep the dirt from the heads of passengers off of the plush and also, and this is the main reason for having them, to furnish an unquestionably clean place for the tired passenger to lean his weary head.

13. The platforms are always of course swept, but they are scrubbed only when they need it.

14. When a car is on a layover long enough, it is wiped down on the outside with clean dry waste, or if the weather is bad and the car is in no condition to wipe, it is washed with water, brushes with handles 10 ft. long being used.

15. This work is the same as described under 13.

15A. This work is like that under 7.

16. We consider this one of the most important of the list. Every foreman has positive orders to make a personal inspection of every car that is to go out on his shift to see that it is in proper shape for service or, if not, to have it put in shape.

17. So that we shall know what time the foreman was on the car, etc.

The time required for one man on this work is about as follows:

No. 1	5 to 8 minutes	No. 9	10 minutes
No. 2	25 minutes	No. 10	10 minutes
No. 3	45 minutes	No. 11	10 minutes
No. 4	15 minutes	No. 12	10 minutes
No. 5	5 minutes	No. 13	10 minutes
No. 6	5 to 20 minutes	No. 14	......
No. 7	Included in 3	No. 15	20 minutes
No. 7A	5 to 10 minutes	No. 15A	
No. 8	10 minutes	No. 16	5 minutes

Thus it will be seen that it requires about three hours time for one man to do the work on one car for what we term a quick terminal clean. This work is done both by day and night wherever the cars are layovers and we keep a force.

The general cleaning is always done during the day and requires ten hours for each of five men. Quite a bit of additional work also is done. The program in general cleaning is about as follows:

The cars are placed on a rip track and compressed air, furnished at most points from a neighboring power house, is used in blowing out the plush upholstery. The compressed air is also used to blow out the accumulation of dirt from under the heater pipes and other places that cannot be cleaned by sweeping.

The woodwork is washed with a good neutral soap and rinsed with clear water, and when it is dry an application of a harmless renovator is used. The floor is then scrubbed, windows shifted and the glass cleaned on both sides of both sash. A final touch up with a clean cloth is made so as to get off any of the renovator that may have been left. The lamp globes are removed and washed if need be and clean seat covers are placed in the car. Then the outside of the car is gone over with some effective cleaner which is washed off with clear water by the use of a hose and car washer brushes. When dry a renovator is applied to the paint on the outside of the car and then is wiped off with dry clean waste.

THE WOODWORK IS WASHED ONCE EVERY SIX MONTHS

Compressed air is used on the cars as often as needed, but the woodwork is washed but twice each twelve months, except in cases where cars have been occupied by persons with contagious disease. In that case the woodwork is thoroughly washed and the car is fumigated with formaldehyde and permanganate of potash mixed together, which makes a very strong and effective fume. This work is done also regularly in March or April and again in October.

To comply with the federal laws regarding the cleaning of water containers, coolers, filling cans, etc., the company has a steam line into the car yards or carhouses at most important terminals. Steam is furnished from the neighboring power house and a record is kept of the date when the coolers are steamed.

In connection with the car cleaning department the company also operates a small laundry. While this is maintained chiefly for the purpose of taking care of the linen used on the sleeping and parlor cars operated by the company, the seat covers used on the coach seats as well as the cleaning rags are washed there at a very reasonable cost.

The renovators which we use are special No. 10, made by the Cymol Chemical Company, and the Brooks renovator.

We have found it best to have the car cleaning department a part of the transportation department of the company rather than a part of the mechanical department of the company. One reason is that coach cleaners can usually be employed for less than one has to pay a mechanic. While we work in perfect harmony with the mechanical department, each has its own foreman with duties which do not in any way conflict with those of the other.

The repair shops of the company are at Decatur and whenever a car is taken there for either light or heavy repairs it is in charge of the mechanical department. The nature of the repairs may result in an accumulation of some dirt so the cars are always swept and otherwise cleaned ready for operation before they are returned to service.

Welding Practice of the Pacific Electric

The Extent of the System and the Large Amount of Special Trackwork Used Give Welding Operations Particular Importance—A Large Amount of Welding Is Done on Both Open and Paved Tracks

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

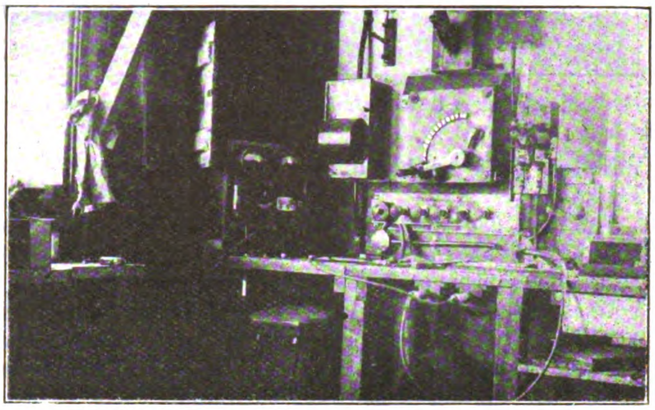
AN IDEA of the extent that welding operations are of value to the Pacific Electric Railway can be gained from a brief summary of the extent of the system and the large amount of special work employed. The system comprises a total of 1,105 miles of track, of which approximately 250 miles is located in paved streets. There are more than 118 railroad crossings alone with steam lines and more than fifty-five complicated special work layouts in the streets of Los Angeles. A portion of the company's tracks are of combination gage construction for joint operation with the Los Angeles Railway, which is a narrow gage line, and this complicates the construction of the special trackwork.

The company has made use of welding in connection with track repairs for the past ten years and has organized special welding gangs for carrying out all important work of this nature. The first welding machines employed were of a grid resistance type quite similar to the machines now being marketed by the Indianapolis Switch & Frog Company. These machines were built in the shops of the company at Los Angeles, a royalty being paid the patentees. These early machines were 2 ft. x 4 ft. x 6 ft. in dimensions and mounted on a wheel-base weighing approximately 1,250 lb. Direct current was used at a potential of from 550 to 600 volts. Four of these machines were constructed and are still in use on the system.

Due to an increase in the amount of welding work necessary, additional equipment has been placed in service as follows:

Five Indianapolis Switch & Frog Company's 600-volt resistance type portable welding machines. Four of these are used in city work and one in open trackwork.

One No. 3 welding torch.

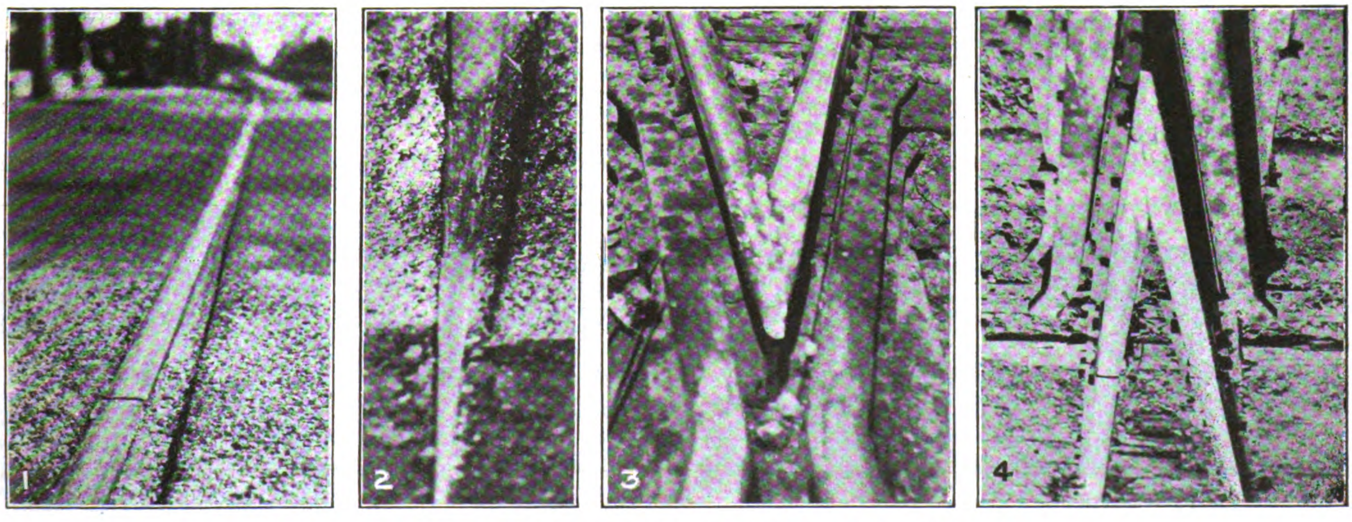


WELDING EQUIPMENT IN BONDING SHOP. D.C. OUTFIT AT THE RIGHT WITH A.C. OUTFIT AT THE LEFT

Two acetylene cutting torches for various work.

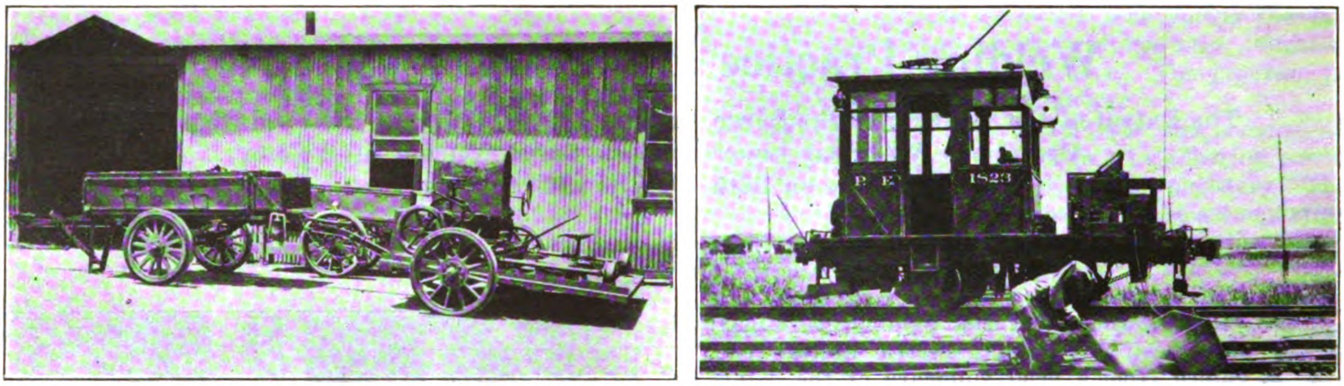
One 500-volt portable resistance welder of the Electric Railway Improvement Company's make. This machine is used for welding work in city streets during the daytime where immediate emergency repairs are required which cannot wait for night forces.

Welding is now found of advantage for a large variety of repairs. In the reconstruction of tracks in paved streets, bolts and nuts are now welded on special work and at rail joints. Nut-locks are omitted as the depositing of metal on the end of the bolt just outside the nuts prevents them from coming loose. Under normal conditions one welding foreman and one helper can weld 1,522 bolts in eight hours. In this work 1 lb. of welding steel is needed for twenty-four bolts welded, the size of the bolts being 1 in. x $4\frac{1}{2}$ in. This particular job was in a paved street where automobile traffic was light and where the average interval between cars was fifteen



RAIL JOINTS AND FROGS AND AFTER REPAIRING

No. 1. Worn rail joint at oil-macadam paved road crossing.
No. 2. Same joint after being built up, ready for grinding.
No. 3. Open track frog point turnout with worn point.
No. 4. The same frog point after repairs are completed.



At Left, Rail Grinder Coupled to Welding Machine for Hauling to Job. At Right, Welding a Worn Frog Point by Use of Equipment Mounted on Special Line Car

minutes. This method of welding bolts has proved very satisfactory.

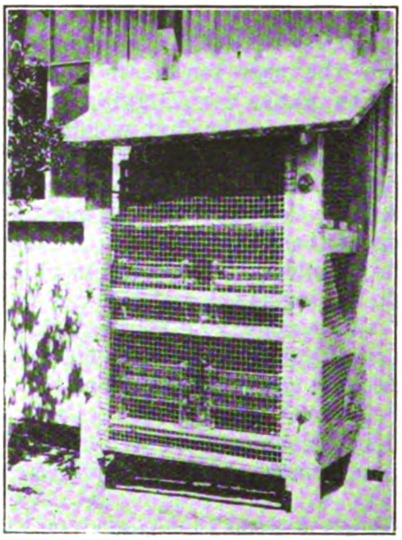
Another use for welding which has cut costs considerably is in the building up of rails in the field to form a compromise joint at railroad crossings where both a heavy girder rail and a light section low T-rail are used. The life of special trackwork has been increased considerably through the use of welding equipment in making repairs. Previously repair work prolonged special trackwork life from three months to eighteen months, but the use of welding, together with more efficient methods, now prolongs the life from one to three years.

With open track construction the building up and welding of battered rail ends at joints has proved very satisfactory. The company maintains more than a thousand highway crossings at various points on its lines and these locations are the ones where the large majority of the work is necessary.

Accompanying illustrations show some of the work being done at an oil-macadam paved crossing. After one of the joints was rebolted and the ties renewed and tamped the rail end of the joint still showed a worn surface of $\frac{1}{8}$ in. extending back for a distance of 28 in. In building up this joint the tread side of the rail was completed first, so as not to interfere with the passing of trains. After the welding was completed the joint was ground down with an Atlas rail grinder. Another illustration shows a frog pointed in a turnout in open trackwork which was reclaimed by electric welding.

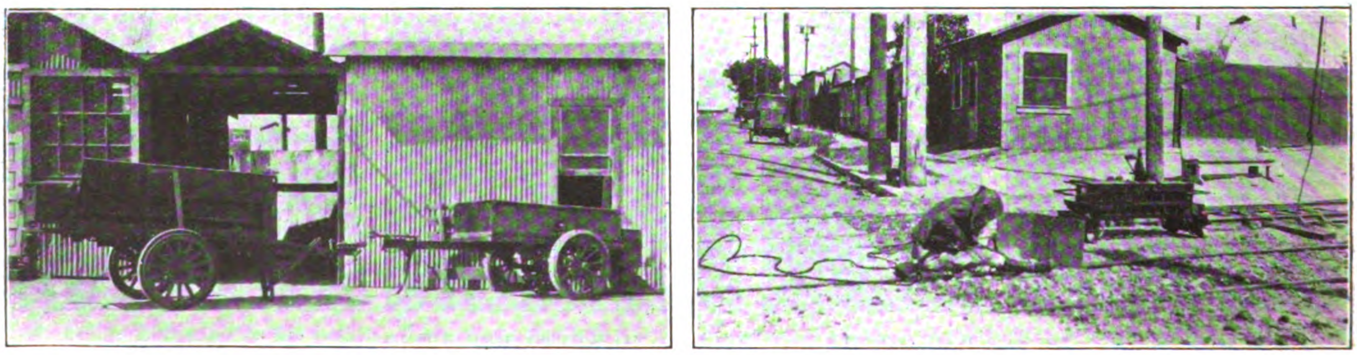
The company's present welding force consists of four foremen, four welders and three helpers, who are all under the supervision of a bonding supervisor. By this system the bonding supervisor can give this work his individual attention for the entire system and give closer supervision, which results in much better work than by having the force subject to the partial supervision of the general track supervisor of each division on which they may be working.

Every effort has been made to give welding work special attention at all times. Welding forces have been impressed with the fact that satisfactory work requires special skill and attention. For making the welds and building up joints the highest grade of welding steel obtainable has been used. Acme special round tool steel $\frac{3}{16}$ in. in diameter, which is a high-grade carbon steel, has been found very satisfactory for reclaiming railroad crossings, frogs, switches, joints, bolts and special work. The Indianapolis Switch & Frog Company's grade B welding tool steel $\frac{1}{4}$ in. in diameter is used for welding all manganese crossings, frogs, switches and special work.



Mounting of Grid Resistors Outside Bonding Shop

Another point which has been given special study and attention is the manner of transporting the machines to and from the job. At first an auto truck was used for this purpose, which hauled the welding equipment installed on a trail truck. While this method was satisfactory for city use, it could not be used for reaching repair work in open track or where the tracks operated over private right-of-way. To meet these con-



At Left, Two Welding Machines Mounted on Rubber-Tired Wheels for Transporting About City Streets. At Right, Working with a 500-Volt Portable Resistor Welder ditions a special line car is used. This line car was fitted up in the company's shop and the welding equipment is made a permanent part. The current for welding is taken from a tap on the trolley pole through a 250-amp. circuit breaker. This safeguards the equipment in case of short circuit or line interference.

A special cart has been designed for handling the rail grinder. This is constructed as low to the ground as possible in order to make easy the handling of the grinder on and off the cart at the point where the work is done. This cart can also be coupled to the welding machine so the two can be transported to any desired location at the same time.

In addition to the portable welding equipment the railway also has a direct-current grid type outfit and an alternating-current welding set installed in the engineering department's bonding shop. In order to provide for efficient ventilation of the resistors used with the d.c. outfit these are mounted outside the shop building and are screened with a coarse wire screen. An accompanying illustration shows this mounting. Other equipment necessary, such as circuit breakers, switches and connecting cables, is mounted above a work bench inside the building. The a.c. equipment consists of a transformer, switches and other necessary apparatus. When the welding forces are not required on trackwork, there is always plenty for them to do in the bonding shop. The work done consists of reclaiming and welding various bonding tools as well as track, bridge and signal tools. The equipment is also used for repairs to pneumatic tie-tamping and paving-cutting tools, which require frequent attention.

New uses for welding equipment are being found constantly which increase its field of usefulness and the Pacific Electric Railway, like most other railways that have had experience in welding, now considers this as a most essential part of its maintenance equipment.

Continuing Old-Type Motors in Service Is Costly

Modern Motors Require Maintenance Expenditures About One-fourth Those for Obsolete Types, Besides Producing Other Economies in Fewer Pull-Ins Less Weight and Faster Service

By H. G. Morse
Railway Engineering Department, General Electric Company, Schenectady, N. Y.

THERE are still in active service in this country some thousands of railway motors from twelve to twenty years old which ought, on the score of reduced maintenance costs alone, to be retired from service and replaced by machines of modern design. If to this be added the greater reliability of the new motor and the consequent fewer failures in service, the reduction in weight and the greater schedule possibilities, it will be found that there are few properties that could not show an interesting return on such an investment.

An average of figures recently compiled shows that the cost of keeping a twenty-year-old motor in service is four to five times that occasioned by a modern type even when the latter is as much as five years old. Before discussing the reason for so great a difference, some actual figures will be illuminating. On a large Eastern property during 1920 on cars in active service the records show that of 3,785 motors of twelve years average age, 25.5 per cent or 1,004 armatures were rewound, while for the same period 609 motors of an average age of five years required 8.7 per cent or fifty-three armatures to be rewound. This, as can be seen, is not a record of brand new motors. As a matter of fact, only about 15 per cent of the second group had been running less than two years, while 40 per cent had been in service for seven years.

On another large Eastern system in 1920, 1,885 motors of obsolete design, used mainly in tripper service and therefore worked less severely than on all-day runs, averaged $7.30 per 1,000 motor-miles for repairs and inspection, whereas 1,412 modern type motors in regular service averaged only $1.19 per 1,000 miles in their fourth year of operation.

On a property in the Southwest 220 old-style motors in 1921 averaged $4.49 per 1,000 motor-miles, and 104 much later design motors averaged $1.42, although in their ninth service year. A large part of the older motors were used only for tripper service, while the later motors were on cars kept on the road to the maximum extent. Another system in the South reports costs on their older motors, of which approximately 1,000 were in operation in 1920, ranging from $2.50 per 1,000 miles for the best to $5.40 for the worst, averaging $3.75. This compares with 50 cents per 1,000 miles on 100 modern motors in service for five years.

Instances like these could be recounted indefinitely, but these are sufficient both in geographical location and quantities of motors involved to prove the case for the new motor. Experience shows that modern motors properly applied should not cost for repairs and inspection more than $1 per 1,000 motor-miles during the first five to seven years, or from $30 to $40 per motor annually to keep them in first-class operating condition. On most motors put in service prior to 1912 operating costs will average $120 to $200 annually on the same mileage basis.

The reason for these big differences is simply the rapid advance that has been made in railway motor design and construction over the past ten years. Better understanding of insulation and ventilation problems and improvements in mechanical design and construction have resulted in a motor of less weight and greater reliability. An examination of repair charges to old-type motors will show that a large percentage of the trouble is due to armature failures with repairs to fields, brush-holders, gears and pinions and to accessory equipment in the order named. The armatures of new motors are better insulated, better ventilated and of better mechanical design so that they are fundamentally improved. Armature and axle bearings are waste packed and oiled, which in itself is a vast improvement over grease lubricated motors.

A large percentage of armature failures is due to armatures getting down on the pole pieces, which is directly traceable to insufficient lubrication of bearings. It is very difficult to get satisfactory oil lubrication on motors designed for grease, as any master mechanic will testify. Field coils are now better supported in the motor, almost eliminating failures from grounded fields due to chafing. Brush-holders have been improved and creepage distances increased, which, with the use of commutating poles, has substantially reduced flashovers. Most street railway systems operate at 600 volts nominally, with peaks considerably above this. As most of the older motors were designed and insulated for 500 volts, this increase in voltage results in a high mortality. Split-frame motors have given way to box frame; better fitting frame heads and bearing caps have replaced the old. These betterments are reflected not only in the direct repair expense, but indirectly in the increased yearly mileage due to less time spent in the repair shop.

SAVES IN PLATFORM EXPENSE TOO

Many other improvements could be cited to show the greater reliability of the modern motor. The direct saving in maintenance will frequently show 20 to 25 per cent return on the cost of replacement, while the other savings may add considerably to this. A case in point is New Orleans, where it was found that by substituting modern machines a faster schedule could be operated, as the new motors were capable of more rapid acceleration and higher free running speeds, and that fewer cars with new motors could provide the same service with material economies in the cost for platform wages.

The reduction in weight that can be obtained by motor replacement, with the consequent saving in power cost and track maintenance, is appreciable and should be considered. One type of motor suitable for single-truck, two-motor cars weighs 1,500 lb., as compared to 2,850, 2,450, or 2,180 lb., respectively, for three of the older motors which it will replace. It is evident, therefore, that on a two-motor equipment, from 1,360 to 2700 lb. can be saved, and 2,750 to 5,400 lb. on a four-motor car. A still further reduction in weight can be secured by dropping the cars down onto low-wheel (24 in. to 26 in.) trucks and utilizing low-wheel motors. A saving of about 2,000 lb. per truck and 100 lb. per motor can be made in this manner.

The Winnipeg Electric Railway has done this with nearly 200 old cars, equipping them with 26-in. wheels and GE-258 motors. More recently the Dayton (Ohio) City Railway has re-equipped fifteen cars that had maximum traction trucks and two 65-hp. motors with 26 in. wheel trucks and four 25-hp., G.E.264 motors and saved considerable weight.

Summarized, there are many places where motor replacement can be justified by the reduction in maintenance expense and increased reliability of service. In other cases the ability to make a better schedule may be the determining factor. In others the necessity of pulling trailers may force the use of larger motors, while elsewhere the desirability of lowering step heights and reducing weight may bring about the motor replacement. There are without doubt similar conditions existing on most railways where the replacement of obsolete motors would bring material economies in addition to the saving in motor maintenance. It would well repay operators to give the situation on their own properties a thorough examination.

Food Costs Show 1 per Cent Increase

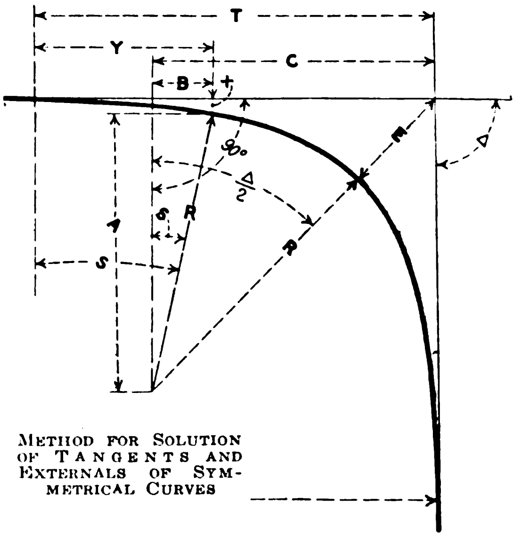
THE retail food index issued by the United States Department of Labor through the Bureau of Labor Statistics shows that there was an increase of 1 per cent in the retail cost of food to the average family in September as compared with August. For the year period Sept. 15, 1921, to Sept. 15, 1922, the percentage decrease in cost of all articles of food combined was 9 per cent. For the nine-year period Sept. 15, 1913, to Sept. 15, 1922, the increase in all articles of food combined was 36 per cent.

Solution for a Compound-Curve Trackwork Problem

A Simple Method for Finding the Tangents and Externals of Symmetrical Curves in Special Trackwork, Using Available Tables

BY L. R. BROWN
Office and Field Engineer New York State Railways, Rochester, N. Y.

FROM time to time there have appeared in the columns of this magazine formulas and methods for solving compound-curve problems. Since the advent of the standard spiral or switch easement, the most frequent problem encountered in the designing of special trackwork curves is the computation of the tangent distances and externals of curves where a standard spiral is used at either end of a given center radius. There are tables given by the steel companies which give the *X*, *Y*, *S* of each of their standard spirals. There is also a booklet put out by one company which gives tables showing these dimensions for the A.E.R.A. recommended spirals. Thus in nearly every case these dimensions as well as the center radius and total angle are known.



METHOD FOR SOLUTION OF TANGENTS AND EXTERNALS OF SYMMETRICAL CURVES

The problem, then, is to solve the tangent distances and externals. This problem, of course, is easily solved by trigonometry and there are several methods of doing it. Much time is wasted in the drafting room in computing these problems unless a given method already worked out and checked is used. If a copy of the formula is at hand it is only necessary to substitute in the formula. It likewise saves time in checking the computations.

The simplest method found by the writer for solving the above problem is that given by the following formula. This method can be used only where the same spiral is used on each end of the curve.

Given: *X*, *Y*, *S* of any spiral, *R*, the center radius, and Δ (see figure).

Find: *T* and *E*.

$$A = R \cos S$$
$$B = R \sin S$$
$$C = (A + X) \tan \frac{\Delta}{2}$$
$$E = \frac{A + X}{\cos \frac{\Delta}{2}} - R$$
$$T = C + Y - B$$

In the Jan. 17, 1920, issue of the *Electric Railway Journal* the writer gave formulas which could be used for solving the *X* and *Y* distances of any spiral in case a railway company used a standard spiral of its own instead of already existing standards.

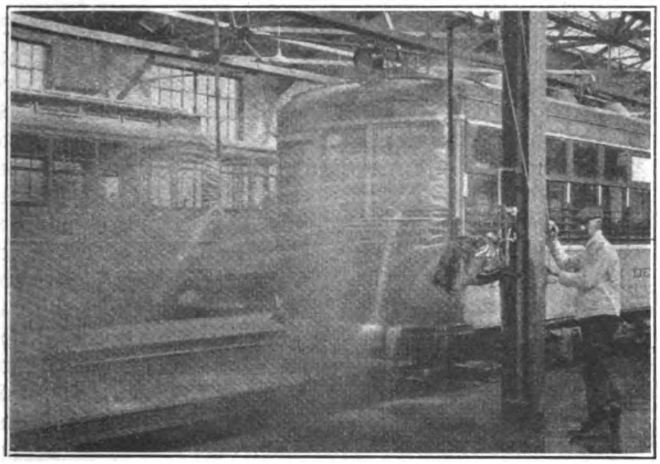
Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Efficient Method for Washing Cars

The New Carhouse of the Detroit Municipal Railways Is Equipped with Perforated Pipes, from Which a Spray Is Applied to the Car Bodies as They Are Operated Back and Forth

AMONG the novel features incorporated in the new St. Jean carhouse of the Department of Street Railways, Detroit, is a spray system for washing cars. It consists of four perforated vertical spray pipes, arranged in two pairs. These are located at the sides of the washing track. A 2-in. pipe is used as the main feed pipe, and this is reduced to 1½ in. at the control valve, and below this to 1¼ in. at the regulating valve and then to 1 in. and ¾ in. at the bottom. Two rows of holes are provided in the bottom sections, with 1-in. centers at the top and ¾-in. centers at the bottom. All holes are 0.082 in. in diameter. The water for washing is taken directly from the fire line of the shop. To provide for cars of different heights, a slotted bushing is placed over the upper portion of the spray pipe. When the slot is turned away from the holes, the latter are covered, thus preventing the water from shooting over the roofs of low cars.


WASHING A SAFETY CAR IN THE DETROIT MUNICIPAL SHOPS

In washing a car it is moved slowly between the first pair of spray pipes, and in order to loosen the dirt the car is stopped while two men with long-handled brushes go over the car on each side. With the dirt loosened, the car is moved slowly past the second pair of sprayers, which rinses the car clean. The safety cars of the Detroit Municipal Railways have hinged metal window guards, which can be turned down out of the way while washing is being done.

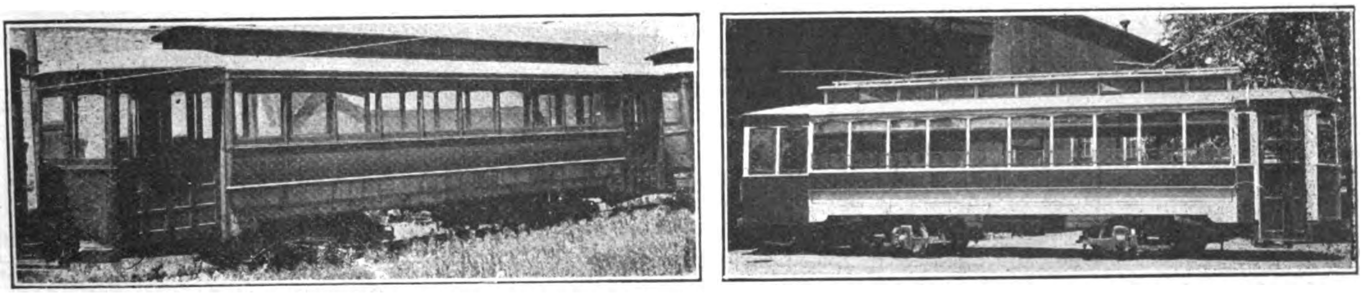
The valves for operating and controlling the flow of water are manipulated from the floor by means of ropes. The washing crew consists of four men, one of whom operates the valves. As soon as the car has passed through, this man helps with the washing. The motorman stays inside the car during the washing and takes it away immediately after the job is finished. This method enables the washing of a safety car to be done in two and a half minutes, and its use has resulted in reducing the cost of car washing to a considerable extent. This equipment was devised by Fred Weld, master mechanic of the system.

Trailers Converted to Motor Cars

BY GEORGE R. GREEN
Superintendent of Equipment Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.

THE Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is now engaged in rebuilding and equipping ten second-hand trailers, to be operated as one-man motor cars. Five of them have already been converted into motor cars at a cost of $2,158 each, exclusive of the cost of the motors and controllers, which the company had on hand. The cars are 41 ft. 8 in. in length over all and seat forty passengers. They have Brill trucks, two 40-hp. motors, 30-in. wheels and DH-16 compressors. The weight of the cars has been kept down to approximately 30,000 lb., every precaution having been taken to remove any surplus material.

The cars are arranged for double-end operation, but have single doors manually controlled. The company's experience with doors has shown that while it takes a slightly longer time to load and unload passengers during peak-load riding, yet the operator has far better control of the boarding and alighting of passengers with the single door. On the remodeled car the rear door is held in a closed position by a magnetic pneumatic locking device which is controlled by the circuit breaker on the operating end of the car.


TEN TRAIL CARS LIKE THE ONE SHOWN AT THE LEFT ARE BEING CONVERTED INTO ONE-MAN MOTOR CARS, OF WHICH THE ONE IN THE VIEW ON THE RIGHT IS A SAMPLE

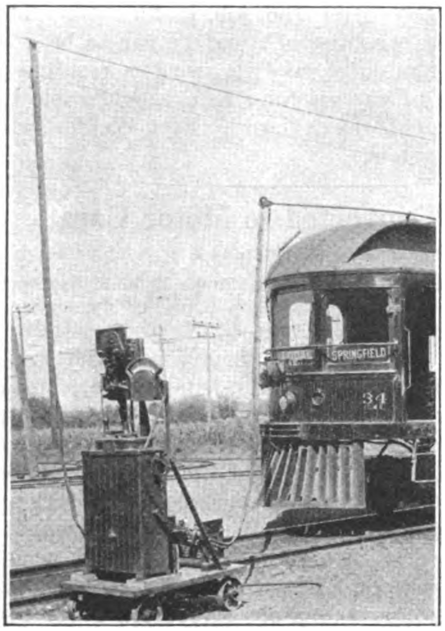
Besides the addition of the motors, control and electrical equipment to the trailers, the rehabilitation work consisted chiefly in the elimination of the rear doors, the addition of window guards and painting of both the inside and outside of the car body. When these ten cars are completed and put in service the railway will have twenty cars of this type available.

Convenient Circuit Breaker Testing Outfit

The Indiana, Columbus & Eastern Traction Company Uses a Portable Outfit in Connection With the Standard Car Equipment for Setting Circuit Breakers

By F. J. Foote
Superintendent of Motive Power and Equipment, Indiana, Columbus & Eastern Traction Company, Springfield Ohio

ANY ONE who has operated an electric car, or has stood by a motorman during his efforts to get a car over the road on time against adverse conditions, such as poor power, bad grades, slippery rails, etc., can appreciate the temptation to fast feeding when the need arises. This fast feeding is rarely justified, however, as it usually results in damage to the equipment. The most effective protectives against too rapid feeding are the fuse and circuit breaker. To a considerable extent the fuse has been superseded by the overload circuit breaker. The kind that is mounted under the car and the opening of which cannot be prevented by the motorman is in greatest favor among equipment men. This type of breaker, set to open at the proper current, and when kept in good order, gives excellent protection to the motors and controllers.



Testing Outfit Connected to Car Ready for Test

The question as to the proper current at which a car breaker should open will not receive the same answer from different equipment men, but the writer has found that the most satisfactory value for this is just enough to get the car up the grades existing in the district where the car is used, when the car equipment is in good order and properly operated. This current must be found by trial for each type of car. I have found that with a 44-ton passenger coach with four 100-hp. motors, 36-in. wheels and a gear ratio of 25:52 900 amp. is just about right.

Testing a circuit breaker is a very simple matter if one has at hand a source of current, a variable resistance, and a testing ammeter of proper capacity. However, many shops are not equipped with this apparatus, the shop over which the writer presides being one of these. It has been our ambition for some time to devise a method for testing the breakers on our cars, and a short time ago the writer conceived the idea that it would be possible to rig up an inexpensive device which could be used in connection with the resistance on the car itself, and the circuit breaker could thus be tested without removing it from car. With this in mind, the C.B. testing outfit shown in the accompanying illustration was made, mostly from old material found around the shop.

The outfit consists of a 1,200-amp. switchboard type ammeter, a G.E.-M.K. circuit breaker set at about 1,200 amp. for safety, a bank of cast-iron grid resistors, and part of an old L-4 controller—the whole being mounted on a low wheeled truck. (The 1,200-amp. circuit breaker is only supposed to open in case the car circuit breaker is stuck.) The resistance consists of thirty-six grids, No. N-3355, two in multiple, divided into six equal sections or steps, and connected to the controller fingers in such a way as to be cut out successively as the controller is fed up.

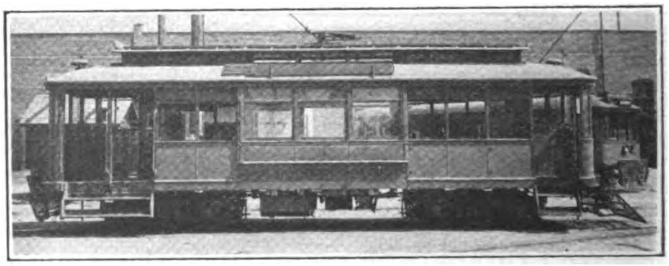
This outfit is provided with one incoming and one outgoing flexible cable, of ample capacity, attached to long poles and provided with stiff copper hooks at the terminals. In use the trolley pole of the car is fastened down, the incoming cable is hooked over the trolley wire, and the outgoing cable is hooked over the trolley wheel of the car. The air brakes are then set, and the car controller is fed up by a man on the car till the ammeter shows from 60 per cent to 75 per cent of the desired current, then the man at the testing outfit at once begins to feed up slowly till the car breaker opens, or the desired current is exceeded, in which case the breaker on the testing outfit is tripped and the car breaker is adjusted for lower current. The operation is then repeated, adjusting the car breaker each time till it opens at or near the prescribed current. By this method many defective circuit breakers have been discovered, some of which could hardly be opened with a crowbar.

This testing outfit has been found satisfactory beyond the writer's expectations, on account of its inexpensiveness, ease and rapidity of operation and practicability. It is not uncommon to test a car breaker and make the necessary adjustments complete in twenty minutes.

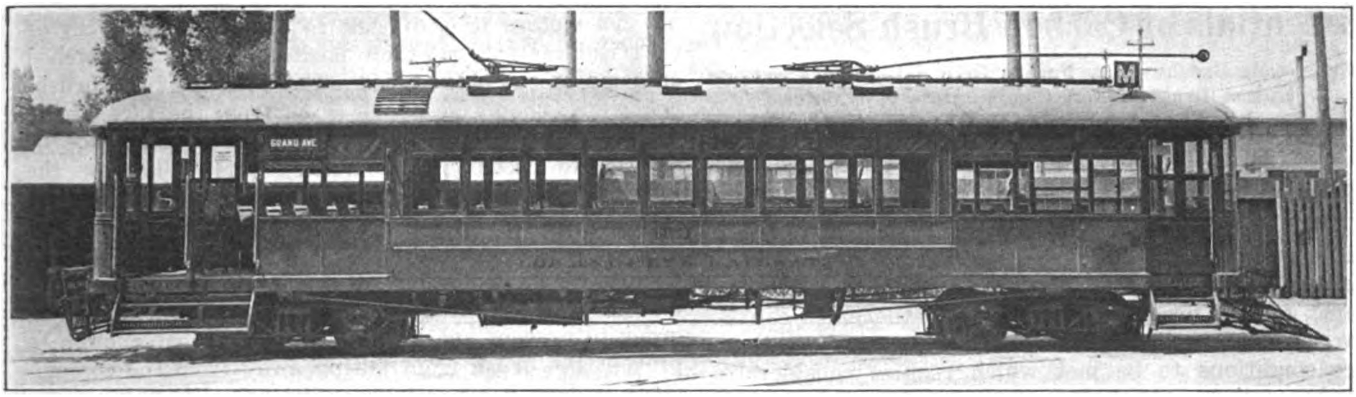
The advantage of having the outfit on a truck is that it may be taken to a car, thus doing away with the necessity for switching the car onto a track where the outfit is located, which at times may be very inconvenient.

Car Reconstruction in Los Angeles

AS A PART of its program for reconstructing cars, the Los Angeles Railway has recently lengthened one of its 35-ft. cars seating thirty-four passengers so as to provide a car 48 ft. long, with a seating capac-



Car Before Reconstruction



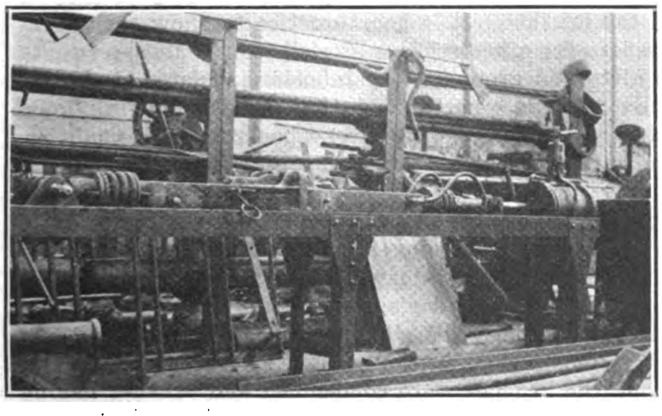
Reconstructed Car Ready for Service

ity of fifty-six. In this reconstruction the car was cut in two parts at the middle and the center section was enlarged, leaving the ends as they were originally. The center section is inclosed and the two end sections are open. In the reconstructed car cross-seats are provided throughout. The original car had longitudinal seats in the inside section. The seats are located opposite the windows and a signal push button is provided for each seat. Two-motor equipment is used.

The original car was equipped with magnetic brakes and was used in service on one of the hill lines. The reconstructed car has been provided with air brakes. An additional trolley pole has also been added, as was found necessary for the longer car. The clerestory of the old car, which was of monitor deck type, was removed and an arch roof was substituted. The original weight of the car was 33,000 lb. and the reconstructed car weighs 39,000 lb. The reconstruction was carried out by P. B. Harris, chief engineer of the company.

Insuring that Couplers Couple

As a literal link in the assurance that all equipment is in the safest possible condition for operation, the Cleveland (Ohio) Railway tests all couplers after any repairs on them have been made. Oftentimes the adjustment is disturbed when each surface of the two halves of a coupler have been machined. Also the working of the coupler may be imperfect because of a replacement of the tongue or the building up of the old one by welding. For that reason, the device shown in the accompanying view has been found effective in discovering defective couplers. One half of the coupler is pinned to the frame, while the other half is attached to the piston of an air cylinder bolted to the other end of the frame. Full shop air pressure of 100 lb. per square inch is admitted to the cylinder through the conductor's valve, the pull on the coupler thus established being much greater than ever will be encountered in actual operation. During the test the air is released from the cylinder and the two halves drawn apart and coupled several times to insure as well that all parts are in perfect working condition.

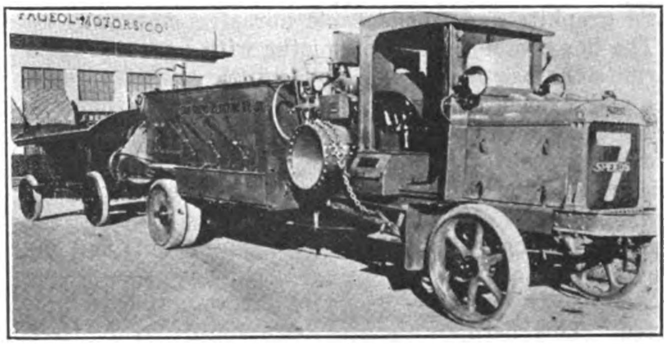


All Couplers of the Cleveland Railway Are Given a Tension and Locking Test After Being Repaired

Novel Highway Maintenance Truck

The San Diego Electric Railway has recently placed a novel highway maintenance truck and trailer in operation. The truck carries all tools and material needed for the care of concrete, asphalt, macadam or dirt roads, for erecting concrete steel or wooden bridges, and for repairing or painting fences.

The truck is equipped with a concrete mixer, air compressor, centrifugal pump with self-priming device, and lengths of suction hose for filling the water tank from wells or rivers. The compressor has twin cylinders, and is driven by a belt from the forward drive shaft. A large air reservoir is mounted just behind the operator's cab and combination material bins are provided so that 1,000 lb. of cement, a cubic yard of sand, two cubic yards of gravel or rock can be carried. All bins have gravity feed to the mixing apron which is controlled by hand-operated gates.



Highway Maintenance Truck and Trailer

The motor hauls a trailer which is specially designed with a side dump body for carrying rock, sand or other material. Other equipment includes a tar or road oil heating tank with gas furnace having a capacity of 50 gal., and a syphon nozzle for spraying the hot tar or oil under pressure with a hose. There are also a complete paint-spraying outfit with hose connection and a pneumatic rotary post hole digger with hose. The truck was manufactured by the Fageol Motors Company, Oakland, Calif.

Essentials of Carbon Brush Selection

High-Grade Brushes May Fail to Give Satisfactory Service Unless Brush-holder, Commutators and Motor Windings Are Kept in Proper Condition

By W. J. Overman
Railway Department, General Electric Company, Boston, Mass.

THE most sensitive parts of a railway motor, and in many cases the most neglected parts, are the brush-holders, brushes and commutators. While as a rule the same general practice in the care of the parts can be carried out on all properties, still in many cases there are conditions to be met which require considerable study on the part of the operator in order to obtain good motor performance.

The selection of brushes is of primary importance, but it must be remembered that even with brushes best suited to a particular type of motor, good results cannot be obtained unless proper care is given to other parts. Railway motors in their development have gone through stages which have given the various classes commutating characteristics quite different.

There are few of the non-commutating pole motors with commutators having flush mica now in service, but it must be realized that the brush selected for this type must contain enough abrasive to keep the mica cut down flush with the copper. The brush must also have a fairly high ohmic resistance to keep down the flow of current from bar to bar through the brush. This flow of current is caused by the difference of potential between commutator bars under the brush and increases in intensity as the electrical neutral shifts away from the brush. The motor manufacturers recommend a particular brush for this type of motor, having very little graphite and considerable abrasive material.

The non-commutating pole motor with undercut mica permits the use of a brush having little abrasive qualities and a much larger percentage of graphite than the brush recommended for non-slotted commutators. The brush must have a high ohmic resistance, however, as this type of motor has no commutating poles to prevent shifting of the electrical neutral.

Commutating poles introduce a counter emf. and the tendency for current to flow from one commutator bar to another through the brush is almost entirely eliminated. This permits the use of a highly graphitized brush having good lubricating qualities and a high current carrying capacity. The brush, being very soft, has slight scouring effect, and is rapidly destroyed by rough commutators, but when correctly applied, will cause practically no commutator wear, and will, in this way, effect considerable saving. With a few exceptions, a brush of this character can be used on all commutating pole railway motors. Tapped field railway motors sometimes require a brush similar to that used in non-commutating pole slotted commutator motors due to increased sparking which roughens the commutator.

From the foregoing paragraphs, it is evident that there is a reason for selecting a certain kind of brush for a certain type motor and that brushes should not be selected in a haphazard manner. Quality should be considered as of primary importance instead of price. A cheap grade of brush, even though containing a large amount of graphite, may have very poor lubricating qualities due to the use of cheap graphite.

The very best brushes may fail to give good results unless the motor is in good condition. Brush-holders should, of course, be in the correct position. With modern motors it is difficult to set the holders out of electrical central, but their position should be watched on some of the older types. The bottom of the brush-holder slot should be about $\frac{3}{16}$ in. from the face of the commutator and the brush-holder slot should not be allowed to become badly worn. This will allow the brush to shift, which sometimes causes poor commutation and broken brushes.

The pressure on the brush is very important and no definite recommendations as to the amount of pressure can be given, as it depends upon many variables. In order to prevent sparking, it must be great enough to prevent the brush from jolting away from the commutator under all operating conditions. Worn bearings, rough track and special trackwork and broken suspension springs all cause jarring of the motor, and this jarring is greatly aggravated in cold weather, due to lack of resiliency in the ground and track. A pressure greater than necessary naturally results in unnecessary wear, but sometimes operators find it necessary to increase the pressure to as much as 9 lb. per brush before good results can be obtained. Under such conditions, it is important to use the very best quality of brush obtainable in order to prevent excessive wear.

Many operators, on examining commutators which need turning, immediately attribute the trouble to mechanical wear and recommend decreasing the brush pressure. Sometimes serious mistakes are made in this way, and the commutator should be very carefully examined to determine whether it has been burned down or scoured down. A burned commutator usually has a blackened and roughened surface, while a rapidly worn commutator usually has a bright surface and is sometimes grooved. All slotted commutators, if equipped with proper brushes, will burn down rapidly after having worn down to the mica, and they should be removed, turned and reslotted before reaching that stage. If upon careful examination it is determined that the commutator has been scoured down, it should then be determined whether or not the proper brush is being used before decreasing the brush pressure. If the proper brush is being used, sandy or dusty roadbeds may be contributing to the trouble, particularly if the motor is the ventilated type. Brush pressures should rarely be less than 5 lb. per brush on any motor.

Some operators find it difficult to use the highly graphitized brushes recommended for modern commutating pole motors, but in most cases the difficulty may be readily overcome. It must be remembered that graphitized brushes will stick in the holders and give very little satisfaction if the bearing oil is allowed to get over into the motor casing where it may be thrown on the brushes. It is poor practice to allow such carelessness for other reasons as well, and it always results in dirty and grounded brush-holder insulated studs. It must also be remembered that brushes having good lubricating qualities have very poor abrasive qualities, and soft brushes will not smooth up rough commutators. On the contrary, the brushes themselves will be rapidly worn away and the brush of this type is very likely to be condemned for being too soft.

Highly graphitized brushes have been known to wear out in less than a day's running on commutators just out of the shop. To all appearances the commutators were smooth, and in the case which the writer has in mind, the brushes were condemned and brushes having less lubricating qualities were put in their place. The results were somewhat better, but not by any means satisfactory, and a further investigation was made. Upon examining the commutators with a reading glass, it was found that the sharp edges had never been removed from the commutator bars after the slotting process. The soft brushes were not abrasive enough to remove these edges of the bars and the result was that the brushes were rapidly scraped away. The trouble was easily remedied by drawing a "V" shaped tool through each slot between the bars and then sanding the commutator. No doubt the short life of many brushes could be traced to just such a neglect of detail.

Proper selection of brushes and proper care of the parts will effect considerable saving, and attention to these details is almost as important as keeping the bearings supplied with oil.

Letter to the Editors

Way Committee Report on Substitute Ties

Brooklyn Rapid Transit Company,
Brooklyn, N. Y., Oct. 26, 1922.

To the Editors:

Your editorial in the *Journal* for Oct. 7 on the subject of substitute ties seems to call for comment, particularly as criticisms of the way committee report on substitute ties is implied.

In the first place the report was clearly a progress report and I believe it is an error to indicate as you do that the sole basis of the report was replies from a questionnaire. There were other bases, such as the general experience of the committee members, many of whom have used and are using substitute ties in several forms. Some of the members have also had opportunity to observe the performances of substitute ties in cases where these ties have been removed for one reason or another. It is not surprising that you as well as others seem to err in thinking that the report was discussing forms of steel ties in particular, although it happens that most substitute ties used by electric railways have been in some form of steel. To take up your numbered criticisms in some detail:

1. The reference to incasement of ties in concrete, I believe, was intended to cover the use of wood ties, as it is well known that such an incasement of wood ties does protect them and prolong their life.

2. It is not clear to me that the use of substitute ties in most forms may not call for an added investment and there is a question as to savings effected unless some particular substitute tie is under review, and there is doubt that savings for some of these can always be had under all conditions of installations. The committee was not discussing "selling features."

3. The word "thoroughly" was inserted for the purpose of clearness and I note you interpreted it correctly. I believe the committee will search some time before it will find a substitute tie which will have most of the virtues of the wood tie. The latter is ideal in all but two points, viz., the ultimate decay and scarcity.

The steam roads are still searching for the proper form of substitute tie.

4. There is the ultimate maintenance cost of track to be considered. I believe any substitute tie which, as part of a substructure, cannot readily be adjusted when settlements occur, which cannot take another set of rails without causing a great deal of labor expense, and without leaving uncertainty as to how well the rails may be refastened, should be considered as not fulfilling the functions of an ideal substitute for the wood ties.

5. It is to be regretted that you referred to steel ties in your discussion. Assuming that the electric railways operate 40,000 miles of single track, there must be about 105,000,000 wood ties in use. There are perhaps 950 electric railway companies in the country. It is noted that 140 of them have used some form of substitute ties. Meanwhile it is understood that one of the largest users has this year installed only between 1 and 5 per cent of its former annual number, because of a reversion to the use of wood ties.

The report cannot well be taken to reflect upon any present form of substitute tie and was not so intended. It has at least done one thing, viz., created an interest in the study of a subject which is of constantly increasing importance to the industry.

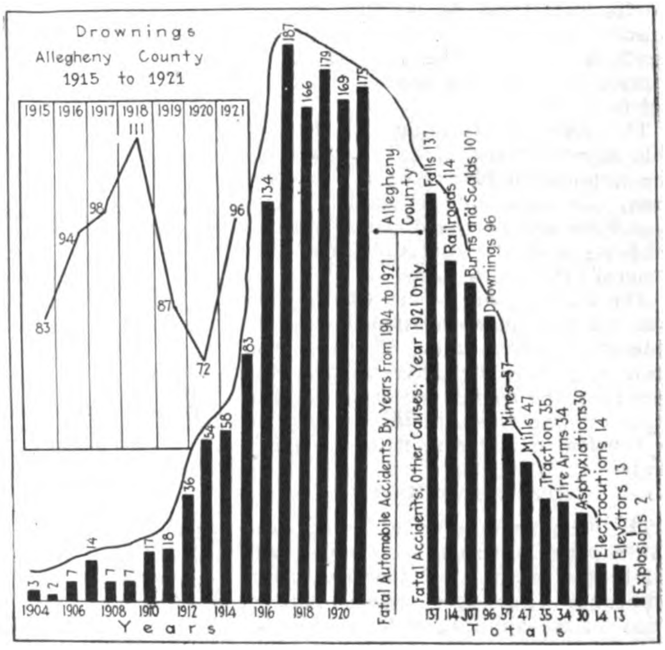
The forms of substitute tie in current use have merit for use under a number of special conditions, and for this purpose some of them have been used in Brooklyn at times and further use is even now under discussion for specific conditions.

R. C. **Cram,**
Engineer Surface Roadway and Sponsor for Committee on Way Matters for 1921-22.

Automobile Accidents Increase

Cecil G. Rice, ex-president American Electric Railway Claims Association, has been compiling statistics of accidents in Allegheny County, Pa., and among the results of these studies is the accompanying chart. With other figures compiled by Mr. Rice it has attracted considerable attention in the Pittsburgh daily papers.

The diagram at the left shows drownings for the last seven years, the reduction coming largely, in Mr. Rice's opinion, through greater vigilance at the beaches. A more interesting chart from a railway standpoint is the larger one illustrating the fatal automobile accidents by years from 1904 to 1921 and those from other causes for 1921 only. The remedy for automobile accidents in Mr. Rice's opinion is stricter examination of drivers before licenses are issued and stricter enforcement of the automobile laws against reckless driving.



Another Lump to Remove

Tests Used in Selecting Employees*

Detailed Study Made by the Market Street Railway, San Francisco, in the Nature of Research as to What Scientific Methods May Be Employed to Aid in Selecting Good Employees Is Here Presented

By M. McCants
Assistant General Manager Market Street Railway, San Francisco, Calif.

BELOW are the results of studies made under the direction of the research committee of the Market Street Railway of San Francisco. Of these studies those portions are included which have the most direct bearing on the report of the A.E.R.A. committee on personnel and training of transportation department employees.

Analysis of Best and Poorest Motormen

The research committee authorized direct contact with and study of about twenty-five of the best motormen in all divisions and about twenty-five of the poorest motormen in all divisions. Subsequently, five division superintendents were each asked to submit the names of the five best and the five poorest motormen in their respective divisions and to furnish certain personal information concerning each of them. In addition, the employment department was asked to furnish data from the application blanks of these motormen.

From April 4 to April 9 one of our men interviewed and gave standardized intelligence tests to groups of the selected motormen at their respective headquarters. Of the selected list of forty-nine, two were absent and could not be tested.

The materials forming the basis of this report consist of: (1) data from the application blanks of the selected men; (2) additional personal information furnished by the division superintendents, and (3) results obtained with general intelligence tests.

The plan of this report was to analyze all the above-mentioned data to determine what value, if any, each item may have in differentiating the best from the poorest motormen, and to point out the most significant facts to be considered in the selection of applicants.

APPLICATION BLANK

The primary function of an application blank is to obtain facts which will aid in the selection of the best fitted applicants. For this reason various items on the application blank will be taken up one by one to determine what value they may have in differentiating the best from the poorest motormen. The data studied are from the application blanks of twenty-four best and twenty-four poorest men.

Twenty of the best men were citizens when hired, as were also sixteen of the poorest. This bit of evidence, therefore, does not indicate that the item is of very great value in hiring motormen. Other statistics, such as married or single, color of eyes, hair, etc., with comments on the results, are given in the accompanying tables.

MARRIED OR SINGLE

	Best	Poorest
Married	14	12
Single	10	11

There is the merest shade of preference in favor of the married man.

PREVIOUS OCCUPATION

	Best	Poorest		Poorest
Laborer	5	4	Special officer	1
Farmer	3	1	Restaurateur	1
Motorman	1	1	Boiler maker	1
Carpenter	1	1	Millman	1
Salesman	1	1	Gardener	1
Miner	2	..	Dairyman	1
Soldier	2	..	Engine driver	1
Real estate	1	..	Grocer	1
Machinist	1	..	Railroad employee	1
Teamster	1	.	Stock raiser	1
Lineman	1		Car cleaner	1
Grocery clerk	1	..	Janitor	1
Locomotive engineer	1	.	Hotel clerk	1
			Mechanic	1
Watchman	1	.	Cannery foreman	1
Butcher	1	..	Construction foreman	1
Oil worker	1	..		

A careful scrutiny of the list of occupations from which these motormen have been drawn reveals no evidence of value in determining whether an applicant will become one of the best motormen.

COMPLEXION

	Best	Poorest
Dark	7	10
Fair	8	3
Medium	4	5
Ruddy	4	5
Sallow	0	1

These facts do not indicate that complexion has value in selecting suitable candidates.

COLOR OF EYES

	Best	Poorest
Blue	9	10
Brown	7	8
Gray	5	2
Hazel	2	2
Dark brown	0	2
Light brown	1	0

The above figures certainly do not give much weight to this item on the application blank.

COLOR OF HAIR

	Best	Poorest
Dark brown	9	9
Black	4	9
Brown	4	3
Medium gray	3	2
Light brown	2	1
Auburn	1	0
Red	1	0

Such facts as these would not indicate that this item (color of hair) has very great value in differentiating the applicants.

WEIGHT

Pounds	Best	Poorest
190 to 230	6	1
180 to 189	4	4
170 to 179	1	3
160 to 169	7	7
150 to 159	4	5
140 to 149	1	2
125 to 139	1	2

The best men range from 230 to 135 lb., with the median at 167¼ lb. The poorest men range from 197 to 125 lb., with the median at 162 lb. Apparently weight has little to do with the candidate's fitness for the job.

HEIGHT

Inches	Best	Poorest	Inches	Best	Poorest
74	1	1	68	6	1
72	2	1	67	1	4
71	2	2	66	0	4
70	4	4	65	0	3
69	8	2	64	0	2

Judging solely from the above statistics a motorman should not be less than 67 in. tall. The most obvious explanation presenting itself is that the short man is not in a position to have the widest field of vision; again, his lack of height may handicap him in the proper operation of the car. At any rate, if the company had set a minimum height of 67 in., nine of these poorest motormen and none of the best would have been rejected. With a minimum of 68 in. only one of the best and thirteen of the poorest would have been rejected.

Briefly, if further investigation continues to reveal such facts as these, the employment bureau will have a simple means of eliminating outright many unsuitable applicants.

AGE AT BEGINNING

Age	Best	Poorest	Age	Best	Poorest
51	..	1	33	1	..
48	1	..	32	2	..
46	..	1	30	1	..
43	..	1	29	1	1
42	..	2	28	1	..
40	..	2	27	1	2
39	1	2	26	2	..
38	..	1	25	1	..
37	1	3	24	1	2
36	1	3	23	3	1
35	1	..	22	2	..
34	3	2	..	..	..

From the above array of figures it may be seen that in age when beginning to learn car operation, the group of best men ranges from twenty-two to forty-eight years, with the median at thirty-one years, while the group of poorest men ranges from twenty-three to fifty-one years with the median at thirty-seven years. If the employment office had rejected all inexperienced applicants above thirty-six years, all of the best men except three would have been hired and thirteen of the poorest men would have been eliminated.

Such facts seem to indicate that the older men are not likely to develop into the best motormen. If continued in-

DEPENDENTS

	Best	Poorest
Wife	4	3
Wife and one child	3	5
Wife and two children	3	0
Wife and three or more children	4	3
Mother	3	2
Father	0	2
Father and mother	0	1
Four children	0	1
No dependents	7	7

Judged from the above facts, the case appears that the best and poorest are about equally blessed with dependents, and those who have no dependents at all are equally divided between the best and the poorest groups.

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*Abstract of appendices to paper on "Selection and Training of Employees" presented by Mr. McCants before the annual convention of the American Electric Railway Transportation & Traffic Association, Chicago, Oct. 2-5, 1922, and printed on page 679 of the Oct. 21 issue of *Electric Railway Journal*.

vestigation bears out this fact the next step would be to set a definite maximum limit which would, of course, not be made public; otherwise the applicant would be tempted to make mis-statements.

At the time of application every man denied that he used alcoholics; consequently, this item had no value in differentiating the two groups.

If the applicants born in Ireland, Greece and Italy had been rejected, ten of the poorest group and none of the best would have been eliminated.

The items of the application blank which, from a study of the two selected groups, seem to have value in distinguishing between the best and poorest men, are: (1) Height, (2) age at beginning, and (3) place of birth. The other items seem to be quite devoid of value. At present the foregoing items constitute the chief sources of information upon which the inspector of applicants must rely in making his selections. If this analysis is conclusive, it would appear that only three out of the score or more of items on the blank are safe guides.

INFORMATION FROM DIVISIONS

Of the informational items furnished by the division superintendents, only a portion throw any light on the problem of setting up distinctions between the two groups of the best and the poorest.

Thirteen of the best and five of the poorest own real estate in some form. Possibly the poorer group would improve its showing if it were to continue in the service of the company for a period of time equal to that of the better group.

NATIONALITY

	Best	Poorest
American	17	9
English	2	1
German	1	2
Danish	1	..
Canadian	1	..
Welsh	1	..
Russian Jewish	1	..
Italian	..	3
Greek	..	3
Irish	..	3
Portuguese	..	2
Dutch	..	1
Syrian	..	1

From these figures it would appear that the Mediterranean races and the Irish afford poor material for motormen. Beyond that, nationality seems to play but little part.

NATIONALITY OF GRANDPARENTS

	Best	Poorest
Scotch	7	..
Welsh	4	..
Danish	5	..
Russian Jewish	4	..
American	45	12
English	9	10
French	3	3
German	13	10
Dutch	1	4
Portuguese	2	8
Irish	3	17
Italian		12
Greek		12
Syrian		4
Bohemian		4
Polish		2
Spanish	..	2

It seems from a study of the above figures that nationality of grandparents is more significant than the applicant considered his own nationality to be. Here again the Mediterranean races and the Irish are to be found predominantly in the group of poorest.

INSURANCE

	Best	Poorest
$2,000 or more	3	2
$1,000 to $1,900	5	5
$500 to $900	3	0
$100	1	1
Accident only	1	1
None	13	17
Total amount carried (not including accident or company insurance)	$11,500	$7,300

It seems that the group of best carries the more insurance. This might be explained by the fact that the group of best has had longer steady employment with the company and has therefore more money to spend for insurance.

ENTIRE WEALTH

	Best	Poorest
$5,000 or more	5	3
$2,000 to $4,500	10	2
$1,000 to $1,500	3	2
$200 to $900	1	6
Undetermined	5	4
None	0	7

The median man of the best group has a financial wealth between $2,000 and $4,500 while the median of the poorest group is between $200 and $900. It is doubtful, however, if these facts have much value for the employment department except to indicate that the men who make the best motormen are the sort of men who accumulate more wealth than do the poorest motormen.

It was suggested by members of the research committee that financial worry tends to cause accidents. This opinion seems to have some basis as the poorest group has at least four cases, while the best group affords not a single instance.

Although both groups spent about the same amount of time in school (the median age at quitting school being fifteen years), the best group made a considerably better showing in that its median is the eighth grade, while the poorest group advanced only to the fifth grade. This is a very significant fact for it indicates the relative ability of the two groups. That native ability which enables one group to get into the eighth grade in the same length of time that the other group gets into the fifth grade enables the best group to develop into better motormen.

Four of the best group and six of the poorest group are reported to be somewhat given to the drinking habit.

Domestic infelicity is mentioned in connection with three of the poorest group, while none of the best group is so reported. Other statistics appear in the accompanying tables.

As a summary of the information from divisions, it might be said that the best group are more largely drawn from American or North European stock, while the poorest group tends to be drawn from Mediterranean and Irish stock. The best group carries more insurance, owns more real property, possesses greater total wealth and completes more school grades in the same time. The poorest group furnishes the only serious cases of domestic infelicity and of financial worry.

It may be safe to infer from all these facts that the one group is superior to the other because it is composed, on the whole, of better all-around men, and that motormen are not born, but are made of good substantial human material.

The mental tests were used to discover if general intelligence bore any relation to success as a motorman. The amount of schooling was not the question at point, but, rather, natural ability, native capacity, the power to grasp new situations.

The tests employed are well standardized and would fit in conveniently as a part of the routine procedure in the employment department. They can be given simultaneously to a group as well as to a single individual. The men with little schooling were given only tests in which their lack of education was not a handicap.

Table I shows the comparative standings of all the men who took the tests. It will be seen that Motorman 139 achieved 98 per cent, which means that in general mental grasp and ability to learn he stands higher than 97 per cent of the adult population of this city. The standings of the best group range from 98 to 26, the latter standing being made by Motorman 124.

It is important to note that fourteen of the poorest group (or more than half) fell below the lowest man of the best group. In other words, fourteen of the twenty-three in the poorest group tested ranged from 23 per cent

TABLE I—INTELLIGENCE RATINGS

Best				Poorest		
B	C	D	A	B	C	D
139	37	69	98	...	...	...
119	30	72	94	...	...	...
130	32	70	93	...	...	...
...	..	..	83	103	(39)	67
112	32	67	80	144	24	(66)
117	23	72	79	...	...	...
122	28	68	79	...	...	...
145	(39)	69	78	...	...	...
...	..	..	76	125	(51)	67
143	36	68	75	...	...	...
107	29	69	66	...	...	...
1	..	..	65	140	37	69
116	26	70	64	...	...	...
...	..	..	53	131	36	(64)
...	..	..	52	109	(39)	69
146	22	71	50	...	...	...
129	34	71	50	...	...	...
127	23	69	49	...	...	...
...	..	..	40	138	27	(66)
...	..	..	36	136	(38)	71
132	34	68	35	...	...	...
105	24	68	34	...	...	...
133	(48)	69	33	141	24	74
108	34	68	33	...	...	...
106	33	68	30	...	...	...
120	27	74	29	..	..	.
135	23	69	29	...	...	...
113	35	70	28	...	...	...
101	25	70	27	...	...	...
137	22	69	27	...	...	...
124	26	69	26	...	...	...
...	..	..	23	110	43	(65)
...	..	..	21	104	(46)	(65)
...	..	..	21	114	34	67
...	..	..	20	142	(40)	72
...	..	..	19	134	36	70
...	..	..	18	126	23	70
...	..	..	17	115	36	(64)
...	..	..	16	147	(40)	71
...	..	..	15	111	(42)	70
...	..	..	12	118	27	(66)
...	..	..	11	128	34	68
...	..	..	8	123	(42)	(66)
...	..	..	8	121	37	(65)
...	..	..	4	102	29	70
...	..	..	..	...	...	...

Legend:

A—Intelligence percentage.
B—Key number of motorman.
C—Age at beginning (breaking in).
D—Height in inches.

The group of best are at the left of Column A, while the group of poorest are at the right.

The figures in parentheses indicate disqualification by the following assumed standards:

1. Not over 37 years at beginning.
2. Not less than 67 inches tall.

All below the twenty-fifth intelligence per cent are also disqualified.

to 4 per cent, and not one of the best group fell so low.

It would seem advisable to inquire further into the cases of motormen from the poorest group who did as well on the tests as did the best group. If we may apply the findings from the analysis of the application blanks and take as a maximum age thirty-seven years, and as a minimum height 67 in., all of these exceptional cases may be explained.

Motorman 103 was too old, thirty-nine, when he broke in, and had been trained in newspaper work, which is quite different from his present occupation. Besides, he is worried over financial losses in Mexico.

Motorman 144 has been in the service less than a year and his division superintendent states that he may be expected to develop into a good man. It is to be noted that he is only 66 in. tall.

Motorman 125 was fifty-one years old when he broke in.

Motorman 140 has domestic troubles in that his wife deserted him, leaving him the care of four children.

Motorman 131 has had less than a year of experience and he is only 64 in. tall, or 3 in. less than the assumed minimum.

Motorman 109 broke in at the age of thirty-nine; however, his division superintendent classes him in the middle one-third of his men, and not as one of the poorest as he was originally supposed to be classed.

Motorman 138 has the financial worries induced by an extravagant wife. In addition, he is only 66 in. tall.

Motorman 136 was formerly a salesman. He drinks and is classed as being one of the least contented of all the men. His division superintendent makes this comment: "Knows how, but is very obstinate." He was thirty-eight years old when he broke in.

Motorman 141 is an Irishman who is said to be independent and quarrelsome. He has to be "treated rough." He is ranked as being the least contented of the men studied in that division.

General intelligence can be gaged fairly well by means of tests, but there are other important qualities for which there are no quick, direct employment tests available. However, there is good reason to believe that, in general, desirable human qualities tend to go together; in fact, careful research in the national army resulted in the conclusion that the best single criterion in classifying men for general value was general intelligence as measured by tests, and this study indicates that the same rule holds true for motormen.

QUALITIES COMPARED

In order to determine how well standing in intelligence corresponds (correlates) with standing in other desirable traits and also with standing in the performance of duties, each division superintendent was asked to rank his men (those tested) in each of the traits and in each of the duties. These rankings were correlated with the rankings in intelligence and Table II and Table III were prepared from the results.

TABLE II—SHOWING THE CORRELATION BETWEEN RANKING IN GENERAL INTELLIGENCE (AS TESTED) AND RANKING IN THE POSSESSION OF DESIRABLE TRAITS

Correlation Coefficients

Division Superintendent	A	B	C	D	E	F	G	H	I	J	K	L	M	N
DS-A........	36	09	19	19	27	19	14	26	07	02	25	31	04	27
DS-B........	19	07	21	31	05	31	31	31	50	16	21	22	02	03
DS-C........	30	05	59	15	52	32	27	32	02	20	59	30	22	34
DS-D........	43	51	14	10	51	60	63	32	23	51	60	56	49	51
DS-E........	79	94	85	69	77	67	81	77	78	67	77	81	78	77

DESIRABLE TRAITS

A. Does not try to beat the other fellow to the corner, not spectacular, does not show off.
B. Courteous, polite.
C. Not talkative, laconic, reserved, reticent.
D. Courageous, sticks to his post in danger, brave.
E. Punctual, prompt, not tardy.
F. Decides quickly, quick to react, ready to act.
G. Proficient, skillful, adept, expert.
H. Contented, satisfied, cheerful, happy.
I. Amenable to discipline, willing, adaptable, conforms to schedule, responsive to suggestion.
J. Cool, keeps his head, not excitable, deliberate, even-tempered, self-confident.
K. Alert, watchful, vigilant, keeps his eyes open.
L. Careful, does not take chances, cautious, prudent.
M. Loyal, faithful, devotion to company, can be counted on.
N. Average of all ranks.

TABLE III—SHOWING THE CORRELATION BETWEEN RANKING IN GENERAL INTELLIGENCE (AS TESTED) AND RANKING IN THE PERFORMANCE OF DUTIES

Correlation Coefficients

Division Superintendent	A	B	C	D	E	F	G	H	I	J	K	L
DS-A....................	−08	16	20	−02	19	29	16	15	03	23	−17	34
DS-B....................	83	03	10	27	25	19	05	01	19	14	13	17
DS-C....................	54	05	20	18	61	52	07	09	34	34	34	18
DS-D....................	77	47	58	55	13	51	54	61	66	57	57	60
DS-E....................	67	75	89	74	70	75	75	75	81	59	59	72

PERFORMANCE OF DUTIES

A. Fills out required reports intelligently.
B. Treats passengers courteously.
C. Uses current economically.
D. Learns his duties quickly.
E. Refrains from unnecessary conversation.
F. Reports for duty promptly. (Does not oversleep.)
G. Operates his car smoothly.
H. Uses his equipment properly and keeps it in good order.
I. Keeps to schedule.
J. Avoids accidents.
K. Keeps car under control.
L. Average of all ranks.

TABLE IV—SHOWING EXTENT TO WHICH RATINGS BY DIVISION SUPERINTENDENTS WERE INFLUENCED BY MOTORMEN'S LENGTH OF EXPERIENCE

Division Superintendent Correlation of:		DS-A	DS-B	DS-C	DS-D	DS-E
Desirable traits with length of experience....................	r 12	.82	.91	.70	.50	.73
Desirable traits with intelligence....................	r 13	.27	.03	.34	.51	.77
Length of experience, with intelligence....................	r 23	−.04	.04	.35	.01	.74
Desirable traits with intelligence (after eliminating influence of length of experience)....................	r 13.2	.53	.01	.15	.59	.50
Desirable traits with length of experience (after eliminating influence of intelligence)....................	r 12.3	.86	.91	.66	.58	.37

A careful study of Table II will reveal the fact that there is a positive correlation between intelligence and other traits desirable in a motorman; or, in other words, the brighter a man is (as shown by tests) the more likely it is that he stands high in other traits—even such traits as contentment and loyalty.

A study of Table III bears out the conclusion that general intelligence and the performance of duties have a positive correlation. Column J of this table indicates that intelligence (as tested) is a positive factor in the very important duty of avoiding accidents.

Although the division superintendents were asked to rank these motormen in inherent traits, i.e., inborn traits which can be only slightly modified, if at all, by discipline or education, it is quite apparent in Table IV that the ranking was very considerably biased by length of experience as motorman. Such biases are an actual hindrance in the investigation, for what the employment department needs are facts which will help in analyzing the inexperienced applicant.

Fortunately, however, it was possible to use the method of partial correlation to determine the correlation of intelligence with traits after the bias of experience had been eliminated. This method of partial correlation threw considerable light on the rating skill of each division superintendent.

Superintendent DS-A appears to have been very considerably influenced by the experience of the men he rated. After the influence of this factor is eliminated the correlation between intelligence and traits becomes quite marked (.53). Only one other man is more greatly influenced by length of experience.

It is almost certain that Superintendent DS-B depended practically entirely upon the length of experience of the men he ranked. Since it so happened that no relation existed between experience and intelligence, the elimination of the former factor could have no possible effect upon the correlation of the latter with traits. Consequently, no weight whatever can be attached to the intelligence correlation figures for this superintendent. The validity of the statements in this paragraph are borne out by the admission of the superintendent himself.

Superintendent DS-C was less influenced by length of experience and consequently a higher correlation is found for intelligence.

Superintendent DS-D is still less influenced by experience and as might be expected there is a high correlation between intelligence and desirable traits.

Superintendent DS-E is influenced by experience least of all as his bottom figure in Table IV shows. For his division, also, there is a high correlation for intelligence.

It has been assumed by some persons

that the more intelligent a motorman is the less satisfied he will be with his job, and the sooner he will leave the service of the company. To investigate the correctness of this assumption a study was made of the relation between the intelligence standing and length of experience; the result showed practically no correlation whatever. In other words, if the twenty-four best men studied are typical of all best men, the conclusion is warranted that the more intelligent are just as likely to remain with the job as the less intelligent. If further study bears out this conclusion, one of the principal objections to hiring the brighter men will have been eliminated.

Another assumption, apparently ill-founded, has been made that the more intelligent men are less likely to be loyal to the company in times of crises. Those who oppose this assumption say, on the contrary, that the less intelligent are more readily misled by agitators, and that the more intelligent cannot be stampeded, that they think for themselves. Certainly the figures of this study (Table II, Column M) give support to those who believe the more intelligent men are more to be depended upon in times of stress.

CHIEF RESULTS WITH TESTS

To summarize the principal indications so far revealed in the use of mental tests the following points may be made:

1. No applicant should be hired who falls below 25 per cent in the intelligence tests.
2. There is a reasonably high correlation between general intelligence and the traits and duties which are important for motormen.
3. Among the best motormen there is no greater tendency for the most intelligent men to leave the service than for the less intelligent.

Report Giving Answers to Some Pertinent Questions

This report, submitted June 9, 1921, related particularly to answers to the following questions:

1. When were the so-called "poorest" men hired?
2. Do dependents increase length of service and reduce the labor turnover?
3. What causes some men to be unusually slow to learn to operate the cars?

WHEN WERE POOREST MEN HIRED?

Undoubtedly there are times of crisis when an employment department cannot pick and choose men, but must take what it can get, as in times of a strike or a war—times when men are scarce and when the job of motorman is not so attractive as it might otherwise be. With these points in mind, a table was made up to show when each of the twenty-three poorest men (as listed in the earlier report was hired. Study of this table shows that the first of these so-called poorest men was hired April 17, 1911, while the last one of this list was hired May 25, 1920. The figures indicate that the 1917 strike and the 1918 war drafts did apparently necessitate the employment of the poorer material, but these two crises do not explain the employment of all of this group. It also shows that of the twenty-three men considered, all but one would have been rejected under at least one of the three assumed standards already mentioned, i.e., the minimum intelligence percentage of 26, the minimum height of 67 in. and the maximum age of thirty-seven years.

The use of general intelligence tests would certainly enable the inspector of applicants to know more exactly than has been possible heretofore the caliber of the men he interviewed, even though men were scarce, and just as soon as a crisis passed he could raise the standard for applicants and thus shut out the less able men.

DEPENDENTS AND LENGTH OF SERVICE

It was pointed out in the prior report that the number of dependents possessed by a motorman bore no apparent relation to his skill and general value to the company. The research committee wished to know, however, if the number of dependents had an effect upon labor turnover, i.e., if a man with dependents was more or less prone to quit his job on account of that fact. To throw some light on this topic, several tables were prepared by the committee. These tables contain a summary of the most important facts which have a bearing on the problem and indicate that among the best motormen the more dependents a motorman has the shorter the length of time he is likely to remain in the service of the company. If a more extended study corroborated these figures it would certainly upset the preconceived ideas of many employment managers, at least so far as concerns a situation such as this one.

A possible explanation of these facts presents itself in the following line of reasoning: The best motormen are capable men and could succeed in other lines of work. When they have no dependents they can get along very well on such pay as they receive, but if they have several dependents it becomes harder to make both ends meet and they leave the service of the company for other work where there is no standard rate of pay for all men alike and where there seems to be a better avenue for economic advancement.

On the other hand the table also shows that so far as the so-called poorest men are concerned, the more dependents a man has the longer he is likely to remain in the service of the company. To explain such facts as these, the following argument may be advanced: The poorest motormen are, as a rule, relatively incompetent men and would not succeed well at most other types of work. Probably they have already learned of their own incompetence through the hard knocks of experience and are, when they have dependents, quite loath to give up this job in order to find a more lucrative one. If the men considered in these tests are a fair sampling as regards dependents and labor turnover, the inspector of applicants would be justified in showing preference to applicants without dependents, for it is only among the poorest men that dependents seem to increase the length of service, while with the best motormen the fewer the dependents, the less the turnover. At any rate, these data certainly would not warrant the inspector of applicants in giving preference to applicants with dependents.

SLOW LEARNERS

The research committee was desirous of learning why some of the motormen took longer than the customary seven-day period to "break in." Accordingly, twenty-one motormen who had taken twelve days or longer to learn the duties of motorman were interviewed and tested. From the results of the interviews and the general intelligence tests Table V was compiled and shows that if the employment department could have used the assumed standards just enumerated, only five of the twenty-one slow learners would have been hired; the other sixteen would have been rejected. If the inspector had rejected all applicants below 67 in. he would have eliminated five of the twenty-one slow learners. If all applicants older than thirty-seven years had been rejected seven of these slow learners, or one-third, would have been eliminated, and it appears that the age at "breaking in" has a really important bearing upon the facility with which a student motorman learns his duties. If the employment department could have rejected all applicants falling below the twenty-sixth intelligence percentage, twelve of these twenty-one men, or four-sevenths, would have been eliminated. It seems that men who make low scores in these tests are slow to learn the duties of motormen, and since the cost of training is an item of no little importance, it might be worth while to measure the general intelligence of all applicants considered.

TABLE V—MOTORMEN TAKING TWELVE DAYS OR MORE TO BREAK IN

Key Number of Motorman	Intelligence Percentage	Age When Hired	Height
205	61	(53)	71
101	59	24	70
216	53	37	69
218	40	37	71
204	33	37	67
217	33	(39)	(63)
219	30	32	(65)
215	29	24	69
202	27	(51)	69
104	(21)	(45)	(65)
201	(20)	(43)	67
214	(20)	37	(65)
213	(20)	32	(66)
206	(19)	29	68
211	(17)	35	69
207	(16)	27	68
208	(15)	(41)	68
210	(13)	35	67
209	(9)	(42)	67
212	(9)	33	69
203	(5)	(40)	68

Note—Parenthesized figures indicate ground for rejection under the assumed standards of Report No. 6, i.e., the minimum intelligence percentage being 26, the minimum height being 67 in., and the maximum age being thirty-seven years.

Motorman No. 203 was forty years old when he "broke in" with this company. He was about thirty-four years when he "broke in" in New York City.

Motorman No. 205 stands first in this list as regards intelligence but he was too old when he broke in, fifty-three years, hence his inaptitude at "breaking in."

No. 101 stands second in general intelligence and eventually developed into one of the best men in his division (being listed among the best in the earlier report. No reason is apparent for his slowness to "break in"; however, the use of the motor co-ordination apparatus may bring to light the real cause. The important fact in this case is that he stood relatively high in the intelligence tests and that finally he got to be a very competent motorman.

No. 216 stood third in the mental tests (43d per cent), but he was thirty-seven years old when he "broke in"; his age may have made him slow in learning. He had been a farmer and may have been unfamiliar with traffic conditions.

No. 218 was fourth in the test standings (40th per cent), but was thirty-seven years old when he "broke in."

No. 204 was thirty-seven years old when he "broke in" and had been a farmer, possibly unfamiliar with traffic conditions.

No. 217 was too old (thirty-nine years) when he "broke in" and was also too short (only 63 in.).

No. 219 was only 65 in. tall. He had been a farm hand and a sailor; in neither of these occupations did he have a good opportunity to learn traffic conditions.

No. 215 was a hardwood floor layer and had previously worked on the farm. He stood at the twenty-ninth intelligence per cent and broke in at twenty-four years. There is no apparent outstanding cause for his unusual slowness at learning his duties.

No. 202 was fifty-one years old when he "broke in." This explanation would seem sufficient to explain his slowness in learning his duties.

The other twelve slow learners are too low in general intelligence, as they range from the twenty-first per cent to the fifth per cent. Five of these twelve were also too old at the time at which they "broke in."

No. 203 was the lowest in general intelligence with a standing at the fifth per cent. The most interesting fact concerning him was that six years prior to his "breaking in" with this company he had "broken in" in New York City and had worked two years there. Only his very low standing in intelligence would explain his inability to learn his duties in operating the cars of this company in a reasonable time.

It is, of course, important to know whether the slow learners gain skill quickly enough to avoid accidents immediately after the "breaking in" period is over and whether they become within a reasonable time as competent as the men who take less time to "break in." If the slow learners do not develop average skill within reasonable time, they are certainly not to be preferred.

TABLE VI—TEST SCORES OF MOTORMAN APPLICANTS ARRANGED IN ORDER OF SIZE OF TEST SCORE

Motormen	Test Score	Motormen	Test Score
(1)	163	(15)	x 117
(2)	x 157	(16)	x 114
(3)	x 134	(17)	113
(4)	x 130	(18)	x 113
(5)	130	(19)	x 112
(6)	x 125	(20)	x 110
(7)	124	(21)	x 108
(8)	123	(22)	x 106
(9)	x 122	(23)	x 105
(10)	121	(24)	x 105
(11)	120	(25)	x 105
(12)	x 120	(26)	x 105
(13)	x 119	(27)	x 104
(14)	118	(28)	x 102

Motormen	Test Score	Motormen	Test Score
(29)	102	(43)	x 83
(30)	x 100	(44)	83
(31)	100	(45)	82
(32)	100	(46)	x 81
(33)	99	(47)	x 80
(34)	96	(48)	80
(35)	96	(49)	79
(36)	92	(50)	x 74
(37)	x 91	(51)	74
(38)	91	(52)	x 74
(39)	x 89	(53)	x 72
(40)	x 87	(54)	63
(41)	x 86	(55)	61
(42)	84	(56)	x 56

Median (Average) Score—102.

Note—All motormen marked with an (x) have left the employ of the company. It will be noted that twenty (20) motormen leaving were above the median (average) score of 102 points, while twelve (12) motormen were below the median (average) score. This indicates that, under existing conditions, the brighter motormen showed a greater tendency to leave the service.

TABLE VII—TEST SCORES OF CONDUCTOR APPLICANTS ARRANGED IN THE ORDER OF SIZE OF TEST SCORE

Conductors	Test Score	Conductors	Test Score
(1)	156	(11)	124
(2)	148	(12)	122
(3)	x 143	(13)	121
(4)	139	(14)	x 120
(5)	x 132	(15)	119
(6)	129	(16)	118
(7)	126	(17)	115
(8)	126	(18)	112
(9)	125	(19)	104
(10)	125		

Conductors	Test Score	Conductors	Test Score
(20)	x 103	(29)	88
(21)	102	(30)	x 86
(22)	100	(31)	x 86
(23)	98	(32)	83
(24)	94	(33)	x 80
(25)	92	(34)	76
(26)	92	(35)	x 70
(27)	x 89	(36)	x 69
(28)	x 88	(37)	65

Median (Average) Score—104

Note—All conductors marked with an (x) have left the service of the company. It will be noted that three (3) conductors above the median (average) score of 104 points left, while eight (8) below the median (average) score left, this indicating that the brighter conductors have a tendency to remain longer in the service than those who do not rate so high.

In comparing this table with Table VI, it will be noted that the two groups of applicants (conductors and motormen) made about the same test scores, with approximately the same average score, indicating that equally bright men are attracted to each of the two platform jobs.

TABLE VIII—SHOWING THE AVERAGE TEST SCORES OF PLATFORM MEN IN RELATION TO THE RATINGS GIVEN FOR GENERAL VALUE TO THE COMPANY

Ratings	Men Still in Service	Men Who Have Left Service
Motormen rated "above average"................	108 plus	103 minus
Motormen rated "average".	101	113½
Motormen rated "below average"................	84 minus	107 minus
Conductors rated "above average"................	118 minus	132 minus
Conductors rated "average"	98 minus	80
Conductors rated "below average"................	93½	83 plus

Report on Intelligence Tests on New Employees

The three tables (VI, VII and VIII) on this page give the most outstanding features of the study of the platform applicants who were employed and tested in the latter half of 1921. The intelligence test used was so devised as to be practically self-explanatory. It offered no advantage to those who had had the better schooling. This test could be given by any competent employment manager with equally accurate results.

A comparison wás also made of the test scores of ninety men with experience of twelve months or less. It was found that the eighteen with the greatest length of service made an average test score of 102 points. The eighteen men who stood next in length of service made an average of 106 points. The next eighteen men had an average of 104 points, the next eighteen men an average of 109½ points, while the eighteen men who stayed the shortest length of time made an average score of 100 points. Apparently, when platform men are so grouped, test scores seem to have very little, if any, relation to length of service under existing conditions.

Although the number of platform men studied is too small to draw any final conclusions, it seems that there is a positive relation between test score and value to the company among those who stick to the job. However, the relation is not close.

The relationship between the test scores of those who left the service and their general value to the company is not clear, especially in the case of motormen. The ratings were given to the men by their respective division superintendents in September, 1922, which allowed, on the average, about eleven months' service with the company before the platform man was rated.

Appendix No. 2

Appendix No. 2 contains some of the detailed discussion of the report of the committee on personnel and training of transportation department employees.* It does not include a discussion of the training of one-man car operators because there are no one-man cars in San Francisco. Neither is there a discussion of standard forms for physical examination because at the present time the Market Street Railway has not assembled sufficient research data on which to offer any suggestions of value. The general criticisms of the suggested psychological tests follow:

1. One of the essential requirements for a psychological test is "standard conditions" whereby the same results would be obtained by other persons in other places. One of these "standard conditions" is a set of standard instructions so that all persons using the test will give it in the same way. It is unfortunate that the tests included in the committee report are not accompanied by instructions for their use and application. To illustrate this point, consider the fourteenth item in the first test of Appendix A, i.e., if two pencils cost 5 cents, how many may be pur-

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*See *Electric Railway Journal* for Oct. 7, pages 589-592.

chased for 50 cents. This item comes in the Stanford-Binet test for fourteen-year-old children. It is supposed to be solved mentally in one minute or less. If the person tested were to use pencil and paper it would make the problem very much easier, or if a longer time were allowed to solve the problem. It is only by adhering to standard instructions that comparable results are to be obtained.

2. A test of general intelligence should be so devised that it is not a test of school training. It should give all applicants an equal chance, so far as that is possible, for general intelligence is probably innate and not acquired, and any intelligence which would give undue weight to the results of school training would, therefore, not really achieve its purpose. In Appendix B the "test to show that a man can follow instructions" (which is a phase of general intelligence) would apparently not be fair to the man of little school training. It is quite possible that an intelligent man of poor schooling might get confused by this complicated test. How many men know Independence Day is the Fourth of July?

3. It is very desirable to devise tests which can be scored objectively, i.e., the same answers will be given the same credit no matter who examines the papers. Many of the test items suggested in the report would be rejected under this criterion. An illustration of this defect occurs in the seventh item of the first test in Appendix A: "What is your idea of the value of such qualities in a conductor?" It would be very difficult to arrive at a standard method of evaluating the answers, yet we must if we are to pool or exchange results which shall be comparable.

4. The tests should be easy to score and quick to score. In the army the tests were drawn up in such a manner that stencils could be used for scoring the answers, thus rendering the work speedy, mechanical and accurate. The "common sense" test or "test of judgment" Appendix B (see last column page 591*) would satisfy this criterion, but most of the other tests would not.

5. It is desirable to employ tests which are practically self-explanatory. The employment manager is usually a busy man and he simply cannot spend a long time testing each applicant personally. It takes usually an hour or more to give the Binet tests to one person, and these tests are similar to the Binet tests in many respects. It is therefore impractical to attempt to give many of the committee report tests to the applicants.

6. A good intelligence test will be a fair measure of such so-called special abilities, such as judgment, ability to learn, ability to follow instructions and directions, memory, ability to make selective response, ability to maintain attention, ability to give a sensible account of some occurrence involving power of observation, etc. There is good evidence to believe that these special abilities are all merely phases of the one thing—general intelligence, and that a test of the latter tests the other abilities also, and if such is the case, it would seem more economical of time and effort to confine attention to testing general intelligence alone.

CRITICISMS OF SPECIFIC PORTIONS OF THE REPORT

Appendix A. Tests for motormen: It is not at all apparent that the tests to "indicate quickness of motor reaction to special sense perception, especially sight and hearing" (foot of page 589, issue of Oct. 7*) do actually test the same mental functions that are used in the performance of motorman duties. The test "to indicate judgment of speed" (page 590*) could probably be passed by almost any one of good education regardless of his ability to judge speed while operating a car.

Appendix B. Form 1. Job Specification. (Second column, page 590*): It is an excellent plan to place before the employment manager in definite form a job specification sheet. Such a sheet would aid in focussing attention upon the requirements of the job to be filled. It tends to keep the interviewer from overlooking any of the requirements. Job specification sheets are more necessary if the employment manager must hire for many different types of jobs.

Form 4. Data Sheet. To be filled by employment agent. (Page 590-1*): This sheet makes it possible for the interviewer to record his judgment of the applicant at the time of interview. It also tends to keep the interviewer from overlooking traits, desirable or undesirable. The items on this sheet could be changed from time to time as careful study revealed some items as being important and others as unimportant.

Form 5. Data Sheet. To be sent to reference. (Page 591*): It is highly desirable to get the references of the applicant to respond with as detailed and specific information as possible. Apparently Form 5 was designed with this purpose in mind. However, it is doubtful if many of the references would reply, for the sheet requires careful study, thought and analysis.

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*References are to *Electric Railway Journal*, issue of Oct. 7.

A. I. E. E. Discusses Cars and Buses

Following a Paper on This Subject by J. C. Thirlwall, Various Speakers Consider Relative Advantages

AT A MEETING of the New York section of the American Institute of Electrical Engineers, held in New York on the evening of Sept. 20, the topic considered was the relative merits of trolley cars, trackless trolley buses and gas motor buses. There was a large audience, and J. C. Thirlwall, railway engineering department General Electric Company, was the principal speaker of the evening. Calvert Townley, chairman of the New York section, presided.

MR. THIRLWALL'S ADDRESS

Mr. Thirlwall's address was largely a comparison of costs of installation and operation of car lines, trackless trolley lines, and bus lines for city service, and was accompanied by statistics which had been presented by him in a paper read in March before the engineering societies of Cincinnati and Indianapolis. These figures were published in *Bus Transportation* for September. Mr. Thirlwall said that so long as municipalities are willing to offer the use of smooth pavements free of charge to all commercial vehicles and compel the railway company to pay not only for its own tracks but for much of the paving as well, a considerable bonus is offered to users of buses. Nevertheless, except for relatively short hauls on selected routes where no attempt is made by a bus company to provide the extra equipment demanded by rush-hour traffic, a railway could show materially better financial returns on its entire investment and be much more successful in handling mass transportation than a bus line.

One reason for this is that the smallest car yet developed, the Birney safety car, will carry 50 per cent more passengers than the largest single-deck bus yet developed, so that to carry an equal number of people would require 50 per cent more buses than Birney cars. Mr. Thirlwall said he omitted in this comparison consideration of double-deck buses, like those operated on Fifth Avenue in New York and on Michigan Avenue in Chicago, because those lines are largely patronized by pleasure riders, and the double-deck bus is not suitable for business transportation. Trolley cars could also have a double deck, he said, but experience has shown that for service in this country they slowed down the schedules too much to be desirable.

The trolley bus is suitable particularly for extensions to a trolley line where the traffic is not sufficient to warrant the installation of rails, also on crosstown lines.

Mr. Thirlwall presented the accompanying table of operating expenses and fixed charges for a route 4½ miles long with street cars making the round trip, including layovers, in sixty minutes. On a fifteen-minute headway four cars would be required, on a ten-minute headway six cars, on a five-minute headway twelve cars. One reason for the high first cost of buses is that during the seven hours of heaviest riding 50 per cent more buses than cars would be required to give equal passenger capacity and carry the people. The accompanying table shows comparative figures of the three systems.

In summing up this comparison, the speaker said that for all routes extending into the business center of large or medium-sized cities the rail cars offer the most efficient and most economical form of transportation; for suburban, feeder, and crosstown service, the trolley bus will be the most suitable vehicle, and that only special conditions that prevent the erection of an overhead line would justify the use of gasoline buses inside the city limits.

COMPARATIVE COSTS PER ROUTE-MILE OPERATED

Long Headway Twelve-Fifteen Minutes	Rail Cars	Trolley Bus	Motor Bus
Annual mileage......	52,500	63,000	63,000
Total investment.....	$61,000	$23,800	$14,000
Fixed charges, per cent	13	13.5	16.7
Annual operating cost	$9,440	$12,500	$17,600
Annual fixed charges..	7,960	3,220	2,340
Total annual cost...	$17,400	$15,720	$19,940
Medium Headway, Eight-Ten Minutes			
Annual mileage.......	79,000	94,000	94,000
Total investment.....	$72,000	$33,000	$21,000
Annual operating cost	14,160	18,600	26,200
Annual fixed charges..	9,360	4,450	3,500
Total annual cost...	$23,520	$23,050	$29,700
Short Headway, Four-Six Minutes			
Annual mileage.......	157,000	188,000	188,000
Total investment.....	$123,500	$60,500	$42,000
Annual operating cost.	28,300	37,000	52,500
Annual fixed charges..	16,050	8,200	7,000
Total annual cost...	$44,350	$45,200	$59,500

In conclusion Mr. Thirlwall said that the bus proponents have made many claims as to their ability to handle all of the traffic of a community, but where the buses have had an opportunity to do so in any city of considerable size, they have failed. This has been true in Bridgeport, Des Moines, Muskegon, Toledo and Saginaw. In all of these places, except Saginaw, after some weeks' trial with the bus as the only means of transportation, the community found it necessary to ask the electric railway to resume service. Even in Saginaw there is a very strong feeling, especially among the retail merchants who have experienced a loss of sales, to ask the electric railway line to begin its service again.

DISCUSSION ON PAPER

At the conclusion of Mr. Thirlwall's address, Chairman Townley said that it was expected that Commissioner Grover A. Whalen of the Department of Plant and Structures, New York, would be present. He was detained but sent a statement which was read by Commissioner Mills. It is given below:

"I cannot go along with the idea that rail transportation of passengers through city streets remains the most economical method of urban conveyance. This conclusion is contrary to the indications of our experience in the Department of Plant and Structures. I say 'indicated' advisedly, for I confess I am not ready to present conclusions. We have not yet had sufficient experience either with the gasoline bus or the trackless trolley car to set forth as demonstrated the greater economy that I believe will be effected in urban transportation by the development of these two methods of surface transportation.

"As to motor buses, the department is operating none. It is supervising the operation of privately-owned buses. It has no records of costs or receipts—but we have this fact, namely: These buses are operating at a comfortable profit at a 5-cent fare on lines abandoned by trolley companies as unprofitable. This is not a carefully figured demonstration of the lower cost of transportation by gasoline buses, but it is more eloquent and more convincing than mere figures. With this experience I am pardoned, I believe, in expecting that the Department of Plant and Structures will be able to carry passengers in buses more economically than they can be carried in cars running on rails.

"I notice that the argument for transportation by rail is based largely on the allegation that 50 per cent more vehicles will be required if buses are substituted for trolley cars. This was true, but it is not true now. The motor bus has grown. The vehicle designed by this department will carry thirty-three seated passengers and twenty-seven standing—a total of sixty. Buses of this type are now in successful operation. This bus has answered the economy claim of the trolley car.

"As to the operation of trackless trolley cars, I do most positively claim that this is the most economical method of passenger transportation along public highways. When our department went into the development of this system of transportation, I had the matter of costs calculated. It developed, on information available a year ago and at costs then prevailing, that the cost per mile of service, including all costs of interest, depreciation, power, maintenance and operation, figured as follows:

Gasoline bus, per car-mile......	29.55 cents
One-man trolley car, per car-mile	24.3 cents
Trackless trolley, per car-mile..	20.95 cents

"Going over the calculation recently, in the light of added facts and experience, I find that the average costs figure as follows:

Gasoline bus, per car-mile......	27.87 cents
One-man trolley car, per car-mile	21.60 cents
Trackless trolley, per car-mile..	18.66 cents

"These figures, it is to be noted, are based on existing conditions. Moreover, they are approximate, not final. Moreover, the trolley car has reached its lowest point on the scale of cost and is not likely to go lower. The gasoline bus and the trackless car, however, are in an early stage of development, and the trend of costs in these operations will be downward as the development proceeds. I feel I am warranted, therefore, in asserting that the Department of Plant and Structures has developed in the trackless trolley system a means of passenger transportation more economical than any yet conceived. I feel that I am warranted also in believing that, if the Legislature frees us from the bonds of injunctions, the Department of Plant and Structures will be able to maintain and operate motor bus lines at smaller cost per car-mile than any cars running on tracks.

"So much for the economy phase of the problem. As for efficiency—quick and dependable service in all sorts of adverse weather conditions, the trackless trolley system and the gasoline bus system both proved themselves superior to the rail lines in our experience on Staten Island when they operated without interruption on winter days when all track lines were tied up."

Edward A. Roberts, chief of transit bureau, New York Transit Commission, followed Commissioner Mills. He quoted from a report of the Transit Commission to the effect that this body sees a place for buses in the New York transportation scheme, there being sections where service is sorely needed and where it cannot well be furnished by railways. As a suggestion to start thinking along the line of trackless trolley development Mr. Roberts asked the question: "What is the matter with the trolley bus?" This question, he said, is inspired by the fact that in spite of the length of time during which the trackless trolley has been in use on a small scale, it is used on only one line in the United States today. As a possible answer he cited the hypothetical case of a rail line faced with a demand for extended service for which the prospective business was in doubt. The natural thing would be to try out the traffic possibilities by means of a motor bus or two, adding to the number as traffic developed. The investment would thus be small and the buses would have some value if the service proved unprofitable.

Assuming, however, that business develops as expected, the time comes when a trolley bus line might be feasible. This, however, would mean the scrapping of the motor buses and making a considerable investment for overhead construction and new vehicles, or still further adding gas buses until the point is reached where a rail line would be profitable. The chances favor the additional buses in this case.

In closing Mr. Roberts said that the results of Mr. Thirlwall's work in the introduction of the safety car gave promise for the trolley bus, and he for one would hesitate to say that there is not a future for it.

Charles R. Harte, New Haven, Conn., then said that he wanted to correct a possible misapprehension as to the reason for discontinuance of street railway service in Bridgeport. This was not a breakdown of the service but the action was taken by the management as a protest against unregulated and unjustified jitney competition. Mr. Harte reminded his audience also that while only one trackless trolley line is in operation in this country, there is one in Windsor, Ont., which seems to be satisfactory, and the Toronto Transportation Commission has a number of trolley buses in use.

Prof. Morton Arendt, Columbia University, said that a feature of the trackless trolley is in the permanency of route, as compared with the gasoline bus. The presence of the overhead gives confidence of continued service and encourages real estate development.

In his closure to the discussion, Mr. Thirlwall reinforced what Professor

Arendt said. This feature is noticeable along the line on Staten Island, New York City. In a new line soon to be commissioned in Baltimore, the value of the service to the new section of the city to be served is illustrated by the backing of the undertaking financially by those whose real estate will benefit. In this case the United Railways & Electric Company will install and operate the line. As to Mr. Roberts' question Mr. Thirlwall said that many cities are considering trolley buses, but complications of one kind and another, principally over franchises, have delayed action. In a number of places the buses have been tried out on a small scale with good results. After all, the new vehicle has been available but a year or so. The city authorities in New York are desirous of extending the trolley bus service on Staten Island, and its inauguration in other places is but a question of time.

Medical Defense of Litigated Claims*

This Article Offers Some Suggestions to Consider in Medical Examinations as Well as Advice to Trial Attorneys on Connecting Direct and Cross Examinations

By JOHN LEEMING, M. D.
Medical Counsel Chicago Surface Lines

THERE are three classes of cases to be considered under this heading: First, cases of non-liability; second, cases of clear liability, and third, cases on the border line, in which the liability is in doubt. The class into which any particular case falls determines the importance of the medical defense. In the cases of clear liability there is no question in my mind but that a strong medical defense is of great assistance in enabling a jury to estimate the extent of the alleged injuries, whether the accident in question was the proximate cause and to assess the damages accordingly. In the border-line cases the medical defense is of the same importance if the defense fails to establish non-liability. In cases where the non-liability is clear it is obvious that the matter of extent of injuries is entirely irrelevant, but I have discovered that most experienced trial lawyers are loath to rely absolutely upon their ability to establish the non-liability issue for the simple reason that few cases are so clear cut. A case which appeared clearly to be a non-liability case may, after the plaintiff's evidence has been introduced, find more support for the plaintiff's theory than was anticipated, and, again, the witnesses that were relied upon by the defense to establish the non-liability may disappoint the trial attorney.

There are many surprises in the trial of lawsuits, and frequently in my experience it has occurred that an attorney who had not intended to introduce a medical defense has, when he found his case breaking badly, got in touch with me for the purpose of considering whether we could advantageously attack the plaintiff's theory that the conditions of disability were, as a medical proposition, due to the injuries.

Usually the trial attorneys with whom I have been associated have decided that in such a case it would be best to put on the medical defense with the hope of inducing the jury to render a more reasonable verdict than might otherwise be rendered. Of course, in cases of clear liability the medical defense must become the basis for defense, and in my experience there have been many cases of verdicts of not guilty where the jury, on medical evidence presented by the defense, rejected entirely the claim that the plaintiff suffered any injury whatever. Those were cases where the jury found that the alleged disability was not the result of injuries claimed to have been suffered from the accident.

My experience teaches me that when we go into court to defend a personal injury case there are two important things to be considered. The first is, who is to blame for the accident, and the second, is, how much is the individual hurt? The relative importance of these two lines of defense depends considerably upon the circumstances, and as to the first line of defense the medical adviser is of no aid. Speaking generally, I would say that if after complete investigation and a thorough conference with the crew and all available witnesses you are convinced that you can present a case to the jury of non-liability, the question of the extent of the injury is of minor importance.

While I do not advocate that a medical defense is essential in all personal injury cases, I do make the claim that in many cases it is of considerable value even in supposedly non-liability cases. It lays a valuable foundation in some cases for the argument of defendant's counsel "that this plaintiff is either mistaken or has deliberately lied in reference to the occurrence and he or she has grossly misrepresented the facts in regard to the effects of the injury." I believe that every personal injury case that goes to trial and which must be submitted to a jury should be treated as a fight and that the slogan of this association of safety first and safety always should be used in the defense of every damage suit that is brought into court. Our legal departments can be relied upon to furnish every available line of defense so far as liability is concerned, and I have the good fortune to be connected with a claim and law department that is forehanded in making thorough preparation for a possible medical defense.

PROGRAM IN MEDICAL DEFENSE

The first step in this preparation begins immediately after the accident occurs. This consists of an effort to obtain reliable information in detail as to the character of the occurrence, the immediate conduct of the injured individual as to whether conscious or unconscious, any bleeding from eyes, ears, nose, mouth or other parts, method of leaving scene of accident, whether the journey was continued, whether the individual walked, what assistance in reaching home, etc., what medical attention was rendered and how soon, the name of the attending physician, etc., an early interview with the attending physician, preferably by a medical man to obtain a statement as to the character and extent of the injuries (in writing if possible), an effort to learn whether the attending physician is fair and friendly and an endeavor, where desirable, to arrange for a consultation and examination by a company physician. If the examination is refused, the fact is noted in the file, as to who makes the refusal, whether the patient, the patient's relatives, the attending physician or the attorney if one has already been engaged.

An early medical examination is often of great value and by using diplomacy this examination can be obtained in the majority of cases. The earlier it can be made the better, and it is highly important that it should be made by a competent medical man and arrangements made for later consultations and examinations if the case requires them.

If it is a hospital case, the same general procedure should be followed, but in addition copies should be obtained of the hospital records, including the examining room diagnosis and later the diagnosis and treatment of the attending physician, duration in the hospital and condition of the patient when discharged. Valuable information is often obtained from the hospital record as to prior condition, character of symptoms, X-ray findings, etc., which may be difficult to procure later for various reasons.

Where an examination is to be made, it becomes very important to choose the right kind of doctor for the particular examination. If it is a surgical case, do not send a gynæcologist to make the examination; if it is a gynæcologist case, do not send a specialist on internal medicine, but adapt your examiner as nearly as possible to the type of injury involved. In any case, it is important to select a medical man who will obtain a complete history—not only of the accident in question, but of previous injury and disease, the medical attendance on such prior conditions, the various medical men who have treated the patient before the date of this accident, any hospital experience ever had, a complete history of the accident in question and an accurate statement of all objective symptoms present without any effort to minimize or to magnify them (these objective symptoms can be testified to in court). The doctor should also obtain as fully as possible a history of the subjective symptoms in the case, noting them on a separate sheet and not in the body of his report. (These symptoms he will not be required to testify to in court because they are subjective in character and may therefore be self-serving statements.)

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*Abstract of paper presented at the annual convention of the American Electric Railway Claims Association, Chicago, Ill., Oct. 2-5, 1922.

You will ask me, "What is the value of this list of subjective symptoms?" The answer is, they would very often indicate the type of individual you are dealing with. The very story of complaint may stamp the patient, especially if a woman, as a confirmed neurasthenic, and such knowledge is often extremely valuable, where there is a proper basis in the evidence, on the cross-examination of plaintiff's expert medical witnesses. And right here may I be permitted to offer a word of caution to our cross-examiner. If there are any lawyers present, it may be considered by them as presumptuous on my part, but at last year's meeting before this section a certain lawyer did not hesitate to speak his mind frankly and freely in condemning doctors and medical testimony generally from A to Z, so that I am sure that I will be pardoned if I offer a moderate suggestion to the members of the legal profession. My suggestion is that much damage has often been done to the defendant's case by improper cross-examination of medical witnesses. Some lawyers seem to be obsessed with the idea that to do their duty to their client it is necessary to go over every medical question that has been testified to on direct examination and make an effort to break the doctor down on cross-examination. Some lawyers do this for the purpose of showing their medical, surgical or anatomical knowledge. My observation leads me to the firm conviction that in the great majority of cases this method does more harm than good. In my lectures to law students, I give them this rule: In cross-examining an adverse medical witness, never ask him a question to which his answer can possibly hurt your case, and only ask such medical witness questions to which his answers might possibly help you, but cannot hurt you. Law students ask the question, "Can this be done?" Some of you gentlemen here may ask the same question. I answer that it can be done. Before telling you how it can be done, I will say further than it is a safe rule on disputed medical questions to prove your theory and your contention by your own medical witnesses rather than take a chance of dragging it out of an unwilling adverse witness. Take an assumed list of subjective symptoms, such for instance as your medical examiner may have obtained at the time of his examination of the patient. Let us assume that these symptoms are headache, backache, general nervousness, sleeplessness, poor appetite, very irritable, tingling sensation in the extremities, sweating of the hands and feet, twitching of the limbs, etc. The injured woman will almost invariably testify that she was perfectly well prior to the accident and never had any of these symptoms before, but that they have been continuous every since she was hurt. The attending physician will probably have testified that his patient complained of all of these symptoms ever since she was hurt. One or two expert witnesses will testify hypothetically that the accident in question was competent and sufficient to cause or bring about the symptoms described. Now how are you going to cross-examine this attending physician and how are you going to cross-examine the medical expert for the plaintiff?

Medical Cross-Examination

I will offer some general suggestions in reference to a case of this type:

Q. "Doctor, in your extensive experience as a medical man, have you ever seen a case which presented a similar group of subjective symptoms as those given to you in the hypothetical question in an individual who had never been injured?" (Yes.)

Q. "You have made a diagnosis of neurasthenia from the clinical picture presented. Have you ever encountered a similar condition in any of your patients who gave no history of injury?" (Yes.)

Q. Tell the jury what other causes than injury might be competent to produce such a condition.

Q. How about uterine displacement as a cause?

Q. Has it been your experience that an enlarged and congested uterus tipped backward and pressing against the sacrum is a sufficient cause for backache, headache and other reflex nervous phenomena?

Q. Such pelvic conditions and many others frequently occur, do they not, as a result of confinement?

(If no pelvic examination has been made.) *Q.* Do you know whether the hypothetical woman described to you was suffering from a laceration of the cervix or perineum—or a prolapse of the uterus or ovary—or whether she had any form of uterine displacement or disease?

Q. I presume you have seen a great variety of nervous phenomena resulting in women from disturbances of this character, have you not? (A yes or no will be equally valuable, for the chances are good that one or more of the jurors will be married men and will have some knowledge of how frequently such conditions cause all kinds of nervousness in women.)

Q. Are you familiar with any rectal troubles, which by continued irritation gradually develop nervousness? (Yes.)

Q. Such conditions as irritable or bleeding piles, painful fissure of the rectum, painful ulcer of the rectum, etc.?

Q. You assume, of course, as the subject was not mentioned in the hypothesis that none of these conditions existed in the hypothetical woman?

Q. Do you know whether this hypothetical woman was anaemic; it was not stated to you in the question?

Q. You will agree, will you not, that impoverished conditions of the blood is a recognized cause of nervousness?

Q. Do you know, by the way, the relative constituents of normal blood—the number, in a cubic millimeter, of red corpuscles, white corpuscles, etc.? (This, of course, not to a well qualified man.)

(If a urinalysis has been omitted in the hypothesis, a dozen questions may be asked which cannot hurt and may help you.)

Q. I suppose, doctor, many cases of nervousness are due to faulty elimination of waste products by way of the kidneys?

Q. Retention of urea and its various salts sometimes so poison the nerve centers as to produce convulsions or unconsciousness, is that true doctor?

Q. This is so well recognized in your profession that you give these conditions technical medical names, do you not?

Q. What are those technical names?

Q. Are you acquainted with the conditions known as uremic coma and uremic convulsions?

Q. Will you agree with the proposition, doctor, that in studying a case and investigating the cause of a nervous condition it is often valuable to make a careful chemical and microscopical examination of the urine?

Q. What do you mean by the term—focal infection?

Q. Are your views in harmony with the modern theory of your profession, that locked up poisonous matter in the tonsils, root cavities of the teeth, sinuses connected with the upper air passages and in many other parts of the body, is often absorbed into the system and produces very deleterious effects upon the nervous system as well as upon other body structures?

Q. Did you assume that in the hypothetical question presented to you the hypothetical person had no such focal infection in any part of her body?

Q. Did you do this, although no X-ray or other examination was made to exclude such conditions?

In some instances above, I have indicated the answer (Yes); if the witness should answer no to such questions, it would be easy to destroy his usefulness to plaintiff, because his lack of integrity and medical knowledge could be established by the defense.

The same general line of questions may safely be propounded with reference to the stomach, the liver, the intestinal tract, the heart, lungs and bronchial tubes, the special senses of sight and hearing, to say nothing of the many causes of nervousness which originate outside of the body, such as family, domestic and business troubles, the effect of hard work, long hours, sedentary habits, etc., all of which have a great bearing upon the production and continuance of nervousness.

After taking the plaintiff's medical expert—and often the attending physician too—through a line of examination like this, on the single subject of functional nervousness, you are in a position to make something of a climax in conclusion by saying:

Q. I take it, doctor, that you simply answered the hypothetical question as it was presented?

Q. You did not take anything into consideration in giving your answer that was not mentioned to you in the question?

Q. You did not have in mind, of course, any of the many other possible causes of the nervous condition?

Q. You simply assumed as the question indicated, that the accident occurred as stated, that the nervousness followed and continued as stated, and you expressed the opinion *on that hypothesis* that the accident and the nervous condition might be related as cause and effect?

Q. I suppose to be perfectly candid, doctor, you would be willing to admit that they might not be so related?

Q. Is it not a fact, doctor, that in the hypothetical question given to you, there is no cause mentioned other than injury to account for the symptoms?

This theory of asking questions of medical men on cross-examination that will elicit answers that cannot hurt you and may possibly help you can be utilized equally well in practically all cases.

Take surgical conditions like hernia, floating kidney, etc., as example; you may go as far as you like in examining for non-traumatic causes of these conditions and you are sure to get admissions that are damaging to the plaintiff's case and valuable to the defense.

Don't take the chance of trying to prove your medical theory by an adverse medical witness, especially when that witness on direct-examination has committed himself to opinions which are opposed to you, but rather as indicated by the questions I have suggested get him to admit other possible causes for the condition claimed.

Introduce evidence to back up your contention by your own medical men, and some attorneys put such witnesses on at the end of their case so that plaintiff will have but little opportunity to bring in rebuttal evidence. Ordinarily, however, little is to be feared from any attempted rebuttal on such lines as I have indicated.

In reference to medical witnesses for the defense, if you have obtained examination of the plaintiff at any time since the accident occurred, it is a weakness in your case if you fail to call the doctor. His examination may have revealed some objective evidence of the injury, especially so if made soon after the occurrence. But a frank statement of these conditions will establish confidence with the jury and place them in a receptive frame of mind when he expresses his opinion as to duration and ultimate outcome of the injury, and if your examining physician has been properly chosen and understands his work, it will be remarkable if on the occasion of the examination he failed to discover some non-traumatic trouble or to have learned something in the past history of the plaintiff that will not be valuable to the defense.

Do not make an expert witness of your examining doctor unless he is specially qualified, but make him a fact witness as to his findings and bring out any admissions against interest which he may have obtained. Plaintiffs' attorneys have a faculty of cross-examining your examining doctor at great length and being brief with your expert witness, who is usually a better qualified man.

In presenting medical opinion evidence, endeavor to use a doctor who has specialized and has had large experience in the subject matter before the court. Do not use a neurologist for a purely surgical case and vice versa. *Drag* out of him his course of study, duration of practice, hospital experience, college and teaching positions, etc. It will be received better by the jury than if he is given five or ten minutes to detail the wonderful opportunities he has had to acquire his skill and cleverness.

Use a physician who knows how to explain medical, surgical and pathological terms in common every day Main Street language and who will avoid as far as possible the use of technical and unnecessary medical terms.

Never use a medical expert who cannot control his temper. Select a man who can maintain his professional dignity with a smile and a pleasing manner regardless of the provocation.

It is important that your witness be a man who understands a hypothetical case and knows how to answer it responsively and in language that accords with legal requirements. He should avoid anything that might be construed as a desire to make a speech from the witness stand, yet he should be ready to give reasons for his answers and his opinions *if asked to do so* in a plain, simple and convincing manner and in a voice that can be heard without effort by the court and the entire jury.

It is equally important that your attorney should not confuse his assumed case with the case at bar and also to be thoroughly familiar with the correct phraseology for the termination of his hypothetical question.

Much criticism has been made of expert medical evidence. My opinion is that it is the abuse or the incorrect use of such testimony that is open to criticism. A year ago at our meeting at Atlantic City a legal representative of one of the large properties expressed his belief that this form of testimony was of no value whatever; that no one on the jury would believe it and that it would be much better to use the money expended in this way to pay judgments. By his methods and with the materials he used, his opinion may possibly have been correct, though in this jurisdiction, as I have indicated, the use of medical evidence has proved to be of value.

Importance of Publicity

West Virginia Utility Men, Meeting at Charleston, Plan to Promote It

AT THE annual convention of the Public Utilities Association of West Virginia, held at Charleston on Oct. 20 and 21, plans were made for a publicity campaign in the state to educate the public concerning the utilities. M. H. Aylesworth, executive manager of the National Electric Light Association, told of the advertising campaign launched by the body he represents.

Former Governor W. A. MacCorkle was toastmaster at a dinner given the delegates at the Kanawha Hotel, at which Mr. Aylesworth declared that within the next ten years public utilities will sell their securities over the counter in scrip form. He contrasted customer ownership of public utility stocks with political ownership and showed to what an enormous extent the people by direct ownership and through ownership by life insurance and other mutual companies were interested in the welfare of public utilities. Dozier A. Devane of Washington, D. C., a former member of the Florida Railroad Commission, supported Mr. Aylesworth's views and advocated that employees "sell" their companies to the users of public service.

W. H. Hallanan, State Tax Commissioner, said that next to the banks the public utilities are taxed closer to the legal mark than any other taxpayers in the state. He depreciated the idea of municipal ownership, as it withdrew taxable assets from the tax lists.

Governor Morgan asserted that he knew of some public utilities that were taxed higher than their properties would sell for on the open market. Speaking from his four and one-half years' experience on the Public Service Commission, he urged that all public utilities continue to give improved service and when increases are needed ask for only as much as is their just due. He condemned municipal ownership and said paternalism and bolshevism, which he described as socialism in action, were the two arch enemies of government.

The association elected C. P. Billings of the Wheeling Traction Company president. Vice-presidents chosen were C. H. Brues of Wheeling, Mentor Hetzor of Moundsville and W. R. Power of Huntington. A. M. Hill was re-elected treasurer and A. Bliss McCrum, secretary.

Express Rates Before State Commissioners

AT THE suggestion of the Interstate Commerce Commission, the subject of express rates, which has been instituted for investigation by the Commission, known as Docket 13930, and set for hearing in Washington on Nov. 20, will be added to the program at the convention of the National Association of Railway & Utility Commissioners to be held at Detroit beginning Nov. 4. Chairman McChord of the commission suggests that this express case would be a particularly apt one in which to apply in full the co-operative plan between the Interstate Commerce Commission and the state commissions with respect to both classes of rates, intrastate and interstate. Chairman McChord will be in attendance at this convention. The program for the meeting at Detroit was referred to in the *Electric Railway Journal* for Oct. 21.

Power and Mechanical Engineering Exposition to Be Held

A NATIONAL exposition of power and mechanical engineering will be held for one week beginning Thursday, Dec. 7, 1922, in Grand Central Palace, New York City. This will come at the close of the meeting of the American Society of Mechanical Engineers and the American Society of Refrigerating Engineers. There will be displayed steam turbines, steam engines, steam boilers, feed-water heaters, superheaters, economizers, metering devices, stokers, coal-handling apparatus, valves and pipe fittings, etc. The advisory committee of the exposition includes men prominent in the national engineering societies, among them being M. R. Bump, of the Doherty Organization; E. B. Katté, chief engineer of electric traction, New York Central Railroad; F. R. Low, editor of *Power*; D. S. Kimball, president American Society of Mechanical Engineers, and others.

Education for Highway Engineering and Transport

THERE will be held in Washington, D. C., from Oct. 26 to 28, the Second National Conference on Education for Highway Engineering and Highway Transport under the auspices of the Highway Education Board. The chairman of this board is John J. Tigert, United States Commissioner of Education. The board also comprises the chief of the Bureau of Public Roads, a colonel of the Corps of Engineers, U. S. Army, and representatives of the National Automobile Chamber of Commerce, the Society for the Promotion of Engineering Education, the Rubber Association of America and the Society of Automotive Engineers. The papers and discussions will have to do not only with educational matters, but also with the general aspects of the subject.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Jitney Elimination Question

Buffalo Situation Clears Up as 375 Jitneys Are Ordered to Stop After Injunction

The strike of platform employees on the local and interurban lines of the International Railway, Buffalo, which is entering its fifth month, is a dead issue and the situation has now resolved itself into a fight on the part of the railway to rid the streets of jitneys, which continue to operate in defiance of the law and court injunctions.

INTERNATIONAL OPPOSED TO MR. HOADLEY

Joseph H. Hoadley, New York, president of the Manhattan Transit Company, and H. D. Chapin, New York, a representative of the company, are under arrest on warrants charging conspiracy to violate the transportation corporation law. The International Railway is the complainant. Members of the Buffalo Jitney Owners' Association are alleged to have leased their cars to the Manhattan Transit Company, which claims authority to operate vehicles for a 10-cent fare.

For the privilege of operating a jitney as a unit of the fleet of the Manhattan Transit Company in Buffalo, each driver or owner agrees to pay $50 in five installments of $10 each and $1 a day, besides contributing to the cost of supervision, inspection and regulation, which would be close to 75 cents a day.

Another clause in the lease gives the Manhattan company exclusive right for advertising space and privileges in each jitney. It is the contention of the International Railway that the Manhattan company would receive more than $155,000 from Buffalo jitney owners on this basis without any overhead expense. Officers of the Jitney Owners' Association would receive more than $102,000 for supervision, inspection and regulation expenses.

INJUNCTION IS ISSUED

Justice George E. Pierce in Supreme Court has issued an injunction restraining the Manhattan Transit Company from operating buses in the streets of Buffalo. Application for the injunction was made by Henry W. Killeen of Penney, Killeen & Nye, attorneys for the International. After the arrest of President Hoadley and the issuance of the injunction order, the Manhattan Transit Company called off the operation of 375 jitneys which have been operating in Buffalo under licenses issued by the New York company through Mr. Hoadley.

Even the operation of 16-cent jitneys in Buffalo is illegal, Justice Harry L. Taylor has ruled in Supreme Court. It was the contention of the jitney owners that by charging 16 cents they would not have to secure a certificate of convenience and necessity from the Public Service Commission because that applies only to vehicles operating through the streets at a rate of fare of 15 cents or less. The court has also ruled that automobiles run for hire cannot operate over a fixed route paralleling the lines of the traction company.

The Appellate Division, Fourth Department, Supreme Court at Rochester, has reversed Justice Charles Pooley in Supreme Court at Buffalo, who, on Aug. 7, granted a peremptory writ of mandamus to the International Railway, directing Mayor Frank X. Schawb to enforce certain provisions of the transportation and highways law. Presiding Justice Frederick W. Krause in his prevailing opinion reviews the history of the Buffalo street car strike and says that it is his opinion that the issuance of the writ of mandamus was an unwarranted interference in details of executive power and that, in the exercise of the judicial discretion, the application should have been denied.

In touching upon the legality of jitney operation in Buffalo, Justice Krause says:

> I think it clearly appears that many of these vehicles were operated in violation of law and such violation has been held to be misdemeanor under Sec. 29 of the Penal Law, but the mere fact that an automobile driver or owner permits others to ride in his vehicle is not unlawful jitney service.

CONFERENCES ON SERVICE AT COST UNDER WAY

The first of a series of conferences were held early in the week between representatives of the city and three representatives of the International with the view of working out a service-at-cost plan for the local lines of the traction company. The meeting was secret. While the conference was being held, delegates of the Amalgamated Association of Street & Electric Railway Employees from all parts of the United States and Canada were holding a secret session in McLeod's Hotel to discuss ways and means for the support of Buffalo strikers and their families during the winter months.

Mayor Ernest B. Crosby of Lockport, by authority of action taken at a public hearing a week ago, has sent to the Lockport Common Council his appointment of a committee of five citizens to consider the purchase and operation of the local lines of the International in Lockport. There has been no local service in Lockport since the strike was called, July 1. The city is without authority to purchase and operate traction lines, but it is declared that a bill will be introduced into the State Legislature this winter to enable the city to acquire the property.

Mayor's Plan Ridiculed

Head of New York Commission Characterizes Hylan's Billion Dollar Proposal as Impossible

The plan of Mayor Hylan of New York for new transit construction has been characterized as "impossible" by George McAneny, chairman of the Transit Commission. In a detailed statement attacking the Hylan plan and the Mayor's refusal to co-operate for the building of needed subway lines, Mr. McAneny has supported his description of the Mayor's plan as chimerical with the following reasons:

> 1. Because the Mayor predicates his new lines on the basis of municipal operation, which, according to Mr. McAneny, is entirely dependent upon the policy of Hylan's successors. Furthermore, the transit chairman maintains that such a basis of operation will not be feasible for many years.
>
> 2. Because the city cannot finance the Hylan plan of new construction, which, Mr. McAneny declares, would require an expenditure of $1,063,000,000 rather than the $600,000,000 estimated by the members of the Board of Estimate. The city would have to spend $500,000,000 to carry out the first five years' work contemplated in the Mayor's program, according to Mr. McAneny.
>
> 3. Because the Mayor's insistence upon municipal operation for the lines to be built would, according to Mr. McAneny, mean that they would not become an integral part of the present system. The result, the transit chairman asserts, would be a piecemeal system over which a single 5-cent fare would be a physical impossibility.

Mr. McAneny declared that the promises the Mayor has been making to communities all over the city that such lines will be built merely because he now puts them on a paper map are not only empty promises but part of a plan of deception that the people themselves should resent.

Asserting that the Hylan Administration has delayed and obstructed and blockaded every attempt to solve the problem of increased facilities, Mr. McAneny says it was "inconceivable that the people of the city will themselves brook any further delays when the situation is better understood."

Mr. McAneny gave the following itemized analysis of the cost of the Hylan plan as estimated by the Transit Commission's engineering and accounting experts:

To buy out the interests of the Interborough and B. R. T. companies in those parts of the existing lines that he proposes should be taken would cost......................	$164,000,000
To pay for the exchange of the Broadway-Bronx extensions, that is, the West Side line of the Interborough Company, for the Lexington Avenue, or East Side line, which he proposes the company shall retain, would cost, on the basis of present operating values	24,000,000
To build and equip the new subways for which his scheme provides would cost........	875,900,000
The total of these three items alone is	$1,063,900,000

Mr. McAneny said that with the addition of the building of his tri-borough bridge connecting Manhattan, Queens, and The Bronx, at an expenditure of $25,000,000 and upward, bus equipment, etc., the plan the Mayor has put forward would cost pretty nearly double the sum the Mayor claims for it. The details of the commission's program have been outlined previously.

Future Form of Transportation for Pasadena Before City Directors

The City Directors of Pasadena, Cal., who have been studying its future transportation problem for the past eight months, have now before them many different solutions offered from various sources, and yet have reached no decision. They have been studying transportation in executive sessions for the most part. They have visited Long Beach to inspect transportation affairs in that city and with particular reference to the bus system operated.

On Oct. 4 the Pacific Electric Railway applied for a forty-year franchise extension, and the City Directors in turn denied the application without comment. On the same day that the application was presented the directors also heard from a recently organized transportation body known as the People's League and from the jitney owners, both opposed to the railway. The jitney owners sent notice to the directors through their organization at the same time that it was preparing petitions for a traction initiative at the November election, which would require the directors to grant five-year permits for bus operation.

The new Pacific Electric proposal, except for the forty-year franchise, is virtually the same as previous proposals, whereby the company in seeking renewals of some of its franchises now about to expire agreed to make an expenditure of approximately $800,000 in improvements to its local lines, as well as extensions, in Pasadena.

The railway requests a double-track franchise on Los Robles Avenue from California to Washington street, a franchise to extend a single-track line on North Los Angeles Avenue from Washington Street to Woodbury Road, and the renewal of its double-track franchise on East Colorado Street from Hill to Lake Avenues.

The Merchants' Association of Pasadena has urged that the Pacific Electric proposal, which follows the lines of an engineer's report made to the directors of the city, be submitted to the vote of the people. The Federated Improvement Association is campaigning to the effect that it wants both the Pacific Electric and the bus proposals submitted to the people, and the other proposition is in the form of an initiative petition in circulation to require the city to accept the bus proposition. Municipally owned buses have been recommended from several sources. The problem is complicated for the City Directors due to the fact that the jitney owners appear to be able to get referendum signatures enough to hold up any transportation policy that may be adopted. One ordinance regulating jitneys in the city of Pasadena has already been defeated in this manner.

Double Trolley to Go

District of Columbia Commission So Decided Following Investigation and Hearing

Authority to abolish the double trolley system has been granted the traction companies of Washington by the District of Columbia Public Utilities Commission following an investigation by the commission and a public hearing at which no opposition developed.

For many years four lines in Washington have been operated by double trolleys, three by the Washington Railway & Electric Company and subsidiaries and one by the Capitol Traction Company. One line using the former's tracks has been in the peculiar position of having been operated by three systems, single and double trolley and underground slot.

Investigation by engineers of the Public Utilities Commission disclosed the fact that the detention factor was considerably higher on lines with the double trolley system than on those with single trolley, grounded return system, due to more frequent breakage, increased danger of crossing and other elements.

Evidence at the hearing showed that the possibility of the electrolysis of underground structures with a single trolley, grounded return system, if properly designated, constructed and maintained, "is extremely remote." It was this claim of danger of electrolysis which originated the demand for the double trolley system and kept it in effect for many years on the older lines of the District of Columbia. The evidence also showed that the double overhead trolley system presents operating difficulties which result in inconvenience and possible danger to the public as well as considerable added expense to the companies.

The commission directed that the companies, in making replacements by installing the single trolley system, fulfill these requirements:

> Each rail joint shall be bonded with an electrically welded, unconcealed bond; the rails of each track shall be cross-bonded at intervals of not more than 500 ft.; double tracks shall be completely cross-bonded at intervals of not more than 1,000 ft.; jumper bonds shall be installed around each piece of special work; each such bond, cross-bond or jumper-bond shall be equivalent to No. 0000 copper wire and shall at all times be maintained in good condition and in thorough contact with the rails.

Previous to this hearing, the companies had tried several times but without success to have the change brought about.

The order, when carried into effect, will leave two systems of power-feed in effect for the street cars of Washington, the single overhead trolley and the underground slot. All lines in the business district use the underground slot, and some have this system their full length. In the outskirts of the city the majority of the lines use the overhead trolley.

Obtains Permanent Injunction Against Striking Employees

The temporary injunction issued out of United States District Judge Bledsoe's court in Los Angeles in July, 1918, restraining members of the locomotive engineers' and trainmen's unions from interfering with the operations of the Pacific Electric Railway lines, which was due to a strike being called by the trainmen, was made permanent by a decision rendered several weeks ago by United States District Judge Frank H. Rudkin of Spokane, Wash.

Judge Rudkin heard the case in Los Angeles in March, 1922, which was fully reviewed in the *Electric Railway Journal*, issue of March 18, 1922, and the Judge has had the case under consideration ever since. The suit was brought by the Pacific Electric Railway against M. E. Montgomery and other officials of the railway unions, and it was upon this that the action of Judge Bledsoe was based when he issued the restraining order against the unions temporarily in July, 1918. Some time ago a motion was filed by the unions for the dissolution of the injunction obtained four years ago, it being the declaration of the unions that all excuse for the action of the court had now passed. However, the position of the unions was combated by the railway and much testimony was taken by both sides at the time of the trial held in March, 1922.

The present suit was brought against certain union leaders and unions and the general object of the case was to obtain an injunction restraining the defendants from interfering with the contractual relations existing between the plaintiff and its employees.

This temporary injunction was allowed and later on approved by a higher court on appeal.

Toledo Considers Use of Pass

After a consultation with Walter Jackson in Toledo during the week ended Oct. 21 Street Railway Commissioner Wilfred E. Cann declared that he was favorably impressed with the weekly pass. He said the question of adopting the pass for use in Toledo would depend largely on Mr. Jackson's analysis of traffic data which he took with him when he left for his home. Mr. Cann has asked Mr. Jackson to submit his findings in the nature of answers to several definite questions. Mr. Cann said:

> If we could sell 14,000 passes a week we could obtain the equivalent of the present total revenue of the lines.
>
> Riders usually use the pass from 3.2 to 4.5 times a day according to averages we have been able to obtain.

Commissioner Cann told a group of business men that rejection of the one-man cars would not deter him from his efforts to improve service and that he would probably urge the use of trackless trolleys for some extensions next summer.

The Council would probably have to give special permission for a trial of the weekly pass. Mr. Cann has not said what the price of the pass would probably be.

Favorable Comment on Plea for Relief from Paving Charges

Both the Oshkosh *Northwestern* and the Kenosha *News* have commented in their editorial columns recently on the declaration made by Carl D. Jackson, chairman of the Wisconsin Railroad Commission and president of the National Association of Public Utility Commissioners, that the present law which requires electric railways to pay for pavements between their tracks is all wrong and should be repealed.

Mr. Jackson explained that the plan originated when horse-drawn street cars were in vogue, and it was based on the idea that the horses wore out the pavements, wherefore their owners, the street car companies, should stand the cost of pavement construction and replacement. The old horse cars, however, no longer are used, so that in view of this changed condition, justice calls for the abandonment of the present plan of assessing costs of paving improvements where street car tracks are concerned. Mr. Jackson then went on to explain how the paving costs assessed against the railways are passed on to the consumer.

All the points made by Mr. Jackson have been made before from time to time, but it is seldom that the newspapers have reacted so favorably to them. Thus the *Northwestern* said:

> There seems to be much merit in the line of argument advanced for a change in the present method of assessing costs for pavements between street car tracks. It is a real injustice, moreover, to penalize the street car riders in this manner, and it obviously is opposed to public welfare to make street car service cost more than it should, which is the actual result of the present policy. And now that attention has been called to this question, it is the duty of the public representatives to give it careful consideration and to revise the law, if as claimed, the law is working to the detriment of general public interests.

The *News* said in part:

> Mr. Jackson is offering a decidedly meritorious line of argument when he suggests that the railway companies should be asked to sell transportation and nothing else. His reasoning is excellent and the people are going to come to see it in the very near future. Street railway companies are not going to operate unless there is a chance for them to earn profit or an indication that they will develop such an earning chance. Added burdens must be eliminated if the street cars are to be kept going and the fare kept at a rate which the people can afford to pay and be willing to pay.

Application of Staley System Before the I.C.C.

An application has been made to the Interstate Commerce Commission by W. L. Staley, the president of the Staley System of Electrified Railways, for the requisite authority to retain the excess earnings as allowed newly constructed lines. In this petition Mr. Staley sets forth that he plans to construct an electrified railroad with 950 miles of main line and 225 miles of branch lines to serve points between the southwestern border of Colorado and a point on the Gulf of California.

The petition sets forth that the principal purpose of the line is to transport coal and coke from the Gallut-Durango fields of Colorado to the mining and metallurgical industries of southern Arizona. The proposed line intends to serve the following places: Durango and Cortez in Colorado; Luna, Grants, Bluewater, Farmington and Aztec in New Mexico; Tucson, Casagrande, Phoenix, Florence, Winkleman, Safford, Solomanville, Clifton, Morenci and Metcalf, in Arizona.

The petition points out that the country to be traversed is rich in mineral, forest and agricultural resources. The line is intended to furnish an outlet for their products to tidewater.

An outline of the plans of the Staley system for building the new lines was published in the *Electric Railway Journal* for Sept. 2, page 334.

Inquiry Into Bus Operation Proves Lively

The New York Transit Commission has taken up recently as part of its inquiry into traction affairs the subject of bus operation in New York City as fostered by the city itself. Most of the present services of this kind were started as emergency routes to afford means of communication following the suspension of surface line car operation. Many of the buses are run by individuals and service has been proved by the commission to be totally unreliable so far as schedules are concerned and wholly inadequate to meet traffic demands. The degree of overcrowding at certain points has reached very high proportions, proportions higher even than are on record on any of the transit lines even at the hours of traffic saturation.

Buses have been leased to individual operators, and on account of their lack of financial responsibility a total of more than $1,000,000 in potential damage claims has piled up against the city. Moreover, the whole operation of the buses appears to be hedged about with politics. In this connection individual operators have told on the stand of payment said to have been demanded of them to secure preferment in the matter of the assignment of routes and it has been brought out that Mayor Hylan's son-in-law's brother is in the business of furnishing insurance to drivers of the bus lines. An Alderman is also in the business of insuring buses. Counsel Shearn of the commission said that he always wondered about the interest displayed by Mayor Hylan in his own $25,000,000 bus proposition, but that "after looking into this business a little bit I can understand it better, for the testimony indicates what choice pickings there would be in it for the politicians."

Bill in Prospect for Control of Utilities in British Columbia

The Federal Government has removed the British Columbia Electric Railway, Vancouver, B. C., from the control of the Board of Railway Commissioners. The Union of British Columbia Municipalities has long been protesting against the policy of federal control of a corporation operating thousands of miles from Ottawa, the government seat.

At a recent convention the British Columbia municipalities went on record as favoring the appointment of a provincial public utilities commission and a bill is now being prepared which will provide for the control of public utility corporations within the province of British Columbia.

The details of the plan which will be submitted to the Legislature next month have been outlined by A. M. Manson, Attorney-General. According to the bill a permanent commission will not be formed.

In disputes relative to rates and service, the government will be empowered to appoint a commission or sole commissioner under the public inquiries act to deal with the controversy and render a decision. The government will grant such an inquiry upon application in writing from the municipal council affected or from 100 or more provincial voters residing in a district affected, but without municipal organization, or from the company.

The commission will have complete jurisdiction over fares for passenger service. The bill provides that, in considering rates, the commission is to "have due regard to giving the company a fair and reasonable return upon the appraised value of the property of the company and to the protection of the public from rates that are excessive."

Extensive Bus System Planned for Chicago

Plans calling for 70 miles of bus route on the south side of Chicago, Ill., 40 miles on the west side and 30 miles on the north side, and greatly increased service on existing routes of the Chicago Motor Bus Company have been announced by financial interests which recently gained control of the Lake Shore Motor Bus Company. This is the holding company for the Chicago Motor Bus Company, the operating company, and the American Motor Bus Company, which is the manufacturing company. Financial control has been secured by John A. Hertz, president of the Yellow Cab Company; Charles MacCulloch, president of the Parmelee Transfer Company and vice-president of the Yellow Cab Manufacturing Company; W. H. Wrigley, Jr., and other Chicagoans with extensive financial connections. John A. Ritchie, formerly president of the Fifth Avenue Coach Company of New York City, has been elected president, general manager and a director of the company. G. A. Green, formerly of the Fifth Avenue Coach Company, has also joined the Chicago company.

The buses to be operated will be of a design combining features of the L type coach of the Fifth Avenue company with the latest open-top double-deck model of the Chicago Motor Bus Company. They are to seat sixty-eight persons. The company expects to spend $3,500,000 in building a bus system.

Trunk routes will operate into the Loop district. The fare is to be 10 cents.

Financial and Corporate

Reorganization Slow Work

Difficulties Encountered in Putting Through Pittsburgh Plan Are Expected to Be Removed

Nothing definite of an official nature has been made public now for some time about the development of the plans for the reorganization of the Pittsburgh (Pa.) Railways. In consequence it might be supposed that the work of completing the plan has been allowed to drag, but that is not the fact.

The interests charged with the responsibility for arranging to carry the matter through have been diligently at work, and have made considerable progress in working out the details. They have, however, encountered several stumbling blocks to further progress. These would seem to make it impossible to comply with the time limit fixed by the Public Service Commission within which to meet certain conditions, but the difficulties encountered are not regarded at this time as presenting barriers insurmountable.

To be as specific as the information available will permit, questions have come up for settlement in connection with the raising of $5,000,000 of new money for use in providing improvements, in connection with the exchange of some of the underlying securities for securities in the new company, and also in connection with acceptance of the new plan by some of the municipalities. The interest rate and length of the term of the new loan are said to be the stickers on that issue.

With respect to the underlying liens, it is understood that some holders are insisting upon a direct guarantee of principal and interest from the Philadelphia Company as a condition of their assenting to the new plan. This was not contemplated under the terms of the preliminary reorganization plan, and the Philadelphia Company, which controls the Pittsburgh Railways Company, is understood to be standing out for the acceptance of the plan of all holders without any preference to them except such as naturally adheres under present priority rights of the holders as fixed by the existing liens on the physical property or on earning power.

As for the municipalities, more than 125 in Allegheny and Washington Counties are entered by the railway and not more than twenty-five, including Pittsburgh, are reported to have accepted the reorganization ordinance. This, however, is regarded as the least troublesome of the problems encountered.

It will be recalled that the railway was to have been reorganized with a capital of $62,500,000, the valuation placed upon the property in the spring of 1920 by the State Public Service Commission. A traction conference board was to have been created, to supervise an annual budget of the proposed new company, and to which Pittsburgh and other municipalities, the latter combined, would elect members.

It was first proposed, when former Mayor E. V. Babcock and the City Council approved the plan a year ago, that the reorganization should be started last March 1. Then it was made June 1, which date the State Public Service Commission fixed. A postponement was obtained by the Philadelphia Company to Nov. 1.

As indicated previously it is confidently believed that all the difficulties which have so far presented themselves will be ironed out satisfactorily, but the need may arise for modifying the reorganization plan slightly. With this in mind a meeting was held a few days ago at which Mayor William A. Magee, members of the City Council and Arthur W. Thompson, president of the Philadelphia Company, and the legal advisers of the company and the city all conferred. The outcome of the deliberations was not announced beyond a statement indicating that the plan might have to be modified slightly, but that the reorganization would undoubtedly go through with its main terms unaltered.

The principal provisions of the terms of the ordinance under which the reorganization is to be carried out were reviewed in the *Electric Railway Journal* for Nov. 21, 1921, page 967.

Seattle Municipal Road Reports Profit

The Seattle Municipal Railway operated with a margin of $39,001 over all actual expenditures during the month of August, according to figures compiled by D. W. Henderson, general superintendent of the line. The gross revenues were $535,469, and the total expenditures were $496,457 including $70,250 set aside for redemption of bonds, $20,000 for depreciation and $69,287 for interest. This does not take into consideration $57,092 charged to depreciation, only $20,000 of which actually is set aside for that purpose by the City Council. The operating expenses were $394,012. Figures show that all railway lines now are taking in more revenue per car mile than it is costing to run them per car mile. The four bus lines, however, are costing more per car mile than the revenue on the same basis.

Will Redeem Bonds.—The Southern Colorado Power Company, Pueblo, Colo., formerly the Arkansas Valley Railway, Light & Power Company, will redeem on Nov. 1, 1922, all the $4,475,300 outstanding first and refunding mortgage sinking fund bonds of the old Arkansas company.

Successor Company Formed

General Gas & Electric Corporation Acquires Assets of General Gas & Electric Company

As of Sept. 15, 1922, the General Gas & Electric Company sold all of its assets to General Gas & Electric Corporation. In payment therefor the latter corporation issued to the General Gas & Electric Company the following stock of General Gas & Electric Corporation:

12,500	shares of cumulative preferred stock, Class A
12,500	shares of cumulative preferred stock, Class B
40,259	shares of convertible preferred stock
45,154	shares of common stock

and assumes all liabilities of the General Gas & Electric Company.

The new corporation is a Maine corporation with an authorized capital stock of 450,000 shares, without nominal or par value, subdivided into:

130,000	shares of cumulative preferred stock, Class A
70,000	shares of cumulative preferred stock, Class B
100,000	shares of convertible preferred stock
150,000	shares of common stock

On Oct. 2 a dividend of $2 a share on General Gas & Electric Corporation cumulative preferred stock, Class A, was declared, being at the rate of $8 per share per annum for the quarter ended Sept. 30, 1922.

The cumulative preferred stock of the General Gas & Electric Company is exchangeable for cumulative preferred stock, Class A, and cumulative preferred stock, Class B, of General Gas & Electric Corporation, on a basis of half a share of Class A stock and half a share of Class B stock for each full share of cumulative preferred stock of the General Gas & Electric Company.

The Guaranty Trust Company, New York, has been appointed depository for the purpose of effecting this exchange, and in addition to the Class A and Class B cumulative preferred stock of General Gas & Electric Corporation, the holders of the General Gas & Electric Company's cumulative preferred stock will receive at the time of exchange their proportion of the dividend declared on the cumulative preferred stock, Class A, of General Gas & Electric Corporation.

In connection with the acquisition by General Gas & Electric Corporation of all the assets of the General Gas & Electric Company and the assumption of all the liabilities, General Gas & Electric Corporation has arranged to issue $2,060,100 principal amount of 7 per cent, sinking fund gold bonds, Series A, in exchange for a like principal amount of outstanding 6 per cent ten-year secured gold bonds of the General Gas & Electric Company. This represents 50 per cent of the 6 per cent ten-year secured gold bonds outstanding as of Sept. 15, 1922.

The 7 per cent sinking fund gold bonds, Series A, of General Gas & Electric Corporation are dated Sept. 1, 1922, mature Sept. 1, 1952, bear 7 per cent interest payable semi-annually on March 1 and Sept. 1, and have as collateral security the 6 per cent ten-year secured gold bonds of the General Gas & Electric Company surrendered for exchange. The trust agreement securing the General Gas & Electric Corporation bonds provides for a graduated sinking fund which will retire all the bonds prior to maturity.

The General Gas & Electric Company controlled the Reading Transit & Light Company, Rutland Railway, Light & Power Company, and Northwestern Ohio Railway & Power Company.

Practically All East St. Louis Stockholders Accept Terms

The offer of the North American Company, New York, N. Y., to purchase the stock of the East St. Louis & Suburban Railway has been accepted by 98 per cent of the preferred and 95 per cent of the common shareholders, who have deposited their stock for transfer under the terms offered. Time fixed for deposit was Oct. 16, but a short extension has been granted to enable those who have not yet deposited their stock to do so. The management is offering the few outstanding stockholders who prefer to sell their stock outright to accepting the original terms of the offer, market prices of $50 a share for their preferred and $9 a share for their common stock. The original offer was at the rate of $55 for the preferred and $10 for the common, payable one-half in North American preferred at $50 a share and one-half in common at $100 a share.

Sioux City Property Changes

The Sioux City Gas & Electric Company, Sioux City, Ia., a majority of whose outstanding stock is owned by United Gas Improvement Company, Philadelphia, Pa., is acquiring the electric generating plant and distribution system of Sioux City Service Company, thus placing the entire electric light and power and gas business in Sioux City under its ownership. It will also own most of the outstanding stock of the Service company, which will continue to operate the city's street railway and heating business. The present financing provides funds to retire at par the $2,051,000 outstanding first 5s of the Service company. Upon completion of this financing there will be outstanding $1,779,300 of 7 per cent preferred stock, $4,000,000 of common and $4,500,000 in first mortgage 6s.

Reorganization Plan in Prospect

In the belief that the Missouri Public Service Commission will allow a valuation of not less than $65,000,000 on the United Railways of St. Louis, the protective committee of preferred stockholders has issued a call for the holders of this stock to deposit their shares with the committee on or before Nov. 15. F. O. Watts, president of the First National Bank of St. Louis, is chairman of the committee. The total preferred stock outstanding has a par value of $16,383,000.

Walter W. Smith, vice-president of the First National Bank of St. Louis, secretary of the committee, says a hypothetical re-organization plan might be worked out on a predicated valuation of $65,000,000, and permission for the company to earn 7 per cent on that amount, somewhat as follows: Six per cent bonds to the amount of $48,000,000 would be issued in place of the existing total of $54,890,000 of funded debt and receiver's certificates. The new issue would be used to take up the receiver's certificates and pay off the underlying bonds. The remainder would be exchanged for other issues. The holders of the present securities, which bear interest at 4 and 5 per cent, would receive less in par value, but approximately an equal income since the new securities would bear 6 per cent.

On a valuation of $65,000,000, the 7 per cent return would bring in $4,550,000, of which $2,880,000 would go for interest charges. There would remain $1,670,000 in income on an equity of $17,000,000 for the preferred and common shares.

The statement issued by the protective committee said that the time had now arrived when the holders must either deposit their stock or forego the benefits which would accrue to the large number of stockholders whom the committee represented.

Financial News Notes

Service Resumption in Brooklyn.—Through the co-operation of the New York Transit Commission, Federal Judge Julius M. Mayer and Lindley M. Garrison, receiver of the Brooklyn Rapid Transit, service is to be resumed on the Park Avenue line in Brooklyn, and also a part of the Marcy Avenue route. The lines have not been run since the strike of 1920.

Receivership Case Again Postponed.—Federal Judge Mayer at New York announced on Oct. 24 that the application of the Continental Securities Company for the appointment of a receiver for the Interborough Rapid Transit Company, New York, because of a threatened default in payment of interest has been adjourned until Nov. 24, to allow the reorganization committee time to complete its work.

Expert Retained to Appraise Akron Property.—Albert S. Richey has been employed by the city of Akron, Ohio, to make an appraisal of the railway property of the Northern Ohio Traction & Light Company within the city limits of Akron. It is understood that this appraisal is to be used in the negotiations between the city and the company for a new franchise to replace the one which expires in 1924.

New Orleans Issue Offered.—An issue of $12,000,000 first and refunding mortgage 5 per cent bonds, Series A, of the New Orleans Public Service, Inc., is offered by Dillon, Read & Company, New York at 90 and interest, to yield about 5.70 per cent. The corporation has been organized to acquire the entire New Orleans Railway & Light Company under reorganization. The bonds are redeemable as a whole or in part at 105 on or before Oct. 1, 1927, at 104 and interest in the next five years, at 103 in the next five, at 102 in the next five, at 101 in the next five and 100½ prior to maturity, Oct. 1, 1952.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	Oct 1922 **7.00**	Sept. 1922 **7.01**	Oct. 1921 **7.24**	May 1921 **7.24**	**4.84**
Street Railway Materials*	Sept 1922 **181**	Aug. 1922 **189**	Sept. 1921 **153**	Sept. 1920 **247**	**100**
Street Railway Wages*	Oct 1922 **208**	Sept 1922 **208**	Oct. 1921 **214**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	Sept. 30 1922 **6.69**	Aug. 31 1922 **5.95**	Sept. 30 1921 **4.56**	Apr. 30 1917 **12.18**	**5.91**
U.S. Bank Clearings Outside N. Y. City (Billions)	Sept. 1922 **12.82**	Aug. 1922 **12.34**	Sept. 1921 **11.47**	March 1920 **18.54**	Av. Mo. 1913 **6.12**
Business Failures Number Liabilities (millions)	Sept. 1922 **1,469** **31.92**	Aug. 1922 **1,669** **36.83**	Sept. 1921 **1,618** **46.02**	Jan. 1922 **2,722** **195.7**	Av. Mo. 1913 **1,213** **24.64**

Conspectus of Indexes for Oct., 1922

Compiled for Publication in this Paper by

Albert S. Richey

Electric Railway Engineer

Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
Eng. News-Record Construction costs	Oct. 1922 **188.6**	Sept. 1922 **185.0**	Oct. 1921 **182.6**	June 1920 **273.8**	**100**
U.S. Bur. Lab. Stat. Wholesale Commodities	Sept. 1922 **153**	Aug. 1922 **155**	Sept. 1921 **141**	May 1920 **247**	**100**
Bradstreet's Wholesale Commodities	Oct. 1 1922 **12.50**	Sept. 1 1922 **12.08**	Oct. 1 1921 **11.19**	Feb. 1 1920 **20.87**	**9.21**
Dun's Wholesale Commodities	Oct. 1 1922 **175.6**	Sept. 1 1922 **172.5**	Oct. 1 1921 **161.8**	May 1 1920 **263.3**	**120.9**
U.S. Bur. Lab. Stat. Retail food	Sept. 1922 **140**	Aug. 1922 **139**	Sept. 1921 **153**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	Sept. 1922 **155.6**	Aug. 1922 **154.5**	Sept. 1921 **164.8**	July 1920 **204.5**	(1914) **100**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Traffic and Transportation

Jitneys Menace Houston

$1,200,000 Program of Improvements Halted Pending Relief to Company by City

The City Council of Houston, Tex., has not yet taken action on the petition of the Houston Electric Company, seeking an increase in fares from 7 cents to 9 cents. When the request was presented by Luke C. Bradley, district representative for Stone & Webster, the City Council called on Mr. Bradley for additional information regarding the financial condition of the company.

At a hearing before the Council Mr. Bradley and W. E. Wood, general manager, presented a detailed financial statement showing that the company is earning less than 1 per cent on its invested capital. Operation of jitneys in competition with the cars was blamed for the depleted financial condition of the company. The request for increased fares came just two weeks after the company asked the Council to prohibit jitneys from competing with the street cars.

According to the financial statement presented by Mr. Bradley, the Houston Electric Company during six months ended Aug. 31, 1922, reported total revenue of $1,003,870. Expenses were: Operating, $773,093.17; depreciation, $140,252.07; taxes, $70,010.02, making total operating costs $983,355.26. This left a balance of $20,515.27 for income return during the six months period.

Under the terms of the agreement entered into last January between the company and the city, at the time the franchise was extended for a period of fifteen years, the company agreed to spend $1,200,000 on improvements and betterments within the period of one year. The statement presented by Mr. Bradley showed that to date the company had spent $650,515 on improvements. He added that all improvement work had been ordered stopped by the company pending an adjustment of the fare issues.

City officials charged the company with breach of promise in ordering work stopped on the improvement program. The traction men countered by declaring that the company was on the brink of bankruptcy and that unless the city extended help to it, the company would be compelled to seek other relief. An extreme measure would be for the company to bring suit in Federal court, alleging that fares imposed in the city are confiscatory. It will be recalled that the Houston Electric Company once before secured relief through the channel of the Federal court, and under the decision rendered at that time the fare was increased from 5 cents to 7 cents.

Mr. Bradley told the Council that his company could borrow no more money, and that it had been found impossible to continue the improvement program as planned.

The question of barring jitneys from the streets of Houston has been referred to the voters to be decided at the general election on Nov. 7. It was hinted by Mr. Bradley that the company would not stand by the results of that election, for it would be impossible to compete with the jitneys, and if relief was not forthcoming the company would be compelled to seek some measure of relief in the Federal courts.

Increases in Fares a Political Issue

Figures made public by the Public Service Commission at Albany, N. Y., on Oct. 19 showed that in thirty-one cities fares were increased under affirmative orders by the Public Service Commission in office under Alfred Smith as Governor, while the up-state commission appointed by Governor Miller soon after he took office had increased fares in only two cities in eighteen months.

Increases of 2 cents in fifteen cities and 1 cent in sixteen other cities were granted by the Smith commission. These increases were granted in the period between April 1, 1920, and April 25, 1921. In two cities, Poughkeepsie and Oneonta, two increases were put into effect, each of 1 cent.

Fares were increased from 5 to 6 cents in Binghamton, Elmira and White Plains; from 6 to 8 cents in Amsterdam, Auburn, Geneva, Gloversville, Hornell, Johnstown and Syracuse; from 6 to 7 cents in Glens Falls, Kingston, Mechanicsville, Newburgh, Poughkeepsie, Saratoga and Schenectady; from 7 to 8 cents in Albany, Ithaca, Jamestown, Oneonta, Port Jervis and Poughkeepsie; from 5 to 7 cents in Cortland, Glen Cove, Middletown, Oneonta, Plattsburg, Rochester, Rome and Watertown.

The commission appointed by Governor Miller equalized the fares in Albany, Troy and other cities on the United Traction system which serves these cities and Watervliet, Cohoes and Green Island, necessitating increases in Troy, Watervliet, Rensselaer, which formerly had been upheld in antiquated franchise fare limit, making Albany pay 8 cents a ride, while the other cities paid 5 and 6 cents. The fare in Albany was reduced by the present commission to 7 cents and the fares in the other cities were increased to 7 cents, thereby equalizing fares on the entire system. Decreases also were decreed in Auburn and Syracuse.

An appeal for higher fare in Utica was denied, but the company appealed to the courts and the Appellate Division annulled the commission's denial.

Minnesota Rate Act Attacked

The Brooks-Coleman act, passed in 1920 and putting rate control of electric railways into the hands of the State Railroad & Warehouse Commission, has become a factor in the campaigning by candidates for election to the Legislature in Minnesota. Senator W. F. Brooks, one of the authors of the law, has taken up explanation of the law, conditions prevailing before its passage, and the effects of the act. He is candidate for re-election. This law, next to the half-backed automobile tax enactment, has, perhaps, created more general interest than any other piece of legislation passed at the last biennial session. Out of it has grown a lot of litigation affecting the valuation of electric railways as a basis for the establishment of permanent rates, and as yet only temporary rates have been made, except in the case of Duluth.

In his opening talk Senator Brooks said there has never been a measure so misunderstood and so generally misrepresented. He had no apologies to make for the bill. Inasmuch as no attempt had been made previously to show how the law aims to protect the interests of the three factors involved, the city, company and riders, he said:

> The bill gives to the electric railway a fair return on the value of its property as determined by an exact appraisal. It gives to the carriers the best of service at the lowest possible cost. It gives to the city of Minneapolis complete control of the operation and finances of the company. The bill provides fully the methods whereby the company property may be obtained by the city for municipal ownership and operation. I know if the citizens of Minneapolis could understand the fundamental principles underlying this bill and the absolute necessity for its passage and the effect of the bill when put in operation many who are now opposing it will join with myself and the other members of the Legislature who voted for it and give it their approval and support.

Six-Cent Fare for East Cleveland

Passengers in East Cleveland, Ohio, will pay a 6-cent fare beginning June 19, 1923, as a result of the decision of the board of arbitration. Up to this time the fare in East Cleveland has been the same as that in Cleveland, which is now 5 cents.

The arbitration board was named when the Cleveland Railway insisted upon an increased rate under the terms of its franchise. The arbitrators were Fielder Sanders, former city street railway commissioner, representing the company, John W. Leadley, consulting engineer, representing East Cleveland, and Attorney Charles Higley, selected by the other two arbitrators.

The arbitration board in fixing a 6-cent rate also authorized the company to sell nine tickets for 50 cents and charge 1 cent for a transfer.

"We feel the decision of the arbitration board is fair," said W. M. Pattison, chairman of the East Cleveland City Commission. "East Cleveland people do not believe they are being imposed upon in being required to pay a cent more than a car ride costs in Cleveland in view of the longer distance. Then, too, we expect that Cleveland car fare may soon again go to 6 cents."

Hearing on Validity of Dallas Six-Cent Fare Ordinance

A hearing was set for Oct. 21 on the injunction case involving the validity of the 6-cent fare extension ordinance passed by the city of Dallas, Tex., now on appeal before the Court of Civil Appeals for the Fifth Supreme Judicial District of Texas at Dallas. The original petition seeking an injunction restraining the officials of the Dallas Railway from collecting 6-cent fares was filed by F. J. Geller and others in the Forty-fourth District Court and was heard by special Judge John W. Pope, who sustained the general demurrer filed by counsel for the company setting forth that the company was not properly a party to the suit; that it was acting merely under authority granted by the city in enactment of the 6-cent fare ordinance.

Action has not yet been taken on the petition for mandamus filed by W. S. Bramlett, et al., seeking to compel the City Commission to take action on a petition for referendum of the 6-cent fare extension ordinance under provisions of the city charter. City Attorney James J. Collins held that the fare extension ordinance was enacted with the emergency clause, and thereby was not subject to the referendum provisions of the charter.

Malden Protests Use of One-Man Car

The city government of Malden, one of the largest suburbs of Boston, has voted to ask for the discontinuance of one-man cars in that city, served by the Boston Elevated Railway. The matter has been brought officially before the Massachusetts Department of Public Utilities, so that it will have to be officially determined. At a public hearing before the department, members of the city government and of the Malden Chamber of Commerce declared that the situation created by the use of one-man cars is a menace to the whole community. The cars used were said to be the old type large semi-convertible cars that had been built for two-man operation and have been changed over for use as one-man cars.

Henry C. Atwill, chairman of the Department of Public Utilities, expressed a doubt, however, that his commission has any power to act on the petition. He said that last year the commission issued an order relative to the operation of one-man cars over a grade crossing, under a provision in law relative to grade crossings, but beyond such regulation he thought the commission had no power.

Counsel for the Boston Elevated, H. Ware Barnum, contends that the Public Utilities Department has no authority to order the one-man car off the street, that if it is to be ordered off by legislation the law will have to apply to all the railways in the State. So far as accidents are concerned, he said that the records show fewer accidents with one-man cars than with the two-man cars.

Freight Via Motor Truck Not Contemplated

Railroads, steam and electric interurbans, in California are not at present planning to pick up freight at its source through the use of motor trucks, as had been reported in traffic circles. Motor truck freight companies, which have been annexing considerable short-haul freight traffic formerly handled by railroads, have been fearing such eventuality, but according to J. T. Saunders, general freight agent of the Southern Pacific Lines in Los Angeles, there is little probability of the railroads attempting to compete with the motor trucks for the short-haul business now.

Although the truck companies have made substantial inroads on the revenues of the railroads, Mr. Saunders asserts that the railroads are helpless until the trucks are compelled to pay taxes on their gross revenues and bear their portion of maintaining state highways. When this accomplished, both carriers will be on a more equitable basis of competition.

The function of the truck, in the opinion of Mr. Saunders, is to serve the railroads by transporting freight from the surrounding country, and not in attempting to parallel the railroad lines with their routes. The railroads cannot attempt to compete with the motor truck companies on short-haul freight by operating a fleet of trucks to secure the freight at the source and convey it to the cars, which has been attempted by several other lines in large cities throughout the country. This practice is not sufficiently successful to warrant general extension because the truck companies have been able to easily undercut the railroads.

The city short haul belongs primarily to the express companies, and if the railroads should enter this field with a truck pickup service, they would be competing with the express carriers, one of the best customers of the rail lines. It may be that in time the express companies will be controlled by the railroads, and if such development materializes, the carriers would be in a better position to go after the city short-haul business in competition with the truck companies.

The growth of the motor truck business is similar to the development of the electric railway. Electric lines were able to divert the large amount of suburban traffic that had gone to the steam lines, and in order to protect themselves, the railroads have pursued the policy of acquiring the electric lines as feeders.

Some such development may take place with the truck problem. If the railroads are allowed to compete with the trucks on a fair basis, there is a likelihood of the rail lines operating truck routes into the back country to facilitate greater freight shipments.

More Five-Cent Lines in Boston

Announcement was made on Oct. 18 by Edward Dana, manager of the Boston Elevated Railway, that plans are under way for extending the 5-cent fare zones on the "L" system as a result of the increased traffic in zones already established and the decrease in the annual deficit. Mr. Dana said:

> We are making and will continue to make every effort to extend the 5-cent fare. Of course when you enter the rapid transit subway, the fare is still 10 cents, and may continue to be.
>
> But our trustees have made a careful survey of the situation on our road, and there is no doubt that as a result of their findings there will be an extension of the 5-cent fare. Generally, however, it is unwise to compare Boston with any other city from viewpoint of transportation. The city has conditions that are unique.

During the month of September of this year, with the 5-cent fare operative in some zones, the Elevated carried 28,357,507 passengers. In September, 1921, the total of passengers carried was only 26,613,458. The deficit this year was $364,000 as compared to $466,000 last year. Despite the reduction of fares there was an increase in mile trips to the extent of 133,000 during the last fiscal year, an increase of 36,000 trips over the previous year.

The total revenue for September, 1921, was $2,566,985. Last month it was $2,572,047. In 1921 the cost of service was $2,716,381. This year it was $2,615,095. The cost of service over receipts in 1921 was $149,395; this year it was $43,048. At present the 10-cent fare in Boston allows a ride of 22 miles, whereas the 5-cent ride averages only 3 miles.

Motormen and Policemen Co-operate

For the purpose of bettering the co-operation between traffic policemen and motormen the Louisville (Ky.) Railway has extended an invitation to all members of the Board of Public Safety, the chief of police and members of the city police traffic squad to attend the monthly dinner given by the company to the carhouse with the smallest number of accidents for the month. Arrangements were made for a dinner on Monday, Oct. 16, at noon for the late-run men, and at 7:30 in the evening for the day men, so that all policemen and street car men could attend.

The dinner for low accidents was captured by the Market Street carhouse during September, and incidentally the same house captured the event in September, 1921, and hadn't won it since that time. The average for the month was 8,000 car-miles per accident.

Police Judge Eugene M. Daily, who has broken up a lot of speeding in Louisville, through fines of $2 a mile per speed of motorists captured, and Alfred Selligman, attorney, with the accident department of the company, were the principal speakers on Oct. 16.

It is recognized that the motormen and traffic policemen are in close daily contact, and that through co-operation, the safety work of each can be made more effective.

Jitney Men Lose

Operators in San Antonio Must Desist From Competition With Public Service Company

Jitney men in San Antonio, Tex., have lost their fight in the higher courts against the ordinance enacted by the City Commission of San Antonio to stop the operation of jitneys in competition with the cars of the Public Service Company. The Supreme Court at Austin has just upheld the judgment of the Court of Civil Appeals for the Fourth Judicial District. The Court of Civil Appeals previously reversed the finding of the District Court in granting a temporary injunction restraining the city of San Antonio from enforcing the terms of the jitney ordinance pending hearing adjudication of the case on its merits.

The San Antonio jitney ordinance was enacted last January. It prohibited the operation of jitneys on certain streets, which in effect prevented the jitneys from running in competition with the traction company, for the only streets on which the jitneys were permitted to operate were those on which no street cars were operated. When the ordinance went into effect, A. Fetzer, and others acting for the jitney operators, filed suit for injunction in the Fifty-seventh District Court. After a hearing a temporary restraining order was granted. This temporary restraining order in effect nullified the provisions of the jitney ordinance and permitted the jitneys to operate unrestrained pending final disposition of the case.

The city took an appeal to the Fourth Court of Civil Appeals, and on hearing the case was reversed. Fetzer then sought a writ of error to the Supreme Court, and in denying this writ the Supreme Court in effect sustained the findings of the Fourth Court of Civil Appeals and denied the writ sought by the jitney men.

In seeking a writ of error to the Supreme Court, the jitney operators alleged that the city ordinance in question was "arbitrarily and capriciously passed for the sole purpose of prohibiting the operation of jitneys over the streets of the city, and that if enforced would have that effect."

It was further alleged that no necessity existed for so prohibiting the operation of jitneys, and averment was made that the ordinance was passed pursuant to a contract made by the city with the Public Service Company of San Antonio, whereby that company agreed to reduce fares to 6 cents provided the city passed and enforced ordinances prohibiting jitneys being operated over the streets of the city.

Business of Freight Traffic Increases

Figures compiled by the traffic department of the Salt Lake & Utah Railroad, Salt Lake City, Utah, reflect a vigorous development of interurban freight traffic. Estimates based on performance of the first eight months of the year indicate that carload freight shipments over the Salt Lake & Utah in 1922 will show an increase of approximately 400 per cent above those of 1916. Included in this estimate only eight principal commodities are considered.

Taking the actual carload shipments handled in former years, the following table shows the steady growth of freight traffic since 1916, the shipments of 1916 being used as 100 per cent basis:

Year.	Cars.	Per Cent.
1916	2,206	100
1917	3,215	146
1918	3,919	178
1919	7,001	318
1920	9.036	410
1921	6,619	300
1922	11,150	505

Transportation News Notes

Opposed to Bus Line.—The Tucson (Ariz.) Rapid Transit Company is protesting the proposed motor bus line into the northern and eastern sections of Tucson, claiming that all the traffic is necessary to its existence and operation. On Sept. 23 the Arizona Corporation Commission convened for a hearing on the application for such motor bus line.

More One-Man Cars for Shreveport.—The Shreveport (La.) Railways has asked the City Commission for permission to substitute one-man safety cars for the present cars on the Fairfield line. It is asserted that if the company is permitted to substitute one-man cars it will be able to improve the service and at the same time eliminate a daily deficit of $50. One-man cars have been in use on the Union Depot line for several months.

Arranging for Special Trains.—The Columbus, Indiana & Eastern and the Columbus, Newark & Zanesville traction lines, in Springfield, Ohio, are making a determined drive to secure "special car" trade which is having good results. The companies have booked a number of special train movements to conventions and football games for the next few weeks. Plans to operate special trains from outlying communities to Springfield for events at memorial hall during the coming season have also been arranged.

Experiments with Remodeled Car.—The operation between Maplewood and Dover of one of the remodeled cars of the Morris County Traction Company, Morriston, N. J., with entrance and exit at one end marks an experiment by the traction company prior to the proposed conversion of all its large two-men crew cars into the pay-as-you-leave cars with one operator. The traction company has several of the small trolley cars operated by one man on its short runs between Maplewood, Springfield and Elizabeth and Morristown and Morris Plains.

Reduction in Fares Asked in Washington.—The Public Utilities Commission of the District of Columbia will grant a formal public hearing on the application of the Federation of Citizens' Associations for a reduction in fare on the lines of the Capital Traction Company. Date of the hearing will be announced later. John H. Hanna vice-president and general manager of the company, said that with passenger traffic declining and the cost of coal and supplies going up, he did not regard this as a propitious time to talk about fare reductions. Mr. Hanna said he would be prepared to give exact figures on the company's earnings or operating expenses when the hearing is held.

Jitneys Regulated by Texas Cities.—At the request of the Waco (Tex.) Traction Company, the Waco City Commission has enacted an ordinance regulating jitneys and other passenger-carrying vehicles. The new ordinance prohibits drivers of such vehicles from soliciting passengers on any street on which street cars are operated, unless to fill a previously made engagement. The City of Temple, Tex., has also enacted an ordinance to regulate the operation of jitneys in that city. The new ordinance fixes a license fee of $25 payable at time of application, for a permit to operate, which is not refundable if the jitney is in operation for less than one year.

Parking Ordinance Upheld—Cities and towns in Oklahoma are exercising their lawful police powers in enacting ordinances prescribing zones in which jitneys and motor trucks operated for hire are to be parked under a decision in the Criminal Court of Appeals, which denied a writ of habeas corpus in the case of A. McGuire of Pawhuska. In the case the complainant alleged that the City of Pawhuska in enacting and enforcing an ordinance fixing the zones in which jitneys may be parked was in effect depriving the owners of such jitneys of their property without due process of law. The court held that this was not the case and that the town had full authority to enact and enforce such ordinance.

Postpones One-Man Car Operation.—The Public Service Railway, Newark, N. J., has postponed the proposed one-man trolley service on the Collingswood and Haddonfield lines as a result of a conference of representatives of the men with Martin Schreiber, manager of the southern division of the railway. The men were concerned about their ability to operate the one-man cars successfully during rush hours because of the heavy traffic on Haddon Avenue and Federal Street, Camden. They were reassured by the company on the point of possible reduction of the force. One-man cars are now being operated on the Cramer Hill, Woodlynne, Crosstown and Merchantville lines.

Legal Notes

CALIFORNIA—*Ineffective Fenders Held Not Proximate Cause of Death of Negligent Pedestrian.*

Where a pedestrian was negligent in stepping upon the track immediately in front of approaching car, the negligence, if any, of the railway company in failing to equip the car with effective fenders was not the proximate cause of the pedestrian's death and it was error to instruct the jury that, even if deceased was negligent, defendant was liable if they further found that if the car at that time had been equipped with a suitable fender, deceased would not have been killed. [Schooley vs. Fresno Traction Co., 206 Pacific Rep., 481.]

FEDERAL COURTS—*Testimony of Various Car Men that They Did Not See Plaintiff Attempt to Board Street Car Held Admissible.*

Where, in an action for personal injuries occasioned by attempting to board a street car, the particular car had not been identified, it was permissible for the company to call the motormen and conductors on cars that had passed the place of injury at or near the time thereof, to testify that they did not see the plaintiff, and knew nothing about the accident. [Fels vs. East St. Louis & S. Ry. Co., 275 Federal Rep. 882.]

GEORGIA—*Street Railway Company Must Bear Expense of Crossing.*

A steam railroad company which had received a perpetual right-of-way in a city street, laid one track, and after the construction across it of a street railway laid another track, and subsequently shifted its tracks in connection with the building of a depot but within the right of way granted. In a suit to determine which company should bear the expense of maintenance of the relocated and new crossing, it was held that the steam railroad was the senior company in occupation with respect to both tracks, and not to have relocated its tracks by such shifting, and that the electric railway company, at whose instance the crossing was first installed, must bear the expense. [Macon Ry. & Light Co. vs. Southern Ry., 110 Southeast, Rep. 912.]

ILLINOIS—*Conditions Under Which Railway Property May Be Assessed for Street Improvements.*

Where property has for years been devoted to street railway purposes, and the evidence tends to show that it will continue so to be used for years to come, the only basis upon which a special assessment for street improvements may be levied against it is that the property will be benefited by the proposed improvement. For such purpose, the street railway property has no market value in the sense in which that term is ordinarily used, and, on objection by the street railway to assessment for improvements in street, the court erred in permitting an expert to testify that the property would sell for at least $16 per foot more after the improvement than before. [City of Chicago vs. Chicago City Ry. Co., 134 Northesat. Rep. 44.]

LOUISIANA—*Duty of Street Car Company to Prevent Obstruction of Platform by Objects Endangering Alighting Passengers.*

A street railway company owes to its passengers the duty to prevent the obstruction of the platforms by baskets or other objects which would endanger passengers when alighting. [Hopkins vs. New Orelans Railway & Light Co., 90 Southern Rep. 512.]

MICHIGAN—*Carrier Not Liable for Injury to Passenger Thrown Down by Speed of Car in Rounding Curve.*

A street railway company is not liable for injury to a passenger, who is thrown before he reached a seat, due to the rapid speed of the car necessary and incidental to efficient operating in rounding a curve immediately after starting. [Clifford vs. Detroit United Ry., 185 Northwest. Rep. 741.]

MARYLAND—*Company Held Liable for Death from Wire Broken by Fallen Limb of Tree if Chargeable with Knowledge of Decayed Condition of Tree.*

Where a large limb of a decayed tree extending out over a public highway broke and caused a railway transmission wire to come into contact with a wire fence, the railway was liable for injuries caused by contact with wire fence if, by the exercise of proper care, it could have known that the limb would probably fall and break its wires and did nothing to protect the public, even though the tree was situated on private property. [Hagerstown & Frederick Ry. Co. vs. State, 115 Altantic Rep. 783.]

MONTANA—*Verdict Exonerating Servant Releases Master.*

In an action for personal injury against a street car conductor and the company, where the company can be held liable only on the doctrine of respondeat superior, a verdict exonerating the conductor, while finding against the company, is inconsistent; the finding by the jury which will support one verdict would make the other one impossible. [Lowney vs. Butte Electric Ry. Co., 204 Pacific Rep. 485.]

NEW JERSEY—*Permission of Board of Public Utility Commissioners Necessary for Jitney Operation.*

A jitney which operates on a route parallel upon the same street to the line of a street railway, is a public utility. As such it must obtain permission to operate from the Public Utility Commission as required by Sec. 24 of the Public Utility Act, and municipal consent to operation is invalid without this permission. [Public Service Ry. Co. vs. Board of Public Utility Com'rs et al., 116 Atlant. Rep. 274.]

NEW JERSEY—*Users of Crossing Over Private Right of Way Without Consent Trespassers and Not Entitled to Warning.*

Where a crossing was constructed over a private right-of-way and track of a railway company without the consent or permission of the company and was used without invitation, the company is not guilty of willful or wanton injury if one of its cars strikes and damages a truck using the crossing, although the company has knowledge that the crossing is being used, and the view of a car approaching the crossing is somewhat obscured by shrubbery. [Staub vs. Public Service Railway, 117 Atlant. Rep. 48.]

NEW YORK—*Injury to Employee While Riding to Work on Pass Held Not to Be "Arising Out of Employment."*

Where a railway employee was riding on a pass to work but was injured before he reached the place where his employment began and before the time for which he was to be paid, the accident was not one arising out of his employment within Workmen's Compensation Law, and his representative could recover damages for his death in an action based on the theory he was a passenger. [Tallon vs. Interborough Rapid Transit Co., 134 Northeast. Rep. 327.]

PENNSYLVANIA—*Contract Not Consummated Because Terms Not Complied With.*

Where a railway wrote to a manufacturer asking the price on certain goods with terms, and the manufacturer gave price and terms, and the railway then replied, stating somewhat different terms, naming a consignee to whom the goods were to be shipped, a limit of time for shipment, and a certain place for delivery, there was no completed contract, where plaintiff did not reply to the last letter, but shipped the goods, consigned to itself, to a place other than that named by defendent. [Frick & Lindsay vs. Johnstown & S. Ry. Co., 115 Atlantic Rep. 837.]

SOUTH DAKOTA—*Knowledge of Peril Necessary Under Last Clear Chance Doctrine.*

Under the last clear chance doctrine, the defendant must have had actual knowledge of plaintiff's peril, and is not liable merely because he ought to have known thereof; the mere fact that he could have discovered the peril being insufficient. [Miller vs. Sioux Falls Traction System, 184 Northwest. Rep. 233.]

Personal Mention

L. A. Lovell Made Auditor

On Sept. 13 the board of directors of the Pacific Electric Railway, Los Angeles, Cal., announced the appointment of L. A. Lovell as auditor and secretary to succeed H. A. Culloden, who resigned to become auditor of the Minaret & Western Railway and its subsidiary companies at Fresno, Cal.

Mr. Lovell entered the service of the Pacific Electric Railway in 1901 with that portion of the present consolidated company known as the Pasadena-Los Angeles Electric Railway in the capacity of bookkeeper. During Mr. Lovell's twenty-one years of service with the company he has held various positions in the accounting department, including those of general bookkeeper and chief clerk. At the time of his appointment he held the position of special auditor.

L. A. LOVELL

Municipal Manager on Leave of Absence

Joseph S. Goodwin, general manager of the Detroit (Mich.) Municipal Railway, has been granted a six months leave of absence by the Detroit Street Railway Commission, due to ill health, and Mayor Couzens has announced that he will take active charge of the management of the railway during Mr. Goodwin's absence on leave. After being ordered by his physicians to take a complete rest, the general manager sent a letter to the Mayor explaining that after two weeks of observation at Harper Hospital he felt that in justice to himself and the Department of Street Railways he should relinquish, for the present, his active participation as head of the department.

Mr. Goodwin in his communication thanked the commissioners for the splendid co-operation and support which were rendered him at all times and assured them that he is determined to be back in fit condition energetically to push the progress of the department's affairs.

The commissioner agreed to grant Mr. Goodwin leave of absence on half pay and it has also been agreed between the Mayor and the commissioners not to appoint anyone to take Mr. Goodwin's place. The members of the commission and the Mayor will from now on devote more of their own time to the conduct of the department, the Mayor agreeing to spend a half of each day at the department headquarters during Mr. Goodwin's absence.

Paper Praises T. F. Hill

Among prominent men in Anderson, S. C., is Thomas F. Hill, superintendent of the commercial and railway departments of the local branch of the Southern Public Utilities Company. The Anderson *Tribune*, in fact, thought Mr. Hill of such importance that he was made the subject of a sketch in a series called "Anderson Men of Today." He is placed in the Anderson hall of fame for his ability to win friendships and his earnestness and interest in his work, qualities especially to be desired in an official of a public utility company.

After being graduated from Wofford College, Mr. Hill for a short time was baggage clerk for the Blue Ridge Railroad. He soon started work with the Anderson Traction Company, and when this company was purchased by the Southern Power Company Mr. Hill was made superintendent of the system. Later he took up his present work as superintendent of the commercial and railway departments.

Mr. McLimont Is Honor Guest at Dinner

To celebrate the fifth anniversary of his association with the Winnipeg (Man.) Electric Railway, officers and department heads of the company gave a dinner to A. W. McLimont at the Royal Alexandra Hotel on Oct. 11. The banquet was not only in honor of the fact that Mr. McLimont, vice-president and general manager, had been with the company five years, but because, as stated by one of the company, he "has successfully eliminated jitney competition, succeeded in getting the fares raised, has almost completely rehabilitated the property, and has completely transformed public opinion from being adverse to the company to now being favorable," and "because he has won the confidence of everyone."

Mr. McLimont stated that efficient selling of the electric railway product will remove the necessity of government regulating bodies and will "remove from politics the use of the public services of the communities as political footballs."

Mr. Wood Bus Head

Manager for Receiver of New York Railways Elected to Guide Fifth Avenue Coach Company

Frederic T. Wood, who has been identified with the transportation development of New York City for more than twenty years and who most recently was assistant to Job E. Hedges, receiver for the New York Railways, has been elected president and general manager of the New York Transportation Company and the Fifth Avenue Coach Company. Mr. Wood succeeds John A. Ritchie, who resigned recently to become head of the reorganized Chicago Motor Bus Company and the American Motor Bus Corporation.

Mr. Wood brings to the Fifth Avenue Coach Company a wide knowledge of bus transportation, gained through years of trained observation and actual experience in New York City and in the principal capitals of Europe. He was trained in the same school of transportation as Mr. Ritchie and possesses the same aims and ideals. It is Mr. Wood's objective to carry on the same principles that have made the Fifth Avenue Coach Company one of the most talked of transportation systems in the country.

F. T. WOOD

Mr. Wood is a graduate of Williams College, through which he worked his way. He entered the transportation business twenty years ago with the old Interurban Street Railway at the office of the company in Christopher Street. That was in the horse car days. He has been identified with every progressive movement in transportation in the city since then and enters the motor coach field with a singular knowledge of the ways and means of constructing and maintaining a modern public service corporation. For the time being, at least, Mr. Wood also will fill the vacancy caused by the resignation of George A. Green, vice-president, general manager and chief engineer of the Fifth Avenue Company, who will join Mr. Ritchie in Chicago.

Mr. Wood is a trustee of Williams College and was president of the Williams Club for two years.

John Garrett Barry—*An Appreciation*

His Recent Appointment as a Vice-President of the General Electric Company Celebrated at a Dinner Given by His Friends as a Tribute to His Great Service to the Industry

ON Thursday evening at the Hotel Commodore, New York, a company of more than 175 men prominent in the electric railway industry gathered at a dinner given in honor of John Garrett Barry. It was a personal tribute from old friends, in celebration of Mr. Barry's recent appointment as a vice-president of the General Electric Company. It voiced a universal sentiment among the men both of the railways and the railway supply manufacturers, a recognition of the distinguished services which Mr. Barry has rendered to the industry during the twenty-eight years that he has been active in this field.

For Mr. Barry has been a great constructive influence in railway affairs. As a member of the executive committee of the American Electric Railway Association he has long been in the inner counsels and has helped to guide the organization and the industry through one of the most difficult periods of railway history. As one of the three members of the finance committee, created last year, he has been most instrumental in placing the association's management and operation on a real financial basis. He has been a great conservative force, a source of sound judgment, but above all else a strength in action, a power for getting things done. This is probably the outstanding characteristic of Mr. Barry's appealing personality, responsible in large measure for his remarkable success.

The story of Mr. Barry's career is an interesting one. He was born in Boston in 1868 and was graduated from the Boston High School at seventeen and went directly to work. Some five years later he entered the employ of the Thomson-Houston Company at Lynn in the training course of the construction department. After a year he went to the Boston office and in 1894 when the General Electric Company was formed he transferred to the railway department, then one of the two major divisions of the company. The problems and opportunities of these pioneer days in electric railroading appealed to Mr. Barry strongly. There was work to be done. There were obstacles to be surmounted. There were puzzling situations to be thought through, as in the creation of any new industry. He became intensely interested and set himself to the task of helping to solve these problems and to develop these opportunities with the belief that the street railway might be lifted through successful electrification to an entirely new plane of public service.

From that time on Mr. Barry has been a conspicuous figure in the evolution of this important branch of the electrical industry. He has a tremendous capacity for work, fortunately coupled with perfect health and a temperament that maintains a good natured poise, proof against the worry and excitement that drag down so many men. He possesses an ability to drive himself under close concentration. He is regular, systematic and rapid in his work and quick in his decisions. All this carried him ahead and in three years he was assistant manager of the department. By 1907 he was manager.

JOHN GARRETT BARRY

The business side of the industry attracted Mr. Barry more than the technical. The practical problems of organization, finance and management in these early days of expansion were ever present and here his sound judgment and clear vision served him and the industry well. Also he is a man of great human understanding and he has the wonderful gift of inspiring men to loyalty, enthusiasm and effort. He therefore soon developed marked organizing ability and strong qualities of leadership and in 1917 was rewarded with appointment to the position of general sales manager of the company, while still retaining the direction of the railway department. Then last June came the further advancement to a vice-presidency, after thirty-two years of service.

If there is one thing that has distinguished the work of John Barry, it has been this remarkable ability of his to get things done. Men turn to him in difficulties and he is ever ready to undertake the task if he feels its urgency and thinks that he can help. But he is a believer in facts. His experience in the affairs of the industry has been a broad one. And he draws on this experience for the knowledge on which he forms his well balanced judgments and supports his vision. Mr. Barry has, therefore, brought great impulse to the promotion of research and development. He has defended this fundamental of progress against the restricting influences of economy programs. And yet, though ready to spend money without hesitation in this creative work, his influence has ever been to steady and make sure. What interests him most, however, is always the practical opportunity to get some good thing done.

Mr. Barry's record is not one of spectacular high spots. He is distinctly the wheel-horse type, self-made. But linked with his great personal capacity for work is his broad human sympathy that has won him a host of friends who admire and love him and has given him knowledge of men. He is a good judge of what people will think and do. In fact, one of his great services to the American Electric Railway Association has been his almost unfailing ability to interpret the point of view of the manufacturers on matters affecting the industry broadly and to guide the councils wisely in the common interest. He is a strong man and he has been intensely occupied, but he has ever maintained the closest human contact with the men with whom he has been associated and devoted a large amount of thought and time to the encouragement and development of young men and the upbuilding of loyalty and higher ideals of achievement in any organization with which he has been connected. His promotion as vice-president of the General Electric Company has been called "the most popular appointment of recent years."

At the dinner Toastmaster Frank Hedley, president of the Interborough Rapid Transit Company, epitomizing the speakers of the evening, pictured Mr. Barry in these words:

> John Barry is a deserving boy from the East who has grown up and developed by his own personal energies. Those energies were recognized by his superiors, and they have put him up and up—not in order to help John Barry, but in order always to put the best man in the job. We regard John Barry as a real man among men.

Joseph K. Choate, vice-president of the J. G. White Management Corporation, said:

> Barry was not a technically educated man, but after he got through with his technical associates and then with those with whom he tried to trade, he became more of a technical man than those who tried to teach him that he was not a technical man.

Gerard Swope, president of the General Electric Company, said that people always knew where Mr. Barry stood. It was a great satisfaction to him when Mr. Barry was made vice-president, and this satisfaction was greatly increased when he realized the respect in which Mr. Barry was held in all parts of the country. J. R. Lovejoy, vice-president of the General Electric Company; Daniel W. Smith, Detroit; Charles C. Peirce, Boston; Judge Daniel Naylon, Schenectady, and Judge James H. Wilkerson, Chicago, also added their tributes.

Mr. Barry in replying said among other things that naturally he was greatly pleased with his promotion to the vice-presidency of the company, but he was still more pleased and greatly touched by the testimonial which had been extended to him at the dinner. He would regard the evening as one of the happiest experiences of his life.

Mr. Barry is a resident of Schenectady and has given generously to public work as president of the Board of Education and as Fuel Administrator of that district during the war. He is a director in the Schenectady Savings Bank and the Schenectady Trust Company and a member of the Board of Trade. He belongs to the Mohawk Club and Mohawk Golf Club of Schenectady, American Institute of Electrical Engineers, American Electric Railway Association and the Engineers', Bankers' and Lotos Clubs of New York.

Obituary

C. D. Meneely

Charles Dickinson Meneely, vice-president and treasurer of the Brooklyn Rapid Transit Company, died on Oct. 22 at his home in Hempstead of heart disease.

Mr. Meneely was born Aug. 11, 1860, at Watervliet, N. Y. He received his education at the Boys' Academy, Albany, and the Graylock Institution, Williamstown. He was graduated from Union College, Schenectady.

His first business experience he obtained under the guidance of his father in the firm of George R. Meneely & Son, manufacturers of railroad supplies at Watervliet. On Feb. 1, 1896, he came to the Brooklyn Rapid Transit as auditor. Four years later he was elected assistant secretary and treasurer and within a month became secretary and treasurer. He succeeded Col. Timothy S. Williams, who was elected vice-president the same day.

On Feb. 11, 1911, the new office of vice-president and member of the board having been created, Mr. Meneely was chosen by the directors to be its first incumbent. He also filled the position of treasurer. When the B. R. T. went into the hands of a receiver, Dec. 31, 1918, Mr. Meneely was retained by Lindley M. Garrison as treasurer for the receiver.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

The Convention Exhibits and the Progress They Typified

Manufacturers Concentrating on Equipment to Reduce Costs, Increase Safety, and Lessen Labor Expense—Complete Display Made of Both Cars and Buses—Maintenance Problem a Topic of Discussion

IN SIZE and variety the exhibits at this year's convention of the American Electric Railway Association met all expectations. The arrangement was particularly effective and the change of surroundings from that of previous conventions added a variety and newness that was pleasing to all. The large number of new devices shown indicated the serious consideration manufacturers are giving toward producing equipment for reducing costs, insuring increased safety and lessening the labor necessary for maintenance and operation. Car builders took advantage of this opportunity to exhibit the latest development in large, light-weight cars for one-man operation. One of the new one-man double truck cars of the Chicago Surface Lines was contrasted with one of the first Chicago horse cars. Exhibits of sweepers, work cars, etc., showed notable advances.

The display of buses and accessories was the most complete ever gathered at any convention. Seven manufacturers exhibited ten city type motor buses, five interurban coaches and two trolley buses, all of which were of the latest design. Comfort for passengers and easy riding were outstanding characteristics. These bus exhibits attracted considerable attention.

The trend of truck construction for electric cars was seen to be toward a simplification of parts and reduction in weight. Several new arrangements of truck brake equipment showed particular advances in simplification. Motor manufacturers laid particular stress on the development of small-sized motors and other equipment for light-weight double-truck cars, laying particular stress on the use of four small motors rather than two larger ones. Important features included light weight, large capacity, self-ventilation and increased strength of parts, due to the use of high-grade materials. Developments in control equipment were toward increased insulation at vital points and liberal contact surfaces to take care of arcing.

Exhibits of car equipment accessories reflected the increasing use of one-man operation and the resulting provisions for lessening the duties of the operator and for increased safety to passengers. Seat designs provided increased comfort for passengers. Electric heaters reduced the fire hazard over former types of such heaters and gave more uniform distribution of heat. Exhibits of slack adjusters, gear cases, brakes, brake rigging and trolley wheels showed advances toward reducing maintenance costs. The exhibits of door operating mechanisms and equipment, trolley catchers, trolley bases, and hand brakes, showed improvements for lessening the duties of the operator, particularly where one-man operation is used.

The exhibits of fare boxes, registers, change carriers, tickets, and the like were more elaborate than at previous conventions. Provisions for automatic instantaneous registration of fares and reducing the labor of the operator were outstanding characteristics. Thirteen displays of fare boxes of the lock and registering type, change makers, coin counting and separating machine, coin wrappers, ticket and fare registers, badges, etc., showed the completeness of the equipment available to lessen the labor and insure honesty in handling revenue received. Other exhibits of particular interest to those maintaining car equipment consisted of certain fixtures, doors, bearings, carbon brushes, headlights, lighting fixtures, shade holders, hand straps, destination signs, step treads, ventilators, window sash and fixtures, roof materials, side panels, paints, varnishes, wire and cables, fire extinguishers, lock nuts, bolts and washers.

The exhibits of shop tools were confined principally to small equipment, such as jacks, hoists, coil spreaders and winders, and labor saving equipment. Exhibits of sanitary and wash room supplies were very good.

Those responsible for the maintenance of track and line found much to interest them. Various exhibits of rails, substitute ties, special trackwork, and the like were very complete and showed developments to produce longer life with less maintenance. Equipment for track maintenance, such as welders, grinders, and rail benders showed particular advances. The display of overhead and line material offered many useful lessons. New designs of insulators gave increased protection from short circuits and extreme weather conditions. Combination railway and lighting poles showed the tendency toward reducing the amount of property installed on the streets. Exhibits of suspension line material contained everything used from the trolley ear to the section insulator.

Probably one of the greatest advan-

tages which came to those in attendance was from meeting manufacturing experts and through a discussion of problems confronting the men directly responsible for maintenance and operation.

G. H. Knutson Joins Spooner & Merrill

Spooner & Merrill, consulting engineers, Grand Rapids, Mich., announce a new partnership and the opening of a Chicago office in the Harris Trust Building. George Henry Knutson, formerly with the Harris Trust & Savings Bank, has assumed personal charge of the Chicago office as resident partner.

Mr. Knutson, it is understood, expects to confine his activities essentially to "experting," financing and refinancing of public utilities, although he will continue to carry on a general consulting engineering practice. In several respects the combination of talent as now embraced within the firm is an unusual one. Messrs. Spooner and Merrill are actively engaged in engineering, construction, rate work, appraisals and valuations, and practically everything along consulting engineering lines. Mr. Knutson will be actively engaged in financing, but in addition knows the consulting engineering field. In this way the firm as now constituted offers to investment bankers, trust companies and to industrial enterprises a complete service not ordinarily offered by the consulting engineer or banker.

Both Mr. Spooner and Mr. Merrill are natives of Grand Rapids, and both have degrees in civil engineering from the University of Michigan. Mr. Spooner has had a broad experience in civil engineering and valuation work and as an expert in engineering litigation. Mr. Merrill's work has, perhaps, been a little more closely confined to engineering work in the field. As for Mr. Knutson, he also was graduated from the University of Michigan. His experience has been especially broad, more particularly in the field of financial engineer, in which capacity he has reported on the impending purchases of utility properties and their security issues by bankers and then followed through to their conclusion the issuance of the securities, also looking after the details relative to the fulfillment of the provisions covering the items of sinking funds, reserve funds, maintenance provisions. etc.

Metal, Coal and Material Prices

Metals—New York	Oct. 24, 1922
Copper, electrolytic, cents per lb	13.812
Copper wire base, cents per lb	15.625
Lead, cents per lb	6.55
Zinc, cents per lb	7.35
Tin, Straits, cents per lb	35.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7.125
Somerset mine run, Boston, net tons	3.95
Pittsburgh mine run, Pittsburgh, net tons	3.25
Franklin, Ill., screenings, Chicago, net tons	3.25
Central, Ill., screenings, Chicago, net tons	2.00
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	6.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl lots), N.Y., cents per gal.	91.50
White lead, (100-lb. keg), N.Y., cents per lb.	11.625
Turpentine, (bbl. lots), N.Y., per gal.	$1.64

Rolling Stock

City Railway, Dayton, Ohio, is rebuilding fifteen of its class 100 cars for one-man operation. The new Cincinnati trucks will be used under these cars to replace Maximum traction trucks.

Grand Rapids (Mich.) Railway is converting seventeen of its closed cars for operation by either one man or two men. As soon as these have been completed it is intended to put an additional twenty cars through the shop for similar changes.

Norfolk & Western Railway Roanoke, Va., has placed an order, through its consulting engineers, for four double cab electric locomotives similar to those now in use on the Elkhorn Grade electrification. These locomotives will be equipped for operation over the alternating-current installation. The capacity of the new locomotive will be somewhat greater than those now in operation, but the design will still maintain the special feature of split-phase operation. The machine will be of the jackshaft and siderod type, weighing approximately 382 tons. This recent addition to the rolling stock is a result of the increased heavy freight traffic.

Track and Roadway

Everett, Wash.—The City Council has accepted a formal agreement embodying terms reached at an informal conference of officials of the city and representatives of the Puget Sound International Railway & Power Company, giving the company an extension of time on paving between tracks on Hewitt Avenue.

New York, N. Y.—The Transit Commission has authorized the construction of an elevated railroad station on the Broadway "L" of the Brooklyn Rapid Transit Company at Williamsburgh Bridge Plaza. The new station is to cost in the neighborhood of $300,000. Plans are now well advanced for the work. The commission has given instructions that they be completed as soon as possible, and that the necessary form of contract be prepared.

Trade Notes

Conveyors Corporation of America, 326 West Madison Street, Chicago, Ill. has appointed the George W. Fife Engineering Company, 1403 Merchants Bank Building, Indianapolis, Ind., its representative for the sale of American trolley carriers in the state of Indiana. The American trolley carrier is equipment for handling coal from railroad cars to bunkers, silos or open storage pile. It consists of an overhead monorail, with a trolley from which a 1-ton bottom dump bucket is suspended.

Dwight P. Robinson & Company, Inc., New York, N. Y., have been awarded a contract for the construction of a cement mill at Birmingham, Ala., for the Lehigh Portland Cement Company of Allentown, Pa. The mill will have a capacity of 1,000,000 bbl. a year.

M. C. McElligott, president of the Canadian Cleveland Fare Box Company, Ltd., Preston, Ont., who also represents the Universal Lubricating Company and other organizations in Canada, is understood to be prepared to take on several new accounts. Mr. McElligott put in more than twenty years in the electric business in the United States, so that he has a real practical knowledge of the business.

"War Surplus," just issued by the Sales Promotion Section of the Office of the Director of Sales, describes in a general way the methods of sale resorted to by the War Department in the disposal of its vast stocks of surplus property and tells what these stocks contain. A loose-leaf insert lists the more important sales scheduled for the near future. Catalogs of sales usually are ready for distribution two weeks before the date of the sale. Requests for catalogs should be made to the Chief Sales Promotion Section, Room 2515, Munitions Building, Washington, D. C.

New Advertising Literature

Sprague Electric Works, New York, N. Y., has issued Sheet No. 67,901, descriptive of the Sprague safety type panelboards and cabinets.

Ballard, Sprague & Company, Inc., New York, N. Y., has issued a twenty-page booklet describing the Ballard-Sprague chimney service and boiler settings.

Benjamin Electric Manufacturing Company, Chicago, Ill., is distributing a pocket catalog No. 23. The book is 5 in. x 6½ in., and contains 250 pages devoted to the illustration and description of the company's electrical products.

The Martindale Electric Company, Cleveland, Ohio, has issued a chart 10 in. x 14 in. showing causes and effects of carbon brush and commutator troubles. This chart is put up in a form which will be of great assistance in locating and correcting troubles on direct-current motors and generators.

Metal & Thermit Corporation, New York, N. Y., has issued the fourth edition of its Thermit Locomotive Pamphlet No. 21, which is of special interest to all railroad superintendents of motive power, general foremen, blacksmith foremen and Thermit welders. The new pamphlet contains many revisions since the last edition was published, chief among which are instructions for applying important improvements in practice in Thermit welding which have been developed by exhaustive research. The drawings and instructions illustrating and describing making Thermit welds in various parts of locomotive frames and other locomotive and railroad equipment have been completely revised since the publication of the last edition to conform to the improved practice.

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Factors Necessary to Determine a Just and Reasonable Wage

UNDER the transportation act, the Railroad Labor Board, in determining what is a just and reasonable wage, is directed to take into consideration the following seven factors:

1. The scale of wages paid for similar kinds of work in other industries.
2. The relation between wages and the cost of living.
3. The hazards of employment.
4. The training and skill required.
5. The degree of responsibility.
6. The character and regularity of the employment, and
7. Inequalities of increases in wages or treatment, the result of previous wage orders or adjustments.

Of these, the last five relate primarily to the conditions of railway employment, while the first two represent between them quite different bases for determining wages in any industry. When results derived from them do not coincide, greater weight must be given either to one plan or the other. How and to what extent to do this was the problem which faced the Labor Board in its decision on the question of the wages of the maintenance of way men this week. Both factors were considered by the board, which wisely declares it lays greater stress on the first basis or that of the scale of wages paid for similar kinds of work in other industries. Its decision also points out that an increase of 2 cents in the wages of the trackmen is thereby warranted, whereas under the cost of living plan there would be no increase because there had been no increase in the cost of living.

After all, the law of supply and demand is the one which practically will have to be controlling in any rising wage market, whether a company or labor board wishes to consider it or not. If men can secure higher wages elsewhere than in the case under arbitration, they will not stay on their old jobs simply because figures can be produced to show that they are receiving a "living wage." The law of supply and demand is also very much simpler to apply. Evidence varies as to the most fundamental facts of the cost of living method, namely, the average number of dependents and the average number of workers in a family, and a still greater problem is to decide the standard of living and the cost of it. One housekeeper can live well and save on a sum which would not be sufficient for bare living to another.

It is indeed well that the United States Labor Board had the conviction and courage to explode the appealing theory that the "cost of living" should be considered as a main factor in establishing wages before the hold of this theory upon industry should become any more firm. The weakness of this method is demonstrated by the efforts of labor so to increase the standard of living that wages should continue to climb despite the downward trend of prices of necessities. If the living-wage plan were sound it would have carried wages down just as it carried them up, and labor's experts would not have had to devise new standards of living to counteract natural laws. The standard of living should improve, to be sure, but not so rapidly as to wreck the industry in the process.

Incidentally, the increase in wages of the trackmen granted in Chicago and the increase in the steel wages made last summer call attention again to the growing scarcity in the labor market, particularly in the class called "common labor." In the past the greater part of the supply in the country of this class of labor has come from immigrants, particularly in recent years from Italy and other southern European nations. This supply has been largely cut off, owing to the present immigration law, and with the present increased business activity the lack of men to do unskilled work will seriously hamper industrial expansion hoped for in the early future. This does not mean that there need be a return to the old immigration limitations, which were largely educational. Some change, however, should be made to admit those who are able, by their entrance, to increase the national wealth as well as the opportunities for those in this country to serve in more skilled positions.

The Rotary Converter Must Look to Its Laurels

DURING thirty years, more or less, in the conversion of low-frequency alternating current to low-voltage direct current, the rotary converter has come gradually almost to monopolize the electric railway power field. It is a wonderful machine in its operation and has reached a high degree of perfection within its range of possibilities. Even at a frequency as high as sixty cycles and a d.c. voltage of more than 1,000 it performs well. The motor-generator, however, is still required to supplement it in high-voltage railway work, notably in railroad electrification, but the motor-generator has gradually retired from what has come to be recognized as the legitimate field of the "rotary."

While the rotary converter has been pursuing the even tenor of its way inventors have been endeavoring to produce a "static" converter with a view to eliminating the commutator and the bearings. The mercury-vapor converter has seemed the most promising possibility. This device has come into use for arc-lighting circuits and has been used for railway purposes also. The 5,000-volt experimental railway distribution installed on the Michigan Railway by the Westinghouse company in 1915 utilized this type of converter, it being well adapted to high-voltage work. The same company had used it on an experimental locomotive operated on the New Canaan branch of the New Haven Railroad during the preceding year.

Abroad the vapor converter is making real progress. Within the past few years it has been adopted by a number of tramways on the Continent and quite recently in Great Britain. Its present status was described in an extensive paper read at the Brussels meeting of the Union Internationale de Tramways early last month. The extent of its use will come as a surprise to many, and this use is in reality more extensive than the number and kilowatt capacity of installations will indicate to Americans because the power requirements of foreign tramways are relatively less than those of this country. The rotary converter has a real rival in the mercury device, which has noiselessness and simplicity, besides its non-rotative quality, to recommend it.

There has also appeared recently on the horizon a new possible rival of the "rotary" in the form of the high-power vacuum tube. The immediate field for this is in radio transmission, but there appears to be no limit to its ability to transform power from alternating to direct-current form. Its progress will be watched with interest, to put the case mildly.

All of this does not mean that present substation apparatus is going to be "scrapped" in the near future. There is a certain engineering appeal in a reliable piece of apparatus like the rotary converter. Its place in the electric railway field is being made more secure by the application of automatic control. In its favor also is a certain prejudice against what might be termed non-dynamic devices for power transformation. The mercury-vapor converter was invented many years ago and is still used to a comparatively small extent. The vacuum tube is in the future as far as large power is concerned, but its application to railway work, if it is applicable at all, is likely to be much more rapid than that of the mercury arc rectifier has been.

Pittsburgh Security Holders Successfully Placated

ONLY a week ago three questions intervened and threatened to delay the reorganization of the Pittsburgh Railways. Two of these had to do with financing and the third with the matter of the acceptance of the franchise conditions by the municipalities through which the road runs. All of them have now apparently been removed. A local financial institution has agreed to underwrite a new issue of securities to the amount of $5,000,000, and the holders of underlying liens have relented, as it were, and no longer insist that in the reorganization the priority of their liens remain undisturbed and that the Philadelphia Company act as guarantor of them. As a result the reorganization will proceed with one bond covering all the properties as a first lien and general refunding mortgage into which all the present mortgage securities will be merged on an equal basis as regards security, even if not ratably.

To Pittsburgh all this is big news. It is also big news elsewhere than in Pittsburgh. It shows a growing appreciation on the part of security holders of the fallacy of too stout insistence upon mortgage rights where such insistence may mean disintegration of a system and destruction of earning power that inheres in the operation of the system as a whole. The same spirit now shown in the Pittsburgh case was manifested in somewhat different form when the Manhattan Elevated Railway stockholders agreed to accept a scaling down of their lease guarantees as part of the program to save the Interborough. The same spirit has also been shown in the New Orleans reorganization. It is a manifestation that would appear to augur well for the impending reorganizations in St. Louis and Brooklyn.

Only Through Co-operation Can the Track Paving Question Be Settled

THAT municipal and electric railway engineers can discuss a mooted question without coming to blows was amply proved by the conference on street railway track paving held in Philadelphia recently under the auspices of the Engineers' Club of that city. There were three sessions of this conference, each filled with animated discussions of this one topic. There was thus ample opportunity to cover all disputable points in detail, and the men who attended the conference and who sent in written contributions to the discussions were in a position to bring out the vital topics because they were talking about their every-day experiences. While of course each side presented the argument from its own point of view, each was obliged to see the case from the other side. There was real evidence of a disposition to fairness, which is to be expected from engineers and is necessary to a solution of an engineering problem.

The Philadelphia conference emphasizes the fact that the design of electric railway track structure and the design of street paving have gone along side by side and very rapidly in recent years. There has been some co-ordination between them, but not enough. This is evidenced by the disagreement as to details which still persists. Obviously, as electric railways have in most cases been required to maintain the paving in the track area, their engineers have tried so to design the track structure as to minimize the maintenance cost and at the same time allow for a maximum salvage at such time as complete reconstruction becomes necessary. Municipalities have naturally concerned themselves principally with the paving outside of the track areas. Thus in the same street contiguous strips of paving are kept up by different interests, and peace can only prevail when there is close co-operation between them. While it is true that a track is an entity in itself it must also be recognized that in the street it is essentially a part of the paving. The whole must therefore be considered as an engineering unit whether it is viewed from the side of the highway engineer or the way engineer.

Forward-looking municipalities recognize the essentiality of street railway service and, therefore, the necessity for tracks in the streets. To the extent to which the city governments represent the thinking element of the population they are inclined to be square in connection with these tracks. The utilities, on their side, admit that tracks complicate the paving problem, but insist that, when the traffic which they handle is considered, they do not cause more street expense than is warranted by the taxes they pay. They are gradually convincing city governments that their enormous paving tax on top of the general tax is inequitable.

However, entirely aside from the question of tax burdens, which will in due course be properly adjusted, there remains the problem of proper adjustment of track and paving design to yield the minimum over-all maintenance expense. This exists whether the municipality and the railway pave their respective strips as at present or whether the city paves the entire street area. The engineers are the men who best understand the situation. If they will get together and determine the proper paving for any given case, their ideas will have much weight with their respective superiors. The Philadelphia conference is a move in the right direction. Another is the action of the American Society for Municipal Improvements in opening its membership to utility engineers.

Excavating Track in Chunks with a Derrick

Methods Adopted in Removing Old Track and Type of Construction Used for New Track in Connection with Reconstruction of Surface Tracks in Fulton Street, Brooklyn, N. Y.—Solid Concrete Construction with Steel Ties and Granite Block Pavement Was Replaced with Wood Tie Construction and Sheet Asphalt Pavement

BY R. C. CRAM
Engineer of Surface Roadway, Brooklyn Rapid Transit System

THE surface tracks of the Brooklyn City Railroad Company in Fulton Street, between Court Square and Flatbush Avenue, Brooklyn, N. Y., probably carry about as heavy car traffic as will be found in any one part of the country, as the traffic schedules call for the passage of 2,400 cars per day over each track. Meanwhile, vehicular and pedestrian traffic is particularly heavy. A description of some of the problems which were met in connection with the reconstruction of these tracks under such heavy operating conditions should be of some interest.

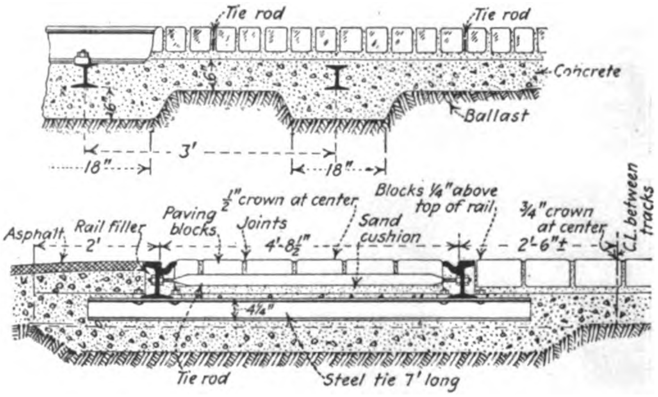
The old tracks were laid in 1908 some time after the construction in this territory of the rapid transit subway under Fulton Street. The tracks were laid in backfill about 18 in. in depth between the top of the roof of the subway and the sub-grade for the ties. The tracks were built of what is known as solid concrete construction using Carnegie steel ties, Type M, 7 ft. 6 in. long, spaced 3 ft. on centers with B. S. Co. 7-in. grooved girder rail, Section 112-284, the rail having been designed and rolled especially for the company. This form of construction is shown in one of the illustrations.

The joints were originally of the special riveted type which had some use in Brooklyn for a short period. This consisted of ⅞-in. x 4½-in. x 29½-in. bars riveted directly to the rail webs and held in place by sixteen rivets, eight in each rail end. These bars, as will be noted in one of the illustrations, did not provide for any bearing on the base or under side of the head of the rail, and the joints were so installed that a steel tie came immediately under the center of the joints.

When the rail was removed, there was still perhaps two years wear left in the head, but the groove had been so badly cut by the wheel flanges that it was breaking down. Meanwhile for the past five years there had been excessive expense due to replacements of the riveted joints, which had failed to stand up under heavy traffic conditions imposed. These conditions were primarily responsible for the track removal. The grouted granite block pavement had withstood the traffic in remarkably good shape and probably would have continued to do so for a long time to come. It was found that the renewal of the track was desirable in order to eliminate the excessive maintenance expense which the records showed. There were about 4,400 ft. of single track involved in the reconstruction work.

HEAVY DAYTIME TRAFFIC COMPLICATED RECONSTRUCTION WORK

The vehicular and car traffic conditions were such that all of the work had to be done during the night, because during the day the rush-hour traffic is much prolonged and daytime rerouting of cars could not readily be accomplished with any degree of satisfaction to the riding public. The highway and police regulations also made inadvisable any attempt to do daytime work of this nature in this street, which is the main thoroughfare in the principal downtown shopping district, and these tracks form the "neck of the bottle" through which all cars must pass in order to reach New York via Brooklyn Bridge. All of the operations consequently were carried on between the hours of 8 p.m. and 5 a.m., with an hour off for the men for lunch at midnight. It was required that new track be laid ready for traffic in the morning in place of the old track which was removed, so that regular service could be maintained without any interruption during daylight hours. During the above hours, car traffic fortunately could be diverted from both tracks without serious inconvenience to the public. Before the work was started, the public was notified of the diversion by car cards and by posters placed upon the elevated railroad columns along the street.



SECTION OF TRACK REMOVED FROM FULTON STREET, BROOKLYN

The principal difficulties in the work which naturally controlled its progress were the excavation of the grouted granite pavement and the removal of the old solid concrete track construction. Air-operated cutting tools and drills were used for cutting the sheet asphalt outside of the rails and for spotting holes in the concrete preliminary to the removal of the track structure proper. The air drills were used to break the concrete into sizes convenient for handling, which required a row of holes on the 2-ft. line outside the outside rails, together with a row of holes on the center of the devil strip. After these holes had been made, the drills were concentrated upon the concrete base in order to break it up. After the first night or two this procedure was found to be very slow, and steps were taken toward speeding the work.

At first, in the course of the removal of the concrete, jack holes were made and ordinary 15-ton track jacks were used partially to lift the tracks in order to permit manual separation of ties from the concrete. The rails had previously been cut by the acetylene cutting torches.

It was soon found that the work accomplished with

Reconstructing a Piece of Heavily Traveled Track in Brooklyn, N. Y.

No. 1. Air drill cutting cross trench in concrete between steel ties, acetylene torch cutting rails.

No. 2. Cross trenches finished; rails cut immediately above trenches.

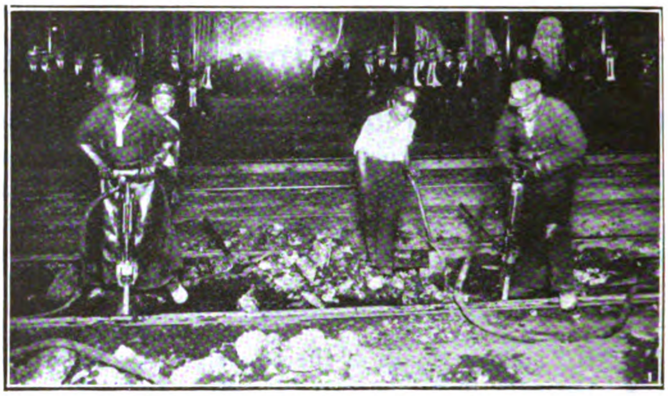
No. 3. Crane loosening a complete section of track from adjacent section, preparatory to loading.

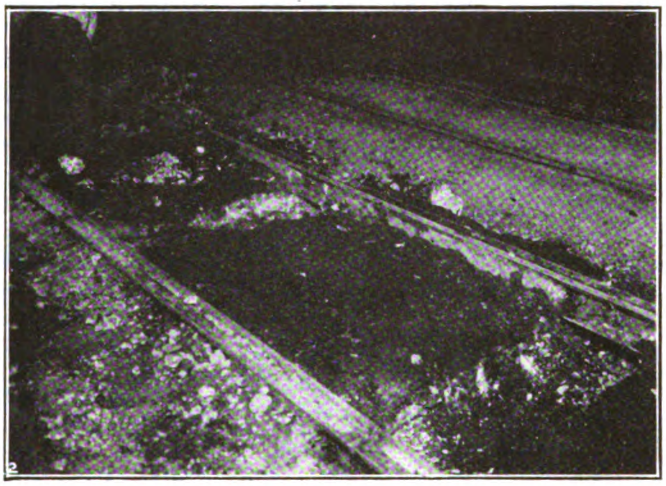
No. 4. Loading a section of complete track, with solid concrete foundation, upon the crane car.

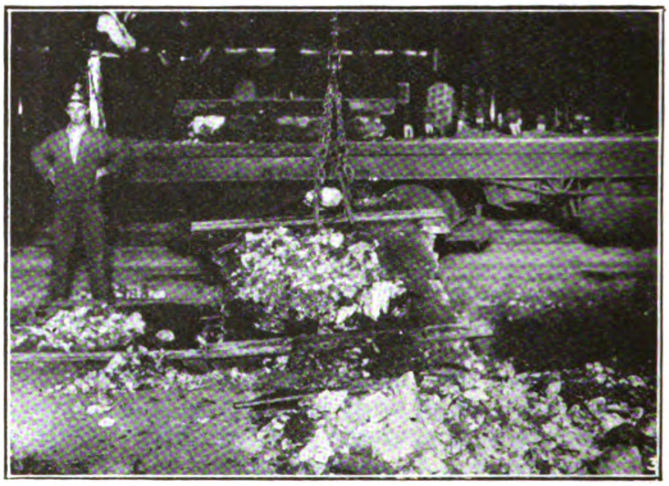
No. 5. Sub-grade is nearly ready to receive new ties when old track is removed.

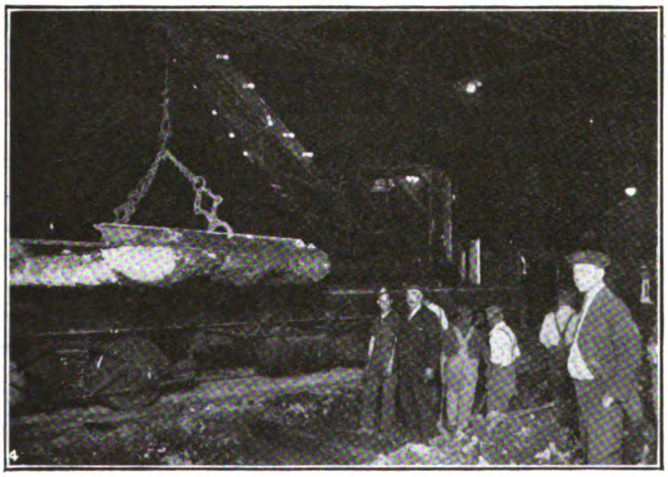
No. 6. One track laid ready for concrete. One track concreted ready for asphalt pavement.

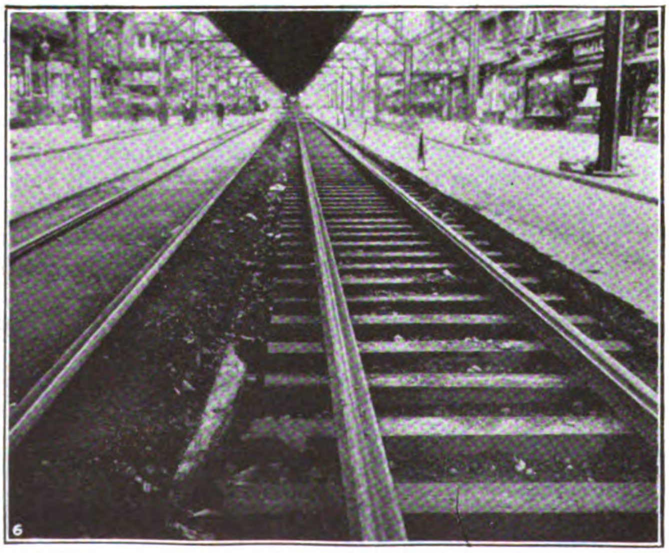
No. 7. Sheet asphalt laid in one track, in direct contact with association standard 7-in. girder grooved rails. Puzzle, find the cast-weld joint.

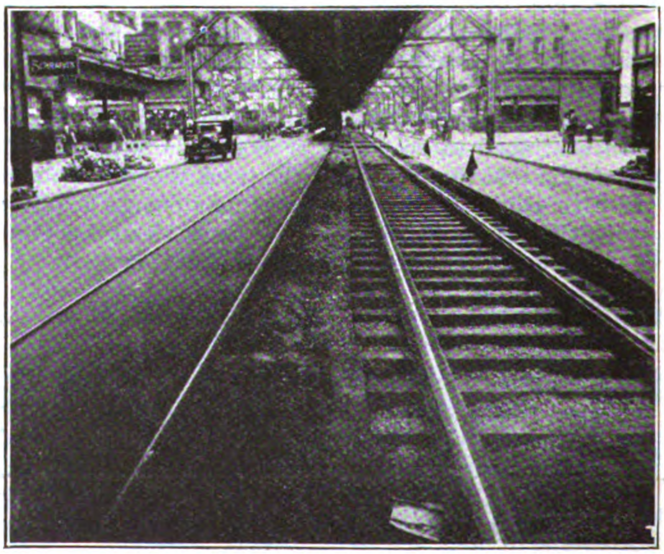












the use of ordinary track jacks was quite limited; therefore to secure increased production a number of 25-ton geared jacks were substituted. Two of these jacks with two men each, or a total of four men, accomplished as much work in a shorter space of time than did four ordinary track jacks with sixteen men. Even with this improvement in the method of breaking up and removing the concrete there was still some congestion and delay to actual laying of new track. This was caused by the time required manually to remove the concrete and either to load it upon work cars or place it temporarily upon the roadway for later loading; this in turn delayed the preparation of the roadbed for the new track.

The accompanying views clearly show how the excavation work was finally conducted, so that with a force of about half the men originally engaged upon removal of old trackwork proper, it was found possible to remove and lay three times as much track nightly as was done during the first few nights before the final removal method was in working order. This method ultimately resolved itself into the following procedure:

PROCEDURE AS DETERMINED BY EXPERIENCE

The air drills spotted holes on the 2-ft. line about 18 in. apart, and also made holes, as previously mentioned, on the center line of the devil strip at a similar spacing. Cross trenches in the concrete were then cut with the air drills, spaced about 9 ft. apart in order to include three steel ties. A jack hole was also made in the concrete in the devil strip at a steel tie about midway between the cross trenches. The rails were cut with the torches immediately above the cross trenches in the concrete. One geared jack was then placed in the jack hole, and the action of this jack was sufficient to loosen the entire mass over the sub-grade and to break the bond of the concrete between holes. The entire section of the first track removed was raised up by the jack sufficiently to permit the attachment of chains thereto, and a Brownhoist derrick then lifted the entire section from the street to the platform of the derrick car. After a certain number of these sections had accumulated on the derrick car, they were transported to a near-by flat car, upon which they were reloaded for removal.

When these work cars were completely loaded they were taken to one of the large dumps in an outlying section of the city and the entire mass was then pushed overboard by the regular pusher cars which are operated on this dump for the purpose of disposing of refuse of this kind. It will be seen that there was no attempt to salvage the rails or steel ties, as the cost for this would balance, if it did not outweigh, the value of the salvaged material.

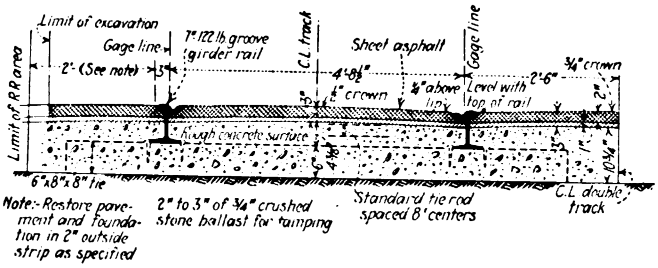
When a section of the old track had been removed in the manner described there was very little grading work necessary to prepare the sub-grade to receive the new track, although it was found desirable to furnish some ¾ in. crushed stone partly as a tamping material and partly as a means for filling up occasional excessive depths of the trench to reach the required sub-grade for the ties.

Upon the sub-grade thus prepared the standard 7-in. track construction, which is in current use in Brooklyn, was installed. This consists, as will be seen in the illustration, of association standard 7-in. 122-lb. grooved girder rails laid upon 6-in. x 8-in. x 8-ft. heart, rough-sawn yellow pine ties spaced 2 ft. on centers and spiked thereto with four standard hook-head spikes in each tie; standard ¾-in. x 2-in. x 60½-in. double-end tie rods were installed on 8-ft. centers. The rails were joined by means of standard cast-weld joints laid opposite.

THE ASPHALT PAVING WAS LAID IN DIRECT CONTACT WITH THE RAILS

Following the installation of the track the concrete was installed at the proper level for sheet asphalt pavement and extended from the base of the tie to a level substantially three inches below the tops of the rail heads. After the concrete had set a sufficient length of time the sheet asphalt wearing surface for the pavement was installed by the company's asphalt paving contractor and it will be noted, in one of the illustrations, that the asphalt was laid in direct contact with the rails, both inside and outside thereof.

In connection with the placing of concrete, considerable time and labor was saved in mixing by having the sand and gravel mixed at one of the yards and brought to the job in work cars. It was then only necessary to provide a chute, by means of which the material was transferred from the car to the hopper of the concrete mixer, the latter located on one track while the car with the concreting materials was on the other track. As previously noted both tracks were available during the night for construction operations, and this feature greatly assisted in the performance of the work.



SECTION OF NEW TRACK INSTALLED ON FULTON STREET

In connection with the removal of the grouted granite block pavement, good use was made of the Clark pavement plow for breaking up the pavement prior to its removal from the street, and advantage was taken of the plow toward the latter end of the job for removing the pavement in the space between the two tracks by means of a special sort of single-tree rigging which permitted the plow to be pulled properly by two cars, one on each track, and without causing damage to the draft rigging. Light for the night work was provided for by special five-light incandescent lamp clusters, suspended overhead from the elevated railroad structure which runs through Fulton Street.

TOTAL MAINTENANCE COST ON THIS TRACK EQUALED THE FIRST COST

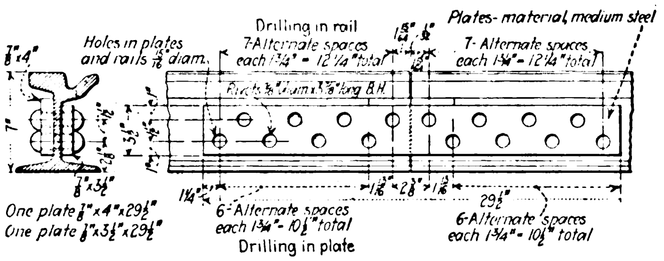
It has been stated that the old track was installed in 1908. Some interest may attach to the record of the maintenance cost up to the time of removal. During the first six months of 1922, the sum of $697 had been spent upon joint repairs, with the incidental paving cost included. A total of $51,217 has been spent in maintenance during the fourteen years the tracks were in service, and of this sum $41,593 was spent upon the joints and paving therefor. As the estimated cost of the new tracks was $51,050, it will be seen that maintenance has consumed an amount practically equal to the cost of renewal.

The average annual maintenance cost per foot per year has been substantially 89.6 cents. Meanwhile the standard 7-in. tracks, having cast-weld joints and wood-tie construction, show an average maintenance cost per foot per year of 10½ cents for an average age of seven and a half years.

The Carnegie steel-tie, solid-concrete type was abandoned in favor of the more resilient, wood-tie type. The experience with the two types in lines carrying the heaviest traffic, combined with carefully kept records of maintenance costs for each type, have seemed to indicate the wisdom of the selection of the resilient type, as fully meeting all requirements of most soil and traffic conditions found in Brooklyn. Meanwhile, there were other considerations which led to the conclusion that rebuilding with the standard wood-tie construction would be advisable.

THE SETTLING OF TRACK COMPLICATED RECONSTRUCTION

The question naturally arises as to why it was considered necessary completely to rebuild the track, having in mind the presence of the steel tie, concrete construction. In the first place, the tracks had settled in some places from 2 to 3 in. No good way has yet been devised to raise to grade tracks built in this manner after they have once settled. The means for raising might be found in special machinery, but questions as to how properly to backfill under the concrete base which is designed to be, and in fact was, very irregular underneath, and as to keeping the tracks out of service long enough to permit such an operation, even if feasible, seemed to weigh against the attempt.


Drilling in rail
Plates- material, medium steel
Holes in plates and rails 15/16" diam.
7-Alternate spaces each 1¾" = 12¼" total
7- Alternate spaces each 1¾" - 12¼" total
⅞"×4"
Rivets ⅞" diam × 3⅞" long B.H.
7"
3½"
⅞"×3½"
1¼"
29½"
One plate ⅞"×4"×29½"
One plate ⅞"×3½"×29½"
6-Alternate spaces each 1¾" - 10½" total
Drilling in plate
6-Alternate spaces each 1¾" - 10½" total

RIVETED JOINT USED IN OLD FULTON STREET TRACK

The scheme of placing shim plates of proper and varying heights upon the steel ties to raise the new rails to grade was considered. But the different width of rail base of the new rail, the necessity for redrilling the top flanges of the steel, the incidental fussing with removal and replacement of concrete around the steel ties all worked against this idea. The worn areas found in the tops of the steel ties under the rail bearings in the vicinity of the joints would also have made it a difficult matter to install wider rail bases on the same ties.

The installation of a deeper rail without the shims did not seem advisable, as the varying grade defects could not be overcome in this manner and there would still have been trouble in redrilling the steel ties. And joints, if an attempt had been made to rerail on the old steel ties, would also have given trouble either on 7-in. or 9-in. rail, as one of the difficulties in maintenance has been due to the inability properly to fasten the rails to the ties at the joints when replacing joints which had failed. Further, the standard cast-weld joint could not have been installed without replacing the steel ties, which in turn could only have been done with several attendant difficulties and at the same time with little assurance that adequate support would be provided for the joints.

Electrification of Austrian Roads Planned

The Serious Need for Coal, Which Must All Be Purchased at High Prices from Other Countries, Is the Controlling Factor in the Determination to Change from Steam to Electricity

BY DR. RUDOLPH MOSSMAN
Secretary Traffic Ministry of Austrian Federal Railways, Vienna

WHILE the new Austria, established upon the ruins of the former Dual Monarchy of Austria-Hungary, has 23 per cent of the population of the former monarchy, it has only about 1 per cent of its former coal resources. It is therefore necessary to import the required supply at high prices from outside. The Czecho-Slovak Republic, formerly a part of the monarchy, is now the main source of coal supply. During the first nine months of 1921 the import of coal and coke alone amounted to 70 per cent of the total imports. The import of coal and power fuel represents the main liability of the Austrian trade budget.

One of the most important problems of the Austrian Republic is, therefore, to utilize the many existing watersheds. It is estimated that the requirement of 13,000,000 tons annually of imported coal can be reduced to 8,000,000. The most urgent request for hydro-electric energy was made by the railways, with their very difficult mountain roads.

After careful investigation by a special committee, the National Council decided, in July, 1920, on the electrification of the Austrian railways. The plan contemplates the electrification of the main line Innsbruck-Bregenz-border, including all its branches in Vorarlberg, Salzburg, Schwarzach, St. Veit, Spittal, Millstätter Lake, Steinach, Irdning, Attnang and Puchheim, covering the period to June, 1925.

For this electrification the law provides 5,096,000,000 kronen, with provision for securing the capital by means of long-term loans. For this work it was expected to obtain foreign capital.

The selection of these lines for electrification was due to the topographical character of the country through which they run. The land slopes gradually from the high Alps in the west in an easterly direction, diminishing at the same time the output of possible water power plants. Large hydro stations can be erected in the west for exclusive railway use, but in the east power stations must be built to cover both the requirements of the railroads and those of other power consumers. Power centers are now being provided in the east, with the aid of the best Austrian engineering talent, primarily to supply Vienna. These include the Styrian, the Upper Austrian and the Viennese water power companies. Here, too, are excellent opportunities for foreign capital.

In connection with the building activities in the east, the electrification of the main line Vienna-Linz-Salzburg has already been considered. But the most urgent necessity for electrification now is that of the western mountainous Alpine roads, with their steep grades, many tunnels and large coal requirements.

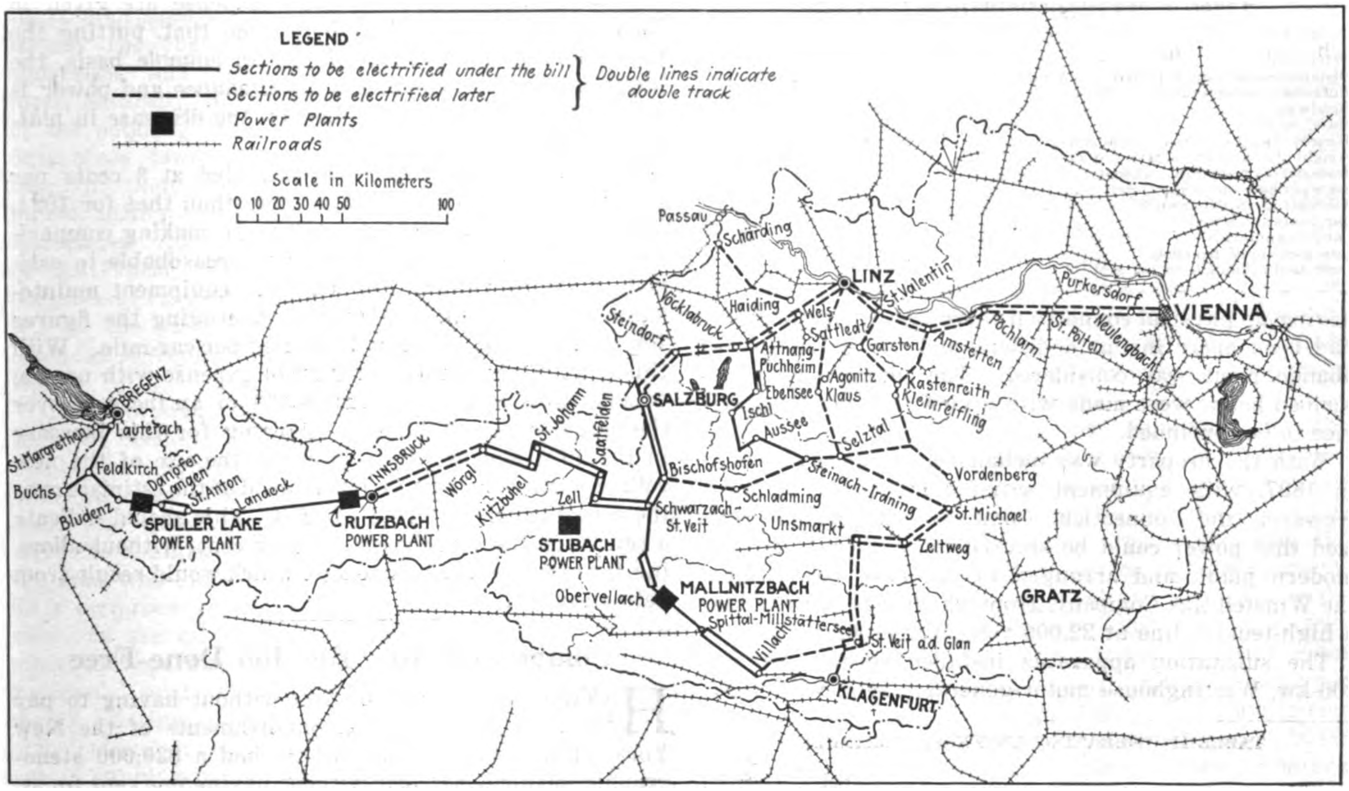
Power for these lines will be generated in stations built by the Federal Railway Administration at the Spuller Lake, west of Innsbruck, near the Danöfen station in Vararlberg, and by means of additions to the Rutz power house near Innsbruck. The power supply for the lines east of Innsbruck (Wörgl), such as the

Salzburg-St. Veit-Wörgl and the Schwarzach-St. Veit-Spittal-Millstätter Lake-Villach, will be furnished from the stations in the Stubach valley and on the Mallnitz at Obervellach.

The work on the Spuller Lake development is progressing rapidly and is expected to be finished toward the end of 1923, so that the electric traction on the line Landeck-Bludenz should be possible in the spring of 1924. The additions to the Rutz plant are expected to be finished this fall.

The power house on the Mallnitz near Obervellach is a high pressure plant with a head of over 1,000 ft. It will produce 20,000 hp. The station is located directly on the railroad.

The Stubach plant is located between Tauern-Moosboden and Enzingerboden in the Grossglockner region, and is fed from an artificial reservoir. This plant will be an accumulation and peak load station, and will contain six 4,000-hp. turbines.


LEGEND
Sections to be electrified under the bill
Sections to be electrified later
Double lines indicate double track
Power Plants
Railroads
Scale in Kilometers
0 10 20 30 40 50 100
Passau
Schärding
LINZ
St. Valentin
Purkersdorf
VIENNA
Neulengbach
St. Pölten
Pöchlarn
Amstetten
Haiding
Wels
Vöcklabruck
Steindorf
Sattledt
Attnang-Puchheim
Garsten
Agonitz
Klaus
Kastenreith
Kleinreifling
Ebensee
Ischl
Aussee
Selztal
SALZBURG
BREGENZ
Lauterach
St. Margrethen
Feldkirch
Buchs
Bludenz
Dalaas
Langen
St. Anton
Landeck
INNSBRUCK
SPULLER LAKE POWER PLANT
RUTZBACH POWER PLANT
Wörgl
Kitzbühel
St. Johann
Saalfelden
Zell
STUBACH POWER PLANT
Bischofshofen
Schwarzach-St. Veit
Schladming
Steinach-Irdning
Vordenberg
St. Michael
Unsmarkt
Zeltweg
Obervellach
MALLNITZBACH POWER PLANT
Spittal-Millstättersee
Villach
St. Veit a.d. Glan
KLAGENFURT
GRATZ

AUSTRIAN RAILWAY LINES SCHEDULED FOR EARLY AND LATER ELECTRIFICATION

THE ELECTRIC MOTIVE POWER

Four different types of electric locomotives will be provided under the present program: (1) The heavy mountain express type "1C-C1," continuous rating 1,850 hp., with a normal speed of 30 m.p.h. Seven of these are being built. (2) The freight type "E" for heavy trains, rated 1,000 hp. at 19 m.p.h. speed. Their maximum output will be 2,000 hp. Twenty of these are being built. (3) The light express type "1C1" for passenger and freight service, rated 870 hp. at 30 m.p.h. speed and a maximum output of 1,500 hp. Each two of these may be combined to one double unit to haul heavy trains. Twenty of these are being built. (4) The express type for medium grades, "1D1" or "1B-B1" of 1,800-hp. continuous rating and a maximum speed of 50 m.p.h.

Due to the depreciation of the Austrian kronen and the considerable increases in the prices of material and in wages, it was impossible to maintain the planned building program to its full extent with the federal funds. The activities on the Mallnitz and Stubach power stations, in particular, had to be delayed. Effort was concentrated on the Spuller Lake and the Rutz work, which was well along. Unfortunately, this will delay the completion of the electrification program which was expected during 1925.

SUPPORT FROM FOREIGN COUNTRIES DESIRED

As this is written Austria has not taken advantage of the granted right to make an electrification loan, but will no doubt use the promised, but not yet liquidated, credits from England, France, Italy and Czecho-Slovakia in the above-mentioned hydro-electric program. The electrification program is to be carried out on a sound commercial and economic basis; the excellence of Austrian hydraulic and electrical talent and the energy of the struggle of the young republic of Austria toward economic freedom all lead to the hope that the activities of the Austrian Republic will be supported also in foreign lands, especially in the United States.

Forms Part of Congress Records

THE editorial in the issue of this paper for Sept. 2, 1922, entitled "The Rio Engineering Congress and the American Electric Railway" has been made a part of the records of the congress, by vote of the publications committee. The editorial pointed out the reasons from an engineering standpoint for close relations between the electric railway engineers in South America and North America, and particularly the interest which South American electric railway men should take in the efforts being made in North America toward the establishment of electric railway standards.

Revamping an Interurban Line

Connecticut Company Operates Lines Between Torrington and Winsted, Detached from Main System—Recent Improvements in Power Facilities and Rolling-Stock Have Brought About Substantial Savings—One-Man Double-Truck Cars a Feature

IN JUNE, 1907, the New York, New Haven & Hartford Railroad purchased the Torrington & Winchester Street Railway, a line consisting of about 11.3 miles of road between Winsted and Torrington, Conn., and 1.14 miles between the main line and Highland Lake. This property is now owned by the Connecticut Company, but is operated independently of the rest of the system, having no physical connection therewith. This property had been operating at a deficit, and the possibility of abandonment was considered. The improvements described below were made with a view to permitting service to be continued.

TABLE I—SERVICE CONDITIONS COMPARED

	Actual 1921	Anticipated 1922
Distance round trip, Torrington to Winsted, miles	22.60	22.60
Running time—terminal to terminal	1 hour	45 minutes
Headway	1 hour	1 hour
Speed, m.p.h.	11.30	15
Weight of single-truck car (summer), lb.	17,000	....
Weight of double-truck car (winter), lb.	37,000	26,000
Seats per hour one way, summer	50	48
Seats per hour one-way, winter	40	48
Kilowatt-hours per car-mile	1.42	2.0
Car-hours annually	20,961	20,961
Car-miles annually	216,900	216,900
Increased speed, per cent	....	33⅓
Decreased running time, per cent	....	25

With the property was included a power plant, built in 1897, with equipment satisfactory for that time. However, the Connecticut Company management realized that power could be secured more cheaply from a modern plant, and arranged to purchase power from the Winsted Gas Company, from which it is secured over a high-tension line at 22,000 volts, three-phase.

The substation apparatus installed consists of two 200-kw. Westinghouse motor-generator sets, with three 125-kva. transformers. Much of the apparatus is of the outdoor type.

TABLE II—OPERATING EXPENSES COMPARED

	Actual 1921	Anticipated 1922
Total maintenance of way and structures	$10,030	$10,030
Total maintenance of equipment	5,862	6,507
Total Power, based in both cases on new substation being in operation and power purchased at 3 cents per kw.-hr	9,240	13,014
Total conducting transportation, exclusive of wages of motormen and conductors	2,427	2,427
Annual platform expenses	23,341	13,625
Total traffic (credit)	166	167
Total general and miscellaneous	5,216	5,216
Total operating expenses	$55,950	$50,652
Decreased operating expenses	....	5,298
Interest and depreciation on new cars (15% of $30,000)	....	4,500
Annual saving	....	$798

The new equipment cost about $20,000, and energy is purchased for 2½ cents per kw.-hr. The company estimates that, using the fiscal year ending Dec. 31, 1921, as a basis, the cost of energy for the current year will be about $10,000. Adding interest at 7 per cent and depreciation at 4 per cent on the new equipment, the total cost of energy for the year will be $12,000. In 1921 the cost for power was $19,800. As the total operating expenses for a year are estimated at $66,000, the change mentioned will save the company 11.8 per cent of the operating expenses.

While the rehabilitation of the power supply in this case is important, the change in rolling stock is also a feature. The company purchased three double-truck one-man safety cars, of which the details were given in the Feb. 18, 1922, issue of this paper, page 576. These cars are heavier than the old single-truck open cars which were used, but are lighter than the old double-truck cars.

The accompanying tables give details of the actual figures for operation in 1921, and the anticipated results for 1922.

Table I is based on the assumption that the car-miles and car-hours for 1922 will be the same as those for 1921. On the basis of actual operating expenses for 1921, a saving of about $800 results in addition to the improved service.

Detailed figures for operating expense are given in Table II, from which it will be seen that, putting the power end of the proposition on an equable basis, the increased cost for equipment maintenance and power is expected to be more than offset by the decrease in platform expense.

Equipment maintenance is estimated at 3 cents per car-mile for 1922, which while more than that for 1921, is much lower than that for 1920. In making comparisons, therefore, it would seem more reasonable to estimate a saving rather than a loss in equipment maintenance, which would be shown by averaging the figures for 1920 and 1921, giving 3.27 cents per car-mile. With this change, the equipment item of expense with normal expenditures would be about $6,860, or an increase over the actual of about $1,000. Allowing for this increase in the 1921 expense, the saving by the use of the new rolling-stock would be $1,798 instead of the estimate over the actual expense of 1921 of $798. This should indicate a return on the investment of 6 per cent, without allowing for any increased patronage which would result from better service.

Commission Has Big Job Done Free

HAVING work done for you without having to pay for it is one of the accomplishments of the New York Transit Commission, which had a $20,000 stenographic job done last year without paying one cent for it. Chairman McAneny and Secretary Walker have been receiving congratulations over this unusual feat. This is how it happened. A year ago the secretary of the commission advertised for bids for making three mimeograph copies and twenty printed copies of all important hearings. The contract provided that the contractor could sell to outsiders copies of the proceedings at 10 cents a hundred words, the contractor to give to the commission a rebate of 7 cents out of the 10 cents.

The rebate on the year's work paid the entire cost of the work and left a balance besides. In short the General Shorthand Reporting Company, which did the job, actually paid for the privilege of doing the work for the commission. Jay McNamara, the manager of this company, found a sufficiently large number of private customers who wanted copies of the commission's findings. His customers became numerous enough so that he made money for the city and probably a little for himself. He explained to the commission that nothing was owed him inasmuch as the rebate account exceeded everything charged against the commission. Secretary Walker, in commenting on the work, praised Mr. McNamara for his expert service.

A Four-Page Résume of the Four-Day Chicago A.E.R.A. Convention

A Tabloid Review of the Important Thought Advanced During the Recent Annual Meeting, Designed so that the Busy Executive May Gain by Thirty Minutes Reading a Comprehensive Idea of All that Took Place

SO MUCH takes place in the short space of four days among the several affiliated associations at the annual convention of the American Electric Railway Association that it is impossible for one attending the meetings faithfully to comprehend the full scope of the proceedings because of the several simultaneous sessions. Furthermore, it requires considerable time to acquire an idea of all that took place from a study of even the much-condensed account published in the *Electric Railway Journal*, for this report of the recent Chicago convention filled 103 pages. The verbatim report published by the Association later will run into many hundreds of pages. Hence the purpose of what follows is to give in the space of four pages an extremely brief but comprehensive résumé of the important thought advanced and business done at the convention in the American, Transportation and Traffic, Engineering and Accountants' Associations. A summary of the proceedings of the Claims Association was published in the issue of Oct. 21, page 663, as prepared by Retiring President Cecil G. Rice.
—*Editors.*

IF THERE was any one topic that stood out as a major interest in the deliberations of the American Association, it was that of public relations. There was a symposium of short addresses on it; it was largely the theme of several addresses, and the principal topic, naturally, in the meeting of the publicity men who took first steps toward the formation of their group into a public utility division of the Associated Advertising Clubs of the World. The great importance of cultivating the good will of the public was emphasized all through the convention.

It was brought out that harmonious conditions must be established between the man who puts up his money, the man who gives his time and effort to running the road, and the man who rides and pays money for these services. This reciprocal relationship can never exist until public relations are on a broad and proper basis. Furthermore, the operation of public utilities can never be so successful as it should be until the situation now commonly existing is changed, whereby a man on the outside looking in on a company's business has the final say in running it. Instead he must be on the inside and assume the full responsibility that goes with the job. If the man outside thinks he can run the road better than you can, and will pay you back what you put into the proposition, let him run it.

This was not an advocacy of municipal ownership, but the conclusion of M. C. Brush, formerly a leader in the industry, but now out of it and therefore feeling free to express his views candidly on the need for the public in pursuing regulatory control to be financially interested in the outcome of it.

Keeping local organizations informed of the true circumstances with respect to the electric railway was cited as an effective approach to better public relations. They constitute a means of collective bargaining with the people just the same as the union does with employees. The value of newspaper advertising was emphasized. As to the perplexing question of how much money it is good business to spend on advertising, the thought was put forth that the average street railway can, with advantage to the company and the community served, spend 1 per cent of its gross earnings on paid advertising.

Gaining the confidence and co-operation of employees and then to reach the public through them was much emphasized as an essential and also effective means of winning good will. The value of the window signs, the poster in the carhouse, the pay envelope stuffer, and other company mediums, were extolled as effective methods for educating employees and public. Company publications were also shown to be very useful in cementing and holding together the company, customers and employees. Publication of commendations for employees in the company publication stimulates employees to a desire to please patrons. A word from a pleased customer is the most valuable form of advertising a company can get.

Another approach to the people is through the daily story of the street cars carried in the news columns of the press. It is vitally important that the press publish the facts concerning the electric railways, and to this end facts must be supplied. Neglect to make provisions for seeing newspaper reporters when they call was considered inexcusable. If the executive is too busy to meet the reporters regularly himself, he should assign to some responsible member of his organization the duty of doing so. Editorial expressions are based on statements that first appear in the news columns. The editor reads his own paper and his competitors'. His opinions are formed in the same manner as those of the casual reader from the information printed. If this information is false, incomplete, confused or biased, then the opinions that later will find their way into the editorial columns will be fallacious, inadequate, harmful in their effects.

State public utility information committees were shown to be very successful in their work of disseminating traction information through matter supplied to the newspapers. And finally, public speaking was shown to be a most effective means of reaching the news pages of the newspapers. The rotary clubs, merchants' associations, etc., are glad to have representatives of electric railways come and talk about a subject that interests everybody in the community. As a result they come to think of the street railway as a personality, and besides thus creating a sympathetic understanding, the newspapers will print a speech where they would ignore the same thoughts sent to them as contributed matter. And to get the most value of a talk of this kind, from the advertising standpoint, it should be written out in advance and given to the newspapers to be released when the address is made.

In regard to the general business situation, H. A. Wheeler, a Chicago banker and formerly president of the United States Chamber of Commerce, said that "there is more money for investment available now than ever before in the United States. There is nothing unfavorable in the business situation. The electric railway business has bridged a period of great distress and has come into easier conditions of operation. But there is no assurance of freedom from political interference."

Carl D. Jackson, chairman Wisconsin Railroad Commission, brought out in his address how paving burdens, excessive taxes, unregulated competition, and other obstacles to the giving of good service are to the detriment of the rider. He also laid stress on the importance of co-operation between regulatory and taxing bodies.

Hon. Walter W. Warwick, former Comptroller United States Treasury, advanced the thought that perhaps the best opportunity to secure the large amount of new money required by the electric railways each year is to go to the plain citizen, the man of small means, who went into the investment business in large numbers during the war and now is ready to invest money got out of government securities, or additional savings, in something else. This man is the man for the electric railways or any other vital industry that needs new money and friends. But this plain citizen wants something more than a promise to pay if all goes well. He wants first of all to know all about your business, just as he did about the Liberty bonds when he invested in them. The railway having won his investment, he will stand with you and fight with you as long as he is convinced that your methods are honest. If you want to sell this plain citizen, it is best to be prepared to talk his language. The average financial statement goes over his head, and some one who talks plainly will get his support and his money.

THE CONVENTION THINKING ON THE BUS

In the course of his address, Mr. Warwick made reference to the bus problem and expressed confidence that the electric railway is in no danger of displacement. He said that electric railways have been, and they will remain, our chief means of local transportation. He did not expect to see street cars supplanted by buses. The latter are efficient for light traffic, but they cannot serve mass transportation. The experience in England has proved this, he believed. Buses give way to tramways wherever traffic increases to a point to warrant it. He said he doubted if any large American city could handle its traffic with buses exclusively; certainly not at a reasonable fare.

Mr. Brush addressed the convention pointedly on this subject and reminded the members that they are transportation men, not merely electric railway men. "You, gentlemen, are experts in managing transportation," he said. "You ought not to sit by and let any beggar buy a truck and put some seats in it and go into this business as a novice, merely because you say the people have got to ride in your cars. The transportation manager should not hold any such idea, because it cannot be done. Therefore, I want to say that I want to see the men whom I have known so well for so many years become 'transportation men' and undertake successfully to furnish that character of transportation which the people want and for which they will pay enough to insure a fair return on the amount of money invested in the business. It is immaterial whether this transportation be by airplane, electric bus, perpetual motion machine or anything else. . . . I do not care whether people ride in buses or wheelbarrows, but why permit these parties to come in and undertake to furnish something which you have been trained to do throughout your lives and to embark in competition with your business, in which you are expert?"

The committee on trackless transportation took the position that all of the transportation requirements of any community should be furnished by one agency and that that agency should be the electric railway company. The public has already been convinced to a large extent that this business is a natural monopoly, and hence it is the duty of electric railway men, as public servants charged with the responsibility for conducting the highway transportation, to study and consider the availability of every feasible unit or method for furnishhing this service. The committee also stated that while it recognized that the electric car running on rails is the most reliable and economical method of urban, suburban and interurban travel, especially for mass transportation, there is, however, a field in transportation in which the railless vehicle can furnish service satisfactory alike in operation and economy. This applies where the traffic is so light that the higher cost per passenger while operating the bus is offset by the relatively high fixed charges per passenger which result from the electric railway's investment in tracks. The possibility of utilizing the motor bus or trackless trolley should therefore be kept in mind by electric railway operators, the committee admonished, either where they are confronted by the necessity of extending transportation service into sections where traffic will be light, or in the economically similar situation of being required to rebuild tracks on a line where the traffic is too light to warrant the new track investment. In the latter case, the economic procedure might be to abandon the track and install bus service.

In considering the effect of bus service upon the financial situation of the electric railways, the committee concluded that if the services of both means of transportation are co-ordinated, the net return of each will be reflected in the net return of the electric railway. Part of the new capital required annually in the operation of a street railway may well be used in the development of trackless service in the field above mentioned. Present investment in the electric railway is thereby conserved, the growing demand for service met, and the return to the investor stabilized. In addition to the function of supplementing street railway service at the same rate of fare, there exists in some of the larger cities a demand for a transportation service at a higher rate of fare which shall insure a seat for every passenger.

A Pacific Coast railway man had found from his experience that in addition to whatever benefits may be derived from an electric railway company putting money into the stage business itself, the greatest benefit is that which comes from co-operation with the independent stage men. In Seattle the railway company has adopted the policy of owning the trunk line facilities, both interurban and stage, and of offering facilities to independent operators at the various terminals, such as ticket facilities, joint advertising of schedules, etc. As a result there has been a great use of these depots by independent operators who bring in large numbers of passengers to the interurban lines. This has produced an improvement of 40 per cent in the net earnings of the interurban in the past six months.

The example thus set by the interurban has meant more money for both railway and stages and has generally improved the whole transportation situation of the community.

The motor vehicle regulatory law developed by a committee for proposal as a uniform law throughout the country suggested the levy of taxes for the use of the highways on a ton-mile basis, the rate to be lower for pneumatic tired vehicles. It would also require liability insurance and a bond conditioned on the payment of all fees, taxes and charges due the state. Safety of vehicles, twenty-one-year-old drivers, a speed limit of 25 m.p.h. for passenger buses and 20 m.p.h. for freight trucks would also be required. One prominent executive in discussing this proposed uniform law pointed out that any regulation which may seem to impose heavy burdens upon the motor carriers may some day come back to plague those railways who go into the business themselves.

The committee on valuation reported that the most recent decisions uphold "fair value of the property at the time of inquiry" as the proper basis for rate making. As a result of the committee study, the association took the position that the yardstick method of valuation be employed wherever applicable, that endeavor be made to complete arrangements with the National Association of Railway and Public Utilities Commissioners for a search for broad fundamental principles of valuation, and that a study be made of price trends and a method worked out by which they may be used in determining fair value of the property.

In the matter of federal taxation the association decided on the policy that any sales tax passed by Congress should follow the example of the French and Canadian acts and exempt regulated industries, and that it should provide sufficient revenue to enable the elimination of the existing surtax and excess profits tax on individual and corporate incomes; that on the question of the normal income tax the public utilities should urge that this should not exceed the present rate; that any tax on undistributed earnings of corporations should be so worded as not to apply to earnings which are reinvested or held for reinvestment in the property within twelve months after the year in which they accrued, or which, together with the earnings distributed, do not exceed say 10 per cent return on the value of the property; that in the event the sales tax is not passed, an attempt should be made to have reduced the very high registers of the surtax on personal incomes on the ground that the present registers are so confiscatory that they are defeating the purpose for which they were created.

The work of the committee on education urged the desirability of co-operation with institutions of learning in arranging summer work on electric railway properties for students as part of co-operative courses; that the supervisory forces on an electric railway be given instruction in the fundamental economic problems of the industry in general and of the property employing them in particular; and that Americanization work be taken up among employees who do not speak English; and finally that there should be provision for instruction in courtesy to the public.

ACTIVITIES OF THE ACCOUNTANTS' ASSOCIATION

The Accountants' Association laid particular stress upon the wisdom and advantage of using the budget system in making expenditures. The need for forecasting revenues and expenditures for the period ahead was considered essential to businesslike and economical operation of a railway system. One of the greatest activities the Accountants' Association can follow was considered to be to work out a proper system of accounts for depreciation. The Accountants' Association, in conjunction with the public relations committee of the parent association, is working with the Interstate Commerce Commission in the endeavor to establish proper rules for depreciation.

The Accountants' Association heard a very able paper which developed the fundamentals of scientific accounting. It also held a joint meeting with the Engineering Association and discussed methods of instituting better co-operation between engineering and accounting departments.

TRANSPORTATION AND TRAFFIC ASSOCIATION

The program of the T. & T. Association was an epitome of the work of the transportation manager. The committee reports and papers discussed the three fundamentals of transportation; first, supplying the means of transportation service, i.e., the best type of car and the best type of platform employee; second, providing that the car shall run through the streets safely but rapidly; and third, inducing the public to patronize the service thus presented.

Recognizing that the natural tendency of any producer is to view the problem of the best way of selling his service rather too much from his own standpoint, the association wisely followed the plan of last year in asking some one from outside the association to talk on this phase of the work. Last year the association secured the viewpoint of an expert salesman, W. L. Goodwin, general manager Society for Electrical Development, who argued in favor of the establishment of a sales organization on each property. This year Edward Hungerford also made some valuable suggestions. His points related primarily to publicity and public relations, and may be summarized by the advice to make the goods for sale attractive, even to the point of meeting the prejudices of the purchaser if they are not too unreasonable. In other words, if the purchaser thinks more about the shape and color of the package in which the goods are supplied, as, for example, if he wants tickets sold in advance, it is good policy to accommodate him, even if no actual reduction in fare is made. Other valuable suggestions were made in the report of the committee on merchandising transportation, and then the meeting ended with the round table on the weekly pass. The most striking feature of this discussion was the satisfactory results noticed on each property using the pass.

The report and discussion on traffic regulations emphasized the revolution effected in street movement and occupancy by the general use of automobiles. This change comes in part from the large number of vehicles moving on the streets, but in still greater degree from the street congestion produced by parking of vehicles. This latter point was particularly emphasized by Lieut. John Martin of the Chicago Police Department, who unreservedly declared that the present Chicago ordinance which prohibits parking in the Loop district between 7 and 10 a.m. and 4 and 7 p.m. is not sufficient. Prohibition of all parking in this district, in his opinion, will greatly simplify the traffic problem. He admitted that this is difficult to bring about because merchants seem to have the idea that their business would be interfered with, but actually an unobstructed front before a store is far better from a business point of view for the proprietor, and vehicles should simply be permitted to load or unload passengers or merchandise. An ordinance permitting parking for even a limited time within the business district is inadequate.

The safety discussion consisted largely of testimony to the necessity of safety measures in modern railroading. The extended campaign conducted by the chairman of the safety committee, including an elaborate exhibit, and the addresses on safety before the other associations impressed this idea firmly on the delegates.

Car design was considered and it elicited much interest. The discussion showed that the turnstile car is one of the live developments in one-man car design at present, though all managers are not united in its favor, and that the Chicago automatic exit door is a very likely development in future one-man cars.

The discussion on personnel and training of transportation employees centered around the report of the committee on that subject which is opening up a new vista on this phase of the subject. It developed the fact that the Market Street Railway had been applying special tests to motormen for a year or more, which developed some very interesting practical data as to the worth of some of the suggested schemes of determining good and poor men. A paper by a Baltimore doctor demonstrated the scientific possibilities of studies along these lines. The convention concluded with an "interurban hour," which was considerably longer than an hour and proved as useful to interurban men as any previous session of the association. Perhaps the most interesting part was the description of the bus situation in California, where the largest electric railways are installing motor bus lines.

THE ENGINEERING ASSOCIATION'S WORK

At the Chicago meeting, possibly even more than usual, the Engineering Association convention was the fruition of a strenuous year of committee work. Reports of committees containing nearly 500 pages had been distributed generally to the membership in time for inspection, if not for assimilation in advance of the meeting. The educational value, along engineering lines, of the reports and discussions was great. The decision of the association to put the Engineering Manual into really convenient form for use was noteworthy. At reasonably frequent intervals the members will now have up-to-date Manuals without the almost impossible task of keeping their loose leaf copies revised.

The specifications contained in the Manual were much enriched this year, particularly by the work of the committee on way matters. The committee's specifications for standard frogs and car-clearance easements, locations of tongue switches at crossovers and turnouts, and sundry track materials received unanimous approval.

The Chicago meeting would have been worth while if only as the occasion for inaugurating the much-heralded rail-joint tests. The American Association showed its confidence in its engineering auxiliary by voting to put $10,000 into engineering research. This sets a precedent, and if the engineers can demonstrate that money invested in this way will bring a satisfactory return to the investors, they will have paved the way for other much-needed research in the future.

Closely related to this work on rail joints was the discussion at the joint session of the American Welding Society and the Engineering Association. The industry is going to benefit by this co-operation, an example being the rail-joint tests referred to above, which will be made under the auspices of the American Bureau of Welding, a subsidiary of the Welding Society with representation from the Engineering Association and other interested bodies.

The engineers showed their common sense in deciding to get together on the subject of rail and wheel tread contour. As rails and wheels are continually engaged in modifying each other's contour, it would seem that the coming joint study of the subject will bring results. Heretofore the equipment and way committees have been asked to co-operate, but no adequate machinery was provided to harmonize conflicting requirements. The new joint committee will this year undoubtedly have many interesting conferences and ought by next fall to get somewhere. In view of the appointment of this committee the association decided not to revise the wheel contour standards this year.

The committee on power distribution reported on an interesting bit of work, the magnitude of which is likely to be overlooked. This committee, in order to bring out the essentials of distribution with the aid of automatic substations, set for itself a hypothetical installation which was made as nearly practical as such a problem can be. Then a number of different solutions for the problem were found, and the results were tabulated in such a way as to permit ready comparison. As the committee members had access to all available data on their subject, their solutions ought to prove highly suggestive. Railway companies would pay a consulting engineering firm a large fee for a piece of work like this. Here it is had for nothing. They would probably appreciate it a great deal better if they paid for it.

Real progress in the direction of car design standardization was indicated in the report of the committee on unification in car design. The committee made concrete recommendations as to certain details. The report was approved and continuation of the work was voted. The work on standardization of shop layouts, done by the committee on buildings and structures, also was notable. The inclusion in the Manual of suggested layouts will, it is believed, increase the present tendency to more effective arrangement of shop equipment.

The engineers showed by the work of their committees on engineering-accounting, and purchases and stores and by the time devoted to these subjects at the meeting that they are vitally concerned with costs. This will serve to offset the belief sometimes held that engineers are likely to overlook the economic phase of their activities.

There was some disappointment in connection with the report of the committee on heavy electric traction, not entirely unexpected, in the statement that the plan of the association for a co-operative committee had not met with general approval from other associations. An "American committee on electrification" seemed so obviously desirable a thing that postponement of its realization is unfortunate. Such a committee will, of course, be formed in time, and the sooner it is formed the less duplication of work will there be in compiling information on current practice in this field.

After careful study of the suggestions made by the retiring president, W. G. Gove, last year, the committee on reorganization reported that many of Mr. Gove's ideas have been since carried out or are in process of being carried out, but that the constitution and by-laws of the association provide substantially for its needs. This will prove gratifying to those who were active in formulating this document many years ago.

Paris-Orleans Railway Electrification Is Progressing

The Large Number of Locomotives Which Have Been Ordered for Initial Installation Will Be Largely of French Make, but America Will Furnish the Control Equipment

AFTER careful investigation into the possibilities of electrification, the railroads of France have decided to electrify more than 5,000 miles of their tracks. The following lines have all made definite plans for electrification: The Paris, Lyons & Mediterranean, running to Marseilles, Nice, Monte Carlo and into Italy, as well as into the Alps, where heavy grades are encountered; the Midi, operating in the southern part of France, and the Paris-Orleans.

The Paris-Orleans Railway is taking the initial step in electrifying approximately 143 route-miles, including its main line extending from Paris to Vierzon. The trains of the Paris-Orleans leave Paris from Quai d'Orsay station, traveling first through one of the most densely populated sections of Paris. They then head practically southwest for Orleans, a distance of about 75 miles. En route to Orleans, the road passes through Bretigny, from which point a short branch line to Dourdan will be electrified.

Orleans, a city of more than 70,000 inhabitants and located on the River Loire, is the terminal for a large number of lines. This city, which is one of the oldest in France, is famous for its celebration each year of the anniversary of its deliverance from the English by Jeanne d'Arc in 1429.

From Orleans the line runs by Nouan and Sabris in passing to Vierzon. Vierzon, which is approximately 123 miles from Paris, is the terminus of the steam-engine division which the railroad is now electrifying.

For operation over this zone and a future extension south of Vierzon 200 locomotives will be purchased. The orders for the first 120 locomotives have already been placed with a group of French manufacturers, namely, Compagnie Electro Mecanique, Société Schneider, Forges et Ateliers de Construction Electriques de Jeumont and Compagnie Thomson-Houston, each of which will build a portion of the locomotives or equipment.

TABLE I—LOCOMOTIVE DIMENSIONS

Length between buffers	41 ft. 5 in.
Length of cab	36 ft. 3 in.
Width of cab	9 ft. 10 in.
Total wheelbase	28 ft. 11 in.
Rigid wheelbase	8 ft. 10 in.
Distance between truck center pins	10 ft. 0 in.
Diameter of new wheels	47¼ in.
Thickness of steel tires	3 in.

Each locomotive will rate approximately 1,400 hp. for one hour and approximately 1,200 hp. continuously, both ratings being at 1,350 volts direct current. A single box cab will be mounted on two 0-4-0 swivel trucks, the total weight of locomotive complete being approximately 66 tons (132,000 lb.). The mechanical parts, however, will be of sufficient strength to permit of ballasting to 79.35 tons, without any modification other than a change in springs.

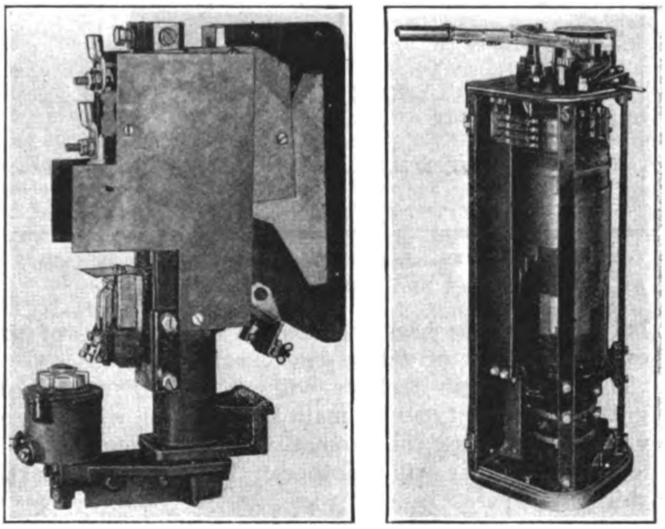
The dimensions of each locomotive are given in Table I.

The specified tractive efforts for these locomotives are given in Table II, these being with a gear ratio of 21 to 62 and wheels of 47¼-in. diameter. Each axle will be driven by a series-type, 1,500-volt, four-pole motor rated at 300 hp. continuously at 1,350 volts and 350 hp. for one hour at 1,350 volts.

DETAILS OF THE CONTROL

The complete control equipment will be built by the Westinghouse Electric & Manufacturing Company at its plant at East Pittsburgh, Pa., which furnishes the following information regarding the details:

The locomotives are designed for double-end control, multiple-unit operation and are governed through a low-voltage battery train line. Westinghouse type-HBF electro-pneumatic control, now standard on many of the large roads in America, will be used. The main circuit diagram of this is shown in the accompanying diagram. The motors will be connected first in series, then in series-parallel and finally in parallel. Twelve series notches, nine series-parallel notches and nine parallel points will be provided. The last two notches of each combination are field control notches, the field strength being reduced by means of inductive shunts as shown. Variations in tractive effort from notch to notch must be kept very low on account of the limited strength of the car couplings. The circuits are arranged so that regenerative control and dynamic braking may be provided later with a minimum change, by adding the necessary equipment in space left for that purpose. None of the locomotives will be provided with regenera-



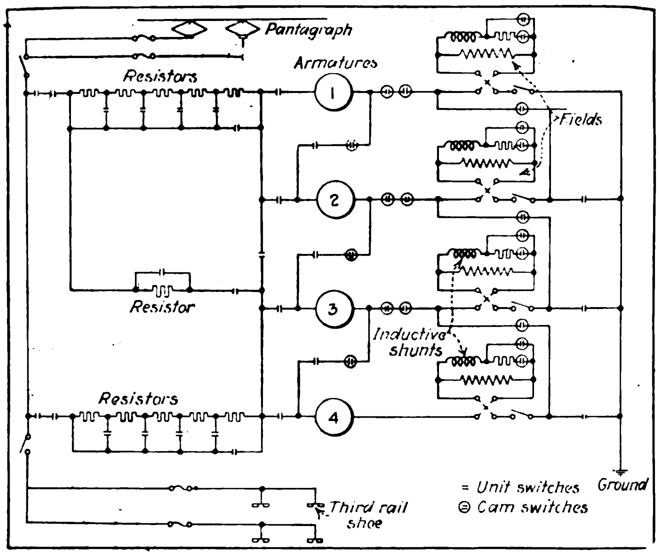
AT LEFT, ONE OF THE UNIT SWITCHES WHICH HELP MAKE UP THE COMPLETE CONTROL SWITCH GROUP. AT RIGHT, MASTER CONTROLLER WITH COVER REMOVED, ARRANGED FOR LEFT-HAND DRIVE

TABLE II—SPECIFIED CONTINUOUS TRACTIVE EFFORTS AND SPEEDS

Tractive Effort in Pounds	Speed M.p.h.		
15,600	6.4	Series connections	Full field
12,200	8.6	Series connections	Min. field
15,600	13.7	Series-parallel connections	Full field
12,200	17.9	Series-parallel connections	Min. field
15,600	28.4	Parallel connections	Full field
12,200	36.8	Parallel connections	Min. field

tive control at present, but extensions to the south of Vierzon will be over profiles which will warrant the use of this feature.

Power is to be received either through third rail shoes or from an overhead wire. It was the purpose at first to use a third rail along the entire length of line except at stations, crossings, yards and similar points, but the idea has been modified so that the use of the overhead conductor will be considerably extended.



Main Circuit Diagram, Electro-Pneumatic Control for Paris-Orleans Locomotive

The pantograph trolleys will be of the air-raised, gravity-lowered type. A main knife switch will be provided for isolating the locomotive circuits from the trolleys and another will disconnect the circuits from the third rail shoes.

BOTH UNIT SWITCHES AND CAM SWITCH GROUPS WILL BE USED

The main circuit connections will be made by means of unit switches and cam-switch groups, each being operated by compressed air at 70 lb. pressure. Use is made of cam switch groups only where it is found desirable to provide a mechanical interlocking of switches and where the cam shaft can be arranged for two positions only. Where cam groups must have three or more operating positions, the difficulty of stopping the cam shaft on an intermediate position would introduce a complication in the control and reduce its factor of reliability. Unit switches are also preferable for arc-breaking service.

Overload protection is provided by the use of an overload relay for each individual motor circuit and also one for the main feed. A ribbon type fuse is placed in the circuit of each trolley and one fuse is placed on each side of the locomotive connected between the third rail shoes on that side and the main knife switch. Provision will be made for installing a high-speed line switch at a later date, should this be found necessary in order further to protect the motors against flashing.

One master controller will be placed in each end of the locomotive, to the left of the locomotive center line, with the brake valve to the left of the controller. The controller handle extends to the left of the controller for operation with the right hand. This arrangement is to conform to the standard French system of running on the left hand tracks.

Each locomotive will be provided with two blowers for motor ventilation and two compressors. The blowers will be arranged so that the failure of either will not cut off ventilating air from the motors. Expulsion type fuses will be used to protect these circuits. The control battery will be charged in series with the blower and compressor motors by the use of a battery-charging resistor and relay.

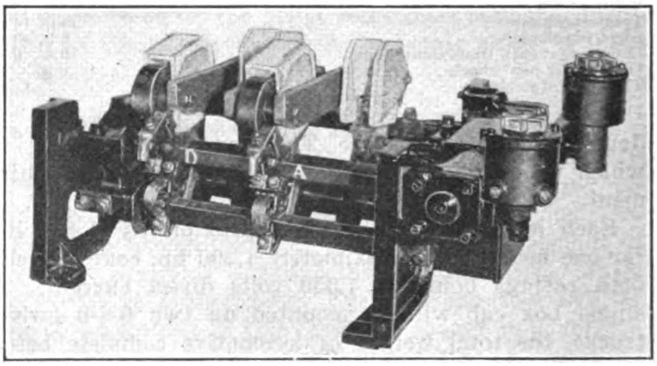
RIGID TESTS MUST BE MET BY EQUIPMENT BEFORE ACCEPTANCE

Very complete and thorough tests will be made of the various items of equipment both before installation in the locomotive and after the locomotive is complete. Preliminary acceptance of each of the first ten locomotives will be given only after it has operated satisfactorily for a distance of 15,500 miles. The balance of the locomotives will be given preliminary acceptance after operating satisfactorily for a distance of 1,863 miles. Each breakdown of more than four hours will extend the preliminary acceptance run by 621 miles for every two days or less that the locomotive is out of service due to defects. The preliminary acceptance for the first ten locomotives, however, will be given within three months after their delivery if the necessary mileages have not been covered by that time. Subsequent locomotives will be given preliminary acceptance at the end of one month if the necessary distance has not been covered within that time.

Final acceptance of each locomotive will be given one year from the date of preliminary acceptance providing the locomotive has operated a distance of 31,000 miles. If the distance operated has been reduced on account of defective construction or design this final acceptance will be extended three months if the locomotive has operated more than 21,700 miles and six months if less than this distance. All dates, however, are based on very reasonable allowances and afford the manufacturers every opportunity to fulfill their part of the contract with the minimum of hardship.

It is expected that the first of these locomotives will be in operation by Oct. 1, 1923, and that the order will be completed by Jan. 1, 1925. This averages approximately four locomotives delivered per month between these dates.

This electrification will be watched with considerable interest, for while this division extends over a fairly level country and no such tonnages are encountered as are handled in America, the fact that a complete steam division is to be electrified insures a direct comparison between the operation by steam and electric and many interesting facts are expected to be obtained from this electrification.



Cam Switches for Paris-Orleans Locomotive Control

Track in Paved Streets

At a Meeting at the Engineers' Club in Philadelphia This Subject Was Discussed from the Standpoint of the Design of Streets for Street Railway Traffic

ON OCT. 9, 1922, there was held in Philadelphia, under the auspices of the Engineers' Club of that city, a conference on the design and construction of streets for street railway traffic. Engineers from a number of cities besides Philadelphia, including a number of prominent electric railway men, were in attendance. A full report of this meeting will appear in due course in *Engineers & Engineering*, the publication of the club.

In opening the meeting John Meigs, the chairman, extended the hospitality of the club to the visitors present, and then read a letter from John A. Griffin, city engineer of Los Angeles, Calif. In this letter Mr. Griffin explained that in Los Angeles it is the practice to install double track on streets 11-ft. centers and put single track in the center of the streets. Headers next to the rail have been omitted in paving laid during the last three years. Asphalt concrete is now used in place of cement concrete. In general the railway company maintains the pavement from 2 ft. outside the outside rail on one track to 2 ft. outside the outside rail on the other track.

The next speaker was R. C. Cram, engineer of surface roadway, Brooklyn Rapid Transit System, who spoke on track locations.

TRACK LOCATIONS

Mr. Cram said that the location of the various utilities in the public streets is becoming more and more a serious problem for the municipal engineer. In the large cities the street railway is the only one which occupies the surface of the streets, the others being underground. The location of manhole heads in the streets complicates the railway's special trackwork. At one point in Brooklyn there are eleven such heads at one intersection. There is a need for closer co-operation between municipal and utility engineers in regard to location, and many cities are finding it desirable to set up special bureaus charged with the design and location of subsurface structures.

More consideration might well be given to the possibility of constructing normal sized sanitary and storm sewers in two lines, one at each side of the street. The construction of all such sub-surface utilities prior to the construction of street railway tracks of permanent character is greatly to be desired. Otherwise, there is apt to be unnecessary digging up of the streets. The sidewalk spaces, also, might be more generally used for locating certain utilities. There is some objection to this from the legal standpoint, but on new streets these objections should not obtain.

The central location of railway tracks in streets is considered by all competent authorities to be best for cities. On wide thoroughfares parked spaces are desirable for the cars. On them better car schedules can be maintained and operation of cars is quiet. Railways can more conveniently maintain parks than paving, and the tendency to neglect the track is less when it is in such locations than where pavements must be opened for track repairs. Side location of tracks, although found in some cases, is not desirable from any standpoint.

Where there are two lines of track in the center of the street, a drainage problem is presented since the crown or cross-section used for streets without tracks should not be employed. The plan sometimes followed of dropping the outside rail to conform to the crown is not desirable. It increases paving troubles and produces side thrust, with consequent wear on track, wheels and journals.

A frequent source of trouble with tracks in central locations comes from the disturbance of the sub-grade due to settlement over cross-trenches made for service connections, etc. The railway has little control over such trenches, and undue expense to the railway on account of these trenches can be avoided only through the co-operation of municipal and utility engineers.

The influence of street widths upon the location of all utilities is marked. A minimum of 42 ft. is desirable. On the other hand, when roadways reach widths of 60 ft. there is temptation to owners of trucks to back them up to curbs and "hog" the available roadway.

Whatever the width of the street, the track need not form an obstruction. It is only when street car traffic is very heavy on narrow streets that the railway use of the street can be said to restrict its use in any way. Even then the parked automobile is more of a nuisance than the street car.

The next address was on track specifications by H. H. George, engineer of maintenance of way Public Service Railway, Newark, N. J. Mr. George's remarks are abstracted below:

TRACK SPECIFICATIONS

Street railway engineers are confronted with many factors in the determination of the type of track construction most suitable for the conditions on their property. One factor is maximum weight of equipment and volume of traffic to be carried and another is the condition of the soil on which the track must be placed, and its ability to support the loads. Soil which under natural conditions would be unsuitable for supporting a track structure may sometimes be made entirely satisfactory by rolling into the soil cinders, slag or crushed stone or, in the latter case, it may be that the run of the crusher will accomplish the best results rather than the use of a uniform sized ballast. Then again, conditions may be such that drainage of some kind or another should be resorted to. The existence of storm water sewers in the streets has a very large effect on the conditions of the sub-surface soil in many cases.

The last important factor is that of economy, and it is in meeting this requirement that the engineer is called upon to exercise his greatest ingenuity, and is largely responsible for the many different details of track construction in use by electric railway companies in this country today. One engineer will advocate stone ballast. According to his ideas 6 in. of such ballast should be placed under each tie. Another engineer, while agreeing that stone ballast is the proper material to use, will say that 4 in. under the tie is sufficient. Still another engineer will say that just as satisfactory results are obtained by the use of gravel, crushed slag, or perhaps cinders for this purpose. Probably all three are obtaining satisfactory results, and it is here that local conditions play a very important part. In one locality crushed stone may be scarce, it may have to be hauled a long distance, while gravel is obtainable locally at a low cost. In the other case it may be that good cinders are obtainable whereas neither stone nor gravel is to be had at a reasonable cost. Or it may be that the natural soil condition is such as to make it unnecessary to use any other than the natural soil for ballast.

In the matter of ties, some engineers specify white oak ties because they can still obtain them locally or within a reasonable distance of their property. But it would be out of the question to require every property to use white oak for this purpose, for it could not be obtained in sufficient quantities at any price. There are plenty of other woods which answer the purpose for electric railway track conditions equally as well at considerably less cost. Many otherwise inferior classes of woods are made entirely suitable for railway ties by the use of a proper preservative treatment.

Tie plates may or may not be necessary or desirable. This depends entirely on the weight to be carried by each tie, and the compressive strength of the wood at right angles to the fiber. If the rail base and the tie at the rail bearing point are wide enough to provide a bearing area sufficient to keep the unit compressive strength within the proper working limits and prevent excessive cutting during the life of the tie, then tie plates are not necessary and they only increase the cost.

As to the question of rails and joints, we are again confronted with a large assortment from which to choose. And the worst of all is the fact that the rail manufacturers are apparently willing to continue to make new sections as fast as a railway company with sufficient influence makes a request for one, sometimes making that company pay for the cost of the new rolls, and sometimes absorbing this cost in its general manufacturing overhead. In many cases the differences between rails are so slight as to be hardly noticeable. Here again weight of equipment, volume of traffic, design of wheel treads and flanges, as well as details of the rest of the track structure must enter into the discussion.

Some street railway engineers advocate a rigid track structure, that is either steel ties encased in concrete or some form of concrete beam support, while others advocate an elastic or resilient supporting structure for their rails. I have some very decided views on this subject but will not express them for it would open up a field for extended discussion which has no place at a conference of this kind.

The point to which I have been endeavoring to lead throughout this discussion is the impracticability of preparing a definite specification for street railway track construction which is best for all conditions. Neither is it desirable to set up two or three types as standard and say to the railway industry "use this type here, or that type there." Such a specification or standard design would work an unnecessary financial hardship on the largest percentage of street railway companies and would probably not give the best results to a great many others who were financially able to build in accordance with it. And not only must economy in first cost be considered, but economy in subsequent maintenance as well. And last, there is still the fact to face that track wears out and must be replaced and it should be so designed as to permit the maximum salvage at the time of reconstruction. This is equally desirable in the case of pavement. Thus concrete pavement in the track space can be put down at a very reasonable figure, and when it is laid, it looks fine, but rails have a peculiar habit of breaking every once in a while, and the joints go bad and the concrete has to be taken up, and it is almost impossible to make a satisfactory repair job on concrete work. If a company is trying to rebuild, the salvage value of concrete is practically nothing. As pavement is an item that is apt to be frequently disturbed, the cheapest in first cost is often the most expensive in the long run.

Standard specifications for the miscellaneous materials entering into a track can and should be prepared, but to say that any given combination will result in the best track for all conditions would be about as ridiculous as to say that there is one best automobile or one best of anything else that is manufactured by assembling a number of different units together. A track design that might prove entirely satisfactory with one type of pavement would probably be far from suitable with several others. The experience of others is a good guide as to what may be expected from any particular type of construction, but this experience should be determined from careful personal observation and not from camouflaged reports. Efforts along this line should be directed toward laying down the principles which should preferably be followed for various given conditions in order that the best results may be expected.

Mr. George was followed by W. W. Wysor, chief engineer United Railways & Electric Company of Baltimore, who spoke on the design of street railway tracks. An abstract follows:

DESIGN OF STREET RAILWAY TRACKS

In designing street railway tracks, there are so many factors to be considered that it is impossible to provide specifications that would govern in all conditions. Any specifications that are prepared, therefore, and which are meant to apply to the entire track structure, should be only very general in character. Once the particular type of construction is decided upon, more detailed specifications may be prepared; but, even then, local conditions must be considered, if we are to attain the best results from a structural as well as financial point of view. Some of the conditions that must be taken into account in the decision as to the type of track to build are:

Type, weight, etc., of equipment that will operate over the track.

The kind and volume of vehicular traffic, other than street cars.

Nature of underlying soil.

Other structures in the street.

Climatic conditions.

Width of streets and character of paving used.

Character of community served.

Lastly, but by no means least, the financial condition of the concern responsible for the railway.

Manifestly, the light, cheap construction, often found in small towns, would not be suitable for a busy metropolitan district, nor would the heavy, expensive track employed in the congested parts of big cities be justified in the country village.

From a strictly railway point of view, the ideal type of track would be a tee-rail on private right-of-way, but that is obviously impossible. In down-town areas, the necessity of having the entire street available for vehicular traffic of all kinds makes it necessary to pave over the track area and hence to adopt some type of track structure suitable for such paving. In outlying districts, however, where width of streets will permit, it is desirable to maintain the track on a private way, with a driveway on each side. This private way may be inclosed by a curb, hedge, grass plot, row of trees, etc., as the width of the street, character of community and individual taste may dictate. This type of construction permits higher speed, makes for greater safety, less noisy operation, and is less expensive in first cost as well as upkeep.

On very wide boulevards, where there is a large volume of vehicular traffic, it may be desirable to enlarge upon this plan and provide three driveways by separating the tracks, and putting in a center driveway for high speed vehicles.

But it is with tracks in paved streets that we are principally concerned at this time and, in deciding upon a type which will meet the particular requirements, we should consider not only the first cost, but the cost of maintenance and replacement and the ease and facility with which repairs and replacements may be made. Perhaps the ideal track would be one built along the highly scientific lines of the Deacon's masterpiece, the wonderful "One Horse Shay," where all parts were equally good and where a breakdown of one part before another was impossible; but it would be very embarrassing to have the tracks crumble to pieces about 5:30 some busy afternoon.

Let us now consider the influences which cause track to break down or wear out:

1. The wear and tear of the cars themselves.
2. The wear and tear of other street traffic.
3. The presence of other structures in the street, which necessitates the frequent tearing up of the paving, thus impairing the track foundation.
4. Climatic and weather conditions.
5. Presence in the soil of substances which cause chemical, electrolytic or other destructive effects.

That portion of the track structure which directly receives the wear of cars and vehicles is the rail and, assuming that we have chosen wisely and well in selecting the other materials that go to make up the entire track structure, the life of the track is determined by the rail. Therefore, we should select a rail which will give maximum life, as well as meet satisfactorily the local conditions. The rail should be heavy and stiff enough to withstand the shock of traffic without undue bending or vibration. Opinions vary greatly on the best type of rail, but, probably, all will agree that what might be required for one place would be unnecessarily expensive for some other location; or that, where a so-called "girder" rail may be desirable in some streets, in others a tee-rail will answer every requirement equally as well and, at the same time, be more economical and more satisfactory from an operating point of view.

For main streets, where improved paving is used, or for heavy traffic, where there may be unimproved paving, the writer believes in heavy rail of whatever type, and that the comparatively small added cost of a heavy over a light rail is more than justified in the longer life thus given to the track.

That engineers differ on the design of rail or that local conditions require different treatment is attested by the large number of sections that have been rolled and still others that are being added to the list from time to time. At least two of the more recent sections were designed to meet local conditions entirely.

The next thing of importance is the selection of the proper method of joining the rails together, for, if the life of the track as a whole depends on the rails, the life of the rail in turn depends on the joints. Street railway engineers realized many years ago that the common form of bolted joints could not be depended on to give satisfactory service in paved streets, and their attention has been turned toward some way of welding rails together, so as to, as far as possible, eliminate the joint.

There are at present at least four well developed types of welded rail joints, all of which have met with considerable success. Railway engineers, however, are not content with the progress that has been made in the art of welding rails together and are continually seeking how they may improve upon the present methods or discover new methods. This is a very live subject before the American Electric Railways Engineering Association.

Having selected the rail, it should be laid upon a foundation that will properly support it throughout its life. Here, again, local conditions make it impossible to lay down any specific rules to govern all cases. Attempts have been made to eliminate the ties and support the rails directly on concrete beams or slabs, but none of these has proved successful. The usual practice is to support the rails on cross ties of wood or steel, laid on ballast of some sort, or, in some cases, on the natural soil where it is of such character as to justify this procedure. The ties should be of such quality that they will not decay during the life of the rail and of sufficient size and density to prevent the rail cutting into them seriously. They may be assisted in this last respect by the use of tie plates. The foundation under the ties should be of sufficient stability to support the track, paving, and live loads without appreciable settlement or movement of ties, and of such character that it will not in the presence of water work into muck and permit a pumping action to be started. This sub-foundation should be self-drained, with ample provision for carrying the water to city sewers or other suitable places of disposal, or else it should be so dense as to be impervious to water. Beyond this, it would seem needless to go.

While some attempts have been made to build so-called "permanent" foundations, where it would only be necessary to renew the rails from time to time, I do not believe they have been attended with much success, for streets are subject to settlement, due to construction of numerous underground structures, such as sewers, water, steam, gas pipes, conduits, etc., and as a general proposition, when the time comes to renew the tracks, they must be given a general resurfacing and realigning.

GENERAL DISCUSSION

In the discussion of the papers by Messrs. Griffin, Cram, George and Wysor, which was participated in generally by those present, the importance of standardization of street widths was first emphasized. Much of the present difficulty, one speaker said, is because streets were not designed for present-day traffic. The importance of so designing track as to adapt it to the subsoil was also emphasized, one speaker pointing out that the greatest wear in paving is along the tracks, particularly at crossings and rail joints. This is because the subsoil is not sufficiently stiff to sustain the travel at those points. The use of more ties and less ballasting might help. In locations where subsoil conditions are especially bad, some special arrangement should be made, such as the placing of a concrete slab underneath at those points.

Another speaker pointed out that in Philadelphia there are very numerous right angle crossings, involving great difficulty with paving. The trouble with the crossing is not so much with the joints as it is the impact due to the flange bearing of the wheels coming into action on the floor of the grooves. Putting a concrete slab underneath or incasing the intersection in concrete does not help.

Another speaker referred to the concrete paving of tracks in Birmingham, where some track was so paved in 1908. This is in nearly perfect condition today. As to standardization of track he said that it is physically impossible to pick out one type that will meet all conditions. In New Orleans, for example, the subsoil is a black, gummy mass which actually flows. Under these circumstances some kind of a concrete base must be used. The same speaker declared that the interests of the street railways, the city and the public are identical. Hence, the city and track engineers ought to work together, and not at cross-purposes as formerly. The greatest asset that the street railway can have is a satisfied public, hence its interest is in having good paving in the track area. This means good foundations and good joints, with tracks built for durability and not for cheapness.

A speaker from Akron, Ohio, told about the laying out of Firestone Park, where the utilities were located so as to minimize street cutting. Even where a city resolves not to permit cutting of new paving for an extended period, leaks will develop or service connections will have to be changed, so that the utilities should be placed right at the start. In Akron a minimum width on double track streets of 56 ft. has been adopted, and for single track streets 42 ft. This is to permit the passing of automobiles parked at the curbs. This speaker was favorably impressed by some light track construction noticed in Columbus, Ohio, where the track is laid with steel ties on a concrete mat. There is no adhesion between the mat and the concrete in which the ties are imbedded.

Regarding the placing of utilities under the sidewalk, the speaker said that this had been done in Philadelphia to a great extent recently. He understood it to be the rule now that every one putting in a new sidewalk must reserve a certain amount of space for underground structures. As to the effect of rigid foundations on track stability, he cited an illustration from Philadelphia, where the track had to be laid on the concrete roof of the subway. This construction has been very substantial and has withstood the hammering at crossings. He thought that track engineers by this time ought to know what mass of concrete is sufficient to put upon a soil to resist the blows when cars cross frogs.

Following the general discussion, E. J. McIlraith, superintendent of buildings and structure, Philadelphia Rapid Transit Company, said that while some of the P. R. T. track standards are criticised as not being adequate, it must be recognized that factors are involved over which the railway has no control. For example, the natural soil in Philadelphia is in general rather sandy. Experience seems to show that in that soil, at least, a better track can be kept up without a massive concrete substructure than with one. Last year several miles of track were renewed on streets where heavy concrete substructures had been used. Here the track structure was from 1 to 5 in. below grade, and was difficult to renew. Even with concrete substructure, the concrete will settle because the street is constantly being ditched. All dirt hauled away in ditching leaves voids that must be filled by the settlement of the track.

In Philadelphia the load per unit of soil area has a safe value. This is the criterion whether a street railway is being built or piers for a bridge. The load per square foot must be kept down and the moisture kept away.

When streets are reconstructed there should be no difficulty in providing the necessary distribution of the load. This can be done by use of the proper quality and quantity of ballast, with the proper rail, or a special rail with close spacing of ties can be used, or again, the soil can be filled first with a lighter material, such as cinders or coarse gravel and then a concrete mat can be built around the ties. In some cases the coarse gravel can be used alone.

At crossing intersections the foundation should not be too rigid. The yielding type of support is not desired, but a resilient foundation is best.

Water will drain toward crossings, and it will filter through the paving. Thus, water must be accepted as inevitable and a foundation provided that will not fail if it begins to yield. The trouble in Philadelphia is not due to the foundation alone, but to the fact that the water takes away the cross-rail support itself.

What is true with foundations is also true with paving. In this connection it should be remembered that the hammer blows which come on the foundations of a street railway crossing from heavy rubber tired vehicles going over them at high speed are more severe than those which come from the street railway car bumping over the intersections, although the noise is not so great. Most of the troubles at crossings can be laid at the door of the very heavy truck. At this point the speaker pointed out that some paving put in on Chestnut Street, Philadelphia, last year, is failing at the crossings, but not at the foundation shoulders. This seems to indicate that, as the hammer blows of vehicles are on the shoulders as well as the intersections, the former should show failure as well as the latter.

Prof. S. H. Stephenson of Rutgers College pointed out that it ought to be possible to make tests of rail joints in the laboratory because a long time is required for tests in service in the street. Several college laboratories are working along other lines of track testing. Referring to the hammer blow or impact on track, he said that this blow from heavy trucks amounts to from four to as high as seven times the static load, depending upon the character of the street. Laboratories ought to be able to help in determining conditions to reduce this impact.

As to the hammer blow, another speaker said that the blow on a concrete base at a joint where the rails are out of surface about ⅛ in. produced by the four wheels of a city car moving at 20 m.p.h. is about 200 ft.-lb. This is for a 37,000-lb. car with a normal load of passengers.

The other sessions of this conference will be reported in later issues.

Important Papers Presented at Brussels Convention

Wide Range of Topics Covered at the Eighteenth International Congress Under the Auspices of the Union Internationale de Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles

TEN papers were scheduled for presentation at the meeting of the Union Internationale de Tramways, held at Brussels, during the first week of October. A list of these was printed in the issue of the *Electric Railway Journal* for Sept. 2, page 329. An abstract of the paper by C. J. Spencer, general manager London Group of Tramways, was given in the issue for Oct. 14, page 641. Abstracts of others of the papers follow. A report of the discussion will be given in a later issue.

ELECTRIFICATION OF SHORT RAILWAYS

A. Pirard, manager Société Anonyme d'Enterprise générale de Travaux de Liège, read a paper on the system of electric power to use on short-line electric railways. He said that the system could be determined roughly by means of the formula $D = aC + \frac{Ktp}{nn'}$, in which D represents the annual cost for energy, C the capital invested in generating and distributing equipment and motors; a, rate of interest and amortization on C; K, energy consumption in watt-hours per ton-kilometer measured at the locomotive or car, n the line efficiency, n' the transformer and substations efficiency, p the cost per kilowatt-hour at the point of purchase, and t the number of ton-kilometers per year. This formula does not take into consideration the expenses of transportation employees or of substation or line maintenance, rolling stock, etc., which are largely the same for all systems of electrification though slightly less for direct current.

Of these factors, t and p are constant, and K is from 5 per cent to 10 per cent less for direct current. The terms C, n and n' are affected by the following considerations, whatever the system used:

1. When the length of line is such that only one substation would be required, the term C is very nearly the same for direct current or single phase, since the higher cost for copper with direct current is balanced by the higher cost for insulation with single phase. The term n is also about the same for both systems. The term n' depends on the manner of transforming the energy. If motor-generators are used it is about the same, but it becomes more favorable for direct current where rotaries or mercury arc electrifiers are used. The advantage of direct current also is greater as the size of the terms t and p become more important. The necessity of obtaining a high value for n' will be often, in the same system, one of the elements of a choice of voltage, since to obtain the same value for n' the zone served by one substation would have to be larger as the trains are heavier and their spacings greater.

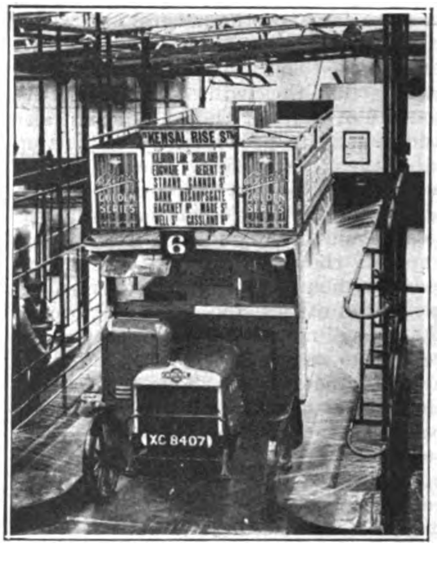
2. Where the system has several substations there are two cases to consider, namely, (a) where the term tp is very important and (b) where the term aC is predominant.

Where no special equipment is necessary to overcome the effects of induction in neighboring telephone or telegraph lines, the term C is considerably less for the single-phase system, and it is the second term tp on which the choice of the system will depend. If tp is very large, since the value of K is less with direct current and the divisor nn' approximates unity, the term $\frac{Ktp}{nn'}$, in the case of direct current, is able to counterbalance the increase in the term aC and give advantage to direct current. If tp is not large, the advantage of the high efficiency is not sufficient to compensate for the increase in first cost and the advantages with direct current.

To resume, for those countries where the general system of distribution of energy is three-phase, at a frequency of more than 25 cycles, high-tension direct-current is preferable when (1) the system is not of great extent or (2) in a system of considerable extent when (a) the price per kilowatt-hour is high or the traffic is heavy, and (3) when the public authorities are very strict in regard to induction on neighboring telephone lines. On the other hand, the single-phase system is preferable in systems of great extent where the cost per kilowatt-hour is low and traffic scanty, and where electrification nevertheless is desirable because of the high cost of coal and its large consumption on heavy grades.

MOTOR OMNIBUS SERVICES IN LONDON

A paper with the title "Organization of Motor Omnibus Services in a Great City" was read by H. E. Blain, assistant managing director London Underground Railways and London General Omnibus Company Group.



WASHING A LONDON BUS BY MEANS OF A SPRAYING MACHINE

The omnibus company, he said, provides street passenger carrying facilities within a 30-mile radius in every direction, taking Charing Cross, London, as a center. It is at present operating 149 routes, with a route mileage of 1.992, employing 3,090 vehicles and more than 21,000 employees. The longest route is nearly 29 miles. During 1921 more than 668,000,000 passengers were carried and 98,745,000 bus-miles run. The operating receipts were nearly $42,000,000 (at par of exchange).

These bus facilities are furnished from thirty-two garages, and there is also a central employment and training school. The Londoner likes the double-deck vehicles, due to his preference for obtaining the maximum of fresh air while traveling. There is no covering over the top deck of any London omnibus. The latest type of bus carries twenty-four passengers inside and twenty-eight outside. There are 312 of these now in operation and the number will shortly be increased to 900.

The garages were originally made self-contained as regards cleaning, repairing and overhauling of vehicles. Now all large repair work is done at a central point. The garages have the following distinctive features: Each is divided into two sections, engineering and operating. The former, set aside to deal with the dock overhauling, is equipped with such machines as a small lathe, sensitive drill, screw press, etc., and a staff which deals with the vehicles kept in from three to six hours each day. There is a garage foreman who is responsible for the dock overhauls and for turning out the omnibuses daily in a fit and safe condition. On the operating side, output assistants deal with the allocation of drivers' and conductors' duties, and depot cashiers deal with the daily receipts. In many of the garages, institute and mess rooms have been provided with billiard and rest facilities.

Each garage has a staff of men specially engaged in the adjustment and tuning up of engines. They devote their attention to the six omnibuses whose fuel consumption is shown on the daily chart to be the worst.

The central overhaul works cover 31 acres and are divided into two parts: Body building, repair and paint shops covering about half the total space; the chassis overhaul section, stores and auxiliary departments, such as millwright toolroom, electrical and experimental sections. From the moment an omnibus to be overhauled enters the gate it goes through a series of consecutive operations which progressively deal with the removal and overhaul of the body, the dissembly and reassembly of the chassis units and the remounting of the body ready for relicensing. The re-erection of the chassis proceeds on a moving platform 220 ft. long by 8 ft. wide which moves at floor level at a speed of 14 in. per minute.

The works include an experimental and research department, and a laboratory for the analysis of all classes of fuels and oils, and for the testing of samples of any material.

Great care is taken in selecting and training the right type of personnel for the company. Drivers take a training covering an average period of twenty-eight days and conductors one of about fourteen days.

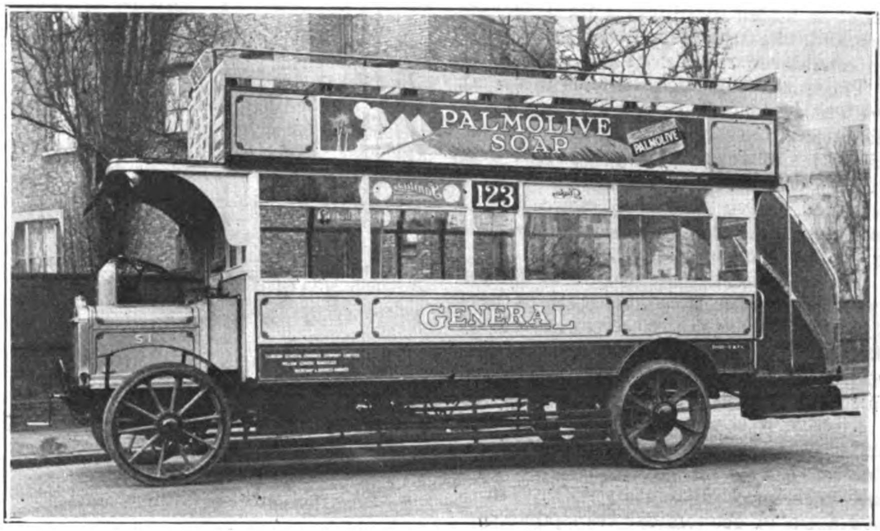
Great care is also taken in selecting and working routes. Long routes have been found advantageous, and it is the custom to operate service from a residential suburb on the outside of London right through the center portion and out to a terminal point in a suburb on the other side. Loading diagrams are used to show graphically the characteristics of the traffic, and careful check is kept on the relative efficiencies of successive schedules by the use of a "schedule comparison card."

The London omnibus fare system is based on mileage and the average charge per mile in 1921 was just below 1 penny (2 cents).

Mr. Blain's paper was illustrated by means of charts in colors showing the details of the ways in which the various operating problems are solved.

PRESENT STATUS OF THE RAIL CAR

The accomplishments in the line of self-propelled rail cars for short railways were covered in a paper by J. Decroës, Brussels. He touched lightly on the subject of steam and storage battery cars. The former has no advantage over the steam locomotive, he said, while the latter has a limited field.



LATEST TYPE OF LONDON BUS, OF WHICH NINE HUNDRED WILL SOON BE IN USE

On the other hand, Mr. Decroës pointed out, the gasoline vehicle has demonstrated its reliability on roads and has a place in rail transportation. It permits the furnishing on short railways of service which cannot be profitably supplied by steam locomotives. Its use results in lower operating costs through elimination of firemen and in some cases of conductors—that is, where the driver can collect the fares. Fuel cost is reduced, and that for water is eliminated. There are also the following: reduced wear on tracks, elimination of smoke and flexibility of speed control.

Two types of transmission for rail cars are available, electric and mechanical. The former has the advantage of the absence of the speed-changing gear, but offsetting this are greater weight, higher cost and lower transmission efficiency. However, when the power to be transmitted is large, the electric transmission seems to be preferable. The 250-hp. Diesel-electric cars used on Swedish railways furnish an example.* The extension of the use of this type of car depends on the availability of cheap fuels, such as heavy oil or possibly gas produced on the car. Steps have been taken in this direction. In countries which do not produce gasoline, it is important to utilize fuels which are widely available.

Mr. Decroës explained that a questionnaire had been sent to 200 railways in the attempt to secure the information on this subject, but with meager results. He, however, gave a general résumé of the practice in different countries. For example, in England the gasoline-bus and, more recently, the trolley bus have been widely used. There are few short railways like those on the continent and rail cars are not used. In Belgium experiments are being made with the Pieper rail car. Several manufacturers in that country are developing cars.

In Canada and the United States the heavy cars have not given the desired results. Recently several railroads have put into commission light cars seating twenty to thirty persons. The cars seating twenty, used in the vicinity of Montreal, have made more than 12 miles to the gallon and operated at a cost of about 12 cents per mile. The operation is said to have been satisfactory.

In France the rail car which has attracted most attention is the small one used on the meter-gage Deux-Sèvres line.† The weight of this vehicle empty is but 5,000 lb., and it will carry from eighteen to twenty passengers comfortably, or thirty as a maximum. It is driven by an 18-hp. engine and the operating cost is about 21 cents per mile. The State Railways is also experimenting with rail cars with encouraging results. A car weighing 7 tons was recently tried out on the line between Les Mureaux and Versailles. The Mosines-Berliet Company, which has had much experience with gasoline tractors, etc., has tested out a rail car between East Lyons and Aoste-St. Genise (45 miles) where speeds of 28 m.p.h. on the outgoing and 21½ m.p.h. on the return trip were made, with an average mileage of 8 per gallon. A 30-ton load was hauled on the return trip. The Dion-Bouton Company has also constructed a light car which was tried out between Toury and Pithiviers in the Loiret Department. This has an electric drive and weighs, equipped, about 12,000 lb. The gasoline consumption was such as to give a mileage of 11 per gallon.

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*See issue of this paper for Aug. 5, 1922, page 193.

†See issue of this paper for March 25, 1922, page 513.

The above are selected from the examples given by Mr. Decroës, several more being given in the original paper. Based on these examples and the general study of the subject, he concludes about as follows:

If on a short railway, traffic on certain trains is light, or if new trains must be added to supply a light service demand, the use of rail cars may well be considered.

The number of such vehicles in use at present is too small and the period of their use too short to warrant close estimates of results to be expected in a given case. However, the results obtained prove that the operation of rail cars for light traffic costs less than steam locomotive operation.

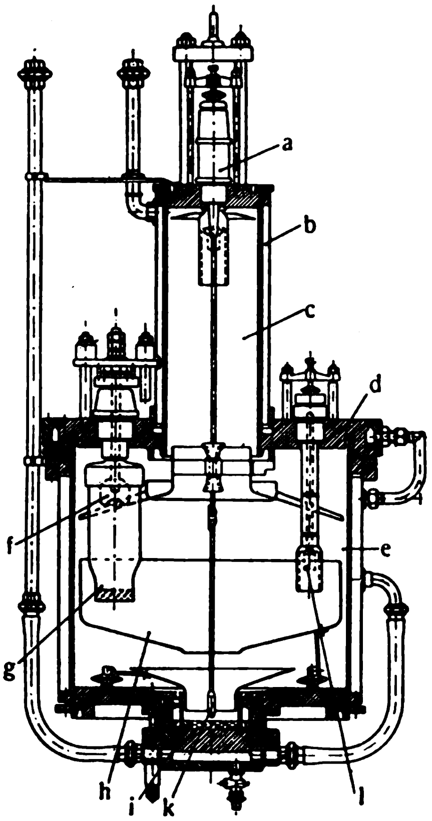
While awaiting the result of longer experience with these vehicles to permit the best mechanical arrangement of their parts, the gasoline bus can be used as a guide in the design of rail cars.

Finally, it is possible that the studies under way looking toward the utilization of heavy oil, anthracite, etc., on rail cars may ultimately result in a new form of economical transportation.

THE MERCURY-VAPOR CONVERTER FOR TRAMWAYS

M. A. Odermatt, engineer with Brown, Boveri & Company, Baden, Switzerland, presented an elaborate paper covering both the theory and practical application of the mercury-vapor converter on tramway systems. The invention of this device he considered one of the most important in the domain of modern electric technique. It is adapted to electric railway power supply on account of its economy and simplicity as compared with motor-generators and rotary converters. The mercury-vapor converter is, said Mr. Odermatt, the ideal converter, converting alternating current to direct current quietly and without the intermediary of revolving parts, its characteristics being such as to compare advantageously with those of the static transformer for alternating current. He then took up the fundamental theory of the device, following this with descriptions of the equipment made by his company.

This apparatus is made of sheet steel, consisting of two closed cylinders. The larger of these, which is located at the bottom of the apparatus, is the working cylinder, containing the electrodes. The other, placed above, is the condensing cylinder. The working cylinder contains at the bottom the cathode, consisting of an insulated pool of mercury. Two sets of anodes are suspended from the top of the working cylinder, one set being the principal anodes and the other the exciting anodes. There are six anodes, each consisting of a cylinder of polished steel.



CROSS-SECTION OF MERCURY VAPOR CONVERTER

a—Starting anode.
b—Cooling jacket.
c—Condensing cylinder.
d—Cover of main cylinder.
e—Main cylinder.
f—Main anode.
g—Directing envelope around anode.
h—Arc deflector.
i—Mercury cathode.
k—Starting terminal.
l—Exciting anode.

The anode is surrounded by an iron cylinder which directs the electric arc toward the cathode. The principal cylinder and the condensing cylinder are surrounded by a refrigerating envelope. The joints are packed in mercury and a pump is used to maintain a vacuum in the cylinders.

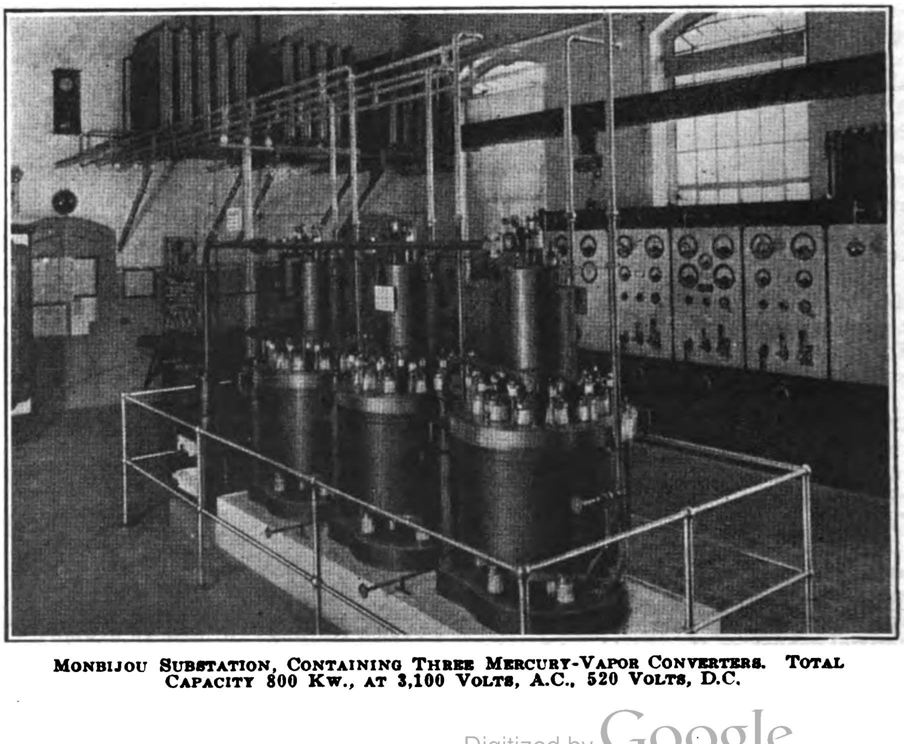
As compared with other forms of converter, the mercury vapor type is superior in that the efficiency is the same for all loads and the efficiency increases with increase in voltage. The advantages of this type can be summarized somewhat as follows:

1. High efficiency, regardless of load.
2. Simplicity in starting and in supervision.
3. Minimum of wear and tear, due to absence of rotating parts, and with a consequent low maintenance cost.
4. Insensibility to momentary overloads and short circuits.
5. Lightness, with consequent simplicity in foundations and in apparatus for handling.
6. Simplicity of accompanying apparatus.
7. Noiselessness of operation.

Brown, Boveri & Company have installed or have under construction 190 installations of mercury-vapor converters, involving 390 units and about 102,000 kw. The first tramway installation was made in 1915 in a substation at Schlieren near Zurich.

The substation of the Lausanne Tramways at Mézières is notable on account of the great overload which it carries. A single converter provides service for an 11-mile line from Lausanne to Moudon. The profile of this line is such as to produce violent fluctuations in current. The equipment was installed in 1917 and produces a saving about 30 per cent over motor-generators.

All of the tramway service in the city of Berne is furnished from a sub-



MONBIJOU SUBSTATION, CONTAINING THREE MERCURY-VAPOR CONVERTERS. TOTAL CAPACITY 800 KW., AT 3,100 VOLTS, A.C., 520 VOLTS, D.C.

station at Monbijou, commissioned in 1919. It has operated so well that it has not yet been necessary to touch any one of the three cylinders which it contains. During the peak load from noon to 2 p.m. the mercury equipment is reinforced with motor-generator groups operating in parallel.

The most important installation in Great Britain is that furnished this year for the tramways in Glasgow. It comprises three converter cylinders, of a total capacity of 1,400 kw. at a voltage of 520. A 2,200-kw. outfit is being installed in Rotterdam, and the first converter in Belgium will be installed this fall to feed the tramways of Liége.

Mr. Odermatt mentioned a number of other important installations of mercury vapor converters in tramway and railway service.

APPLICATION OF ELECTRIC AND OTHER WELDING ON THE TRACK AND IN THE SHOPS OF ELECTRIC RAILWAYS

In a paper of considerable length on this subject, M. E. d'Hoop, of the Brussels Tramways, gave a résumé of the practice of electric railways, with particular reference to the procedure followed in the United States. In this paper he credited the *Electric Railway Journal* with much of the information on United States practice. He said that the introduction of electric welding in Belgium is so recent that there is not yet much experience to relate. However, his studies of the subject had opened up so wide a horizon that he was pleased to give the Brussels conference the results. After describing briefly the practice in Detroit, Milwaukee, Baltimore and elsewhere, Mr. d'Hoop said that in the United States, in case of welding of new track, the rails are furnished with but one bolt hole at each end and the bolts are removed after welding. This, he thinks, will become general practice.

The Liége Tramways, Mr. d'Hoop stated, have developed a novel form of welded joint which does not require fish plates. The rails are first carefully aligned and the ends are forced slightly apart by means of a wedge driven between the heads. With a carbon arc, the bases and lower part of the webs are cut away to leave a space of about 0.8 in. A steel plate is then placed under the rail bases, bridging over the space, and being held temporarily in position by means of wedges. The space is then filled in by welding, the metal being allowed to protrude to form a swelling. The rail heads are then welded together and the surface is filled in as necessary. This joint requires about 5½ lb. of welding metal and about two hours of time to make. The cost is about 35 francs. The advantages claimed for this joint are flexibility and low cost.

Mr. d'Hoop discussed in some detail the subject of electrodes, referring to the three types: bare electrodes, electrodes coated with a flux which also acts as a guide for the arc, and electrodes consisting of a soft core surrounded with the particular alloying materials required. The bare electrodes are cheap and are in general use in the United States and England. They are more difficult to use than the others and produce a less stable arc. The second type of electrode is used largely in Germany. The flux coating guides the arc and also facilitates the welding. Electrodes of the third type are at present expensive.

Mr. d'Hoop closed the first part of his paper with brief descriptions of the cast-weld, thermit and gas-weld joints, and then took up arc welding in the shops. He mentioned the ease with which repairs to motor shells, wheels, etc., can be made, and cited the practice of the government railways of Sydney in constructing trucks with the aid of welding and without rivets. Another case was a motor shell broken in twelve pieces, which was repaired in Albany, N. Y., by welding. He expressed belief in the future development of rail-tire welding, quoting the Indianapolis & Eastern Traction Company and the Spokane & Inland Empire Railroad as examples of roads on which this work had been done successfully. He foresaw a radical change in the future in the work of maintaining wheels, due to the development of this process, and referred to the automatic welding machine of the General Electric Company.

Mr. d'Hoop closed his paper with these conclusions:

The process of arc welding possesses considerable advantages over most preceding processes, above all in the repair of broken parts and the rehabilitation of used pieces. It enables work to be done which would be impossible by other means. It is an important source of economy in construction and operation.

There is a field for arc welding in the shops as well as in connection with the track.

It is necessary to use materials appropriate to the work in welding. Further, success depends on the skill of the welders. To remedy the difficulty of recruiting and developing good welders, it is suggested that professional schools create special sections for the instruction of arc welders. Large companies could have schools in their own works.

It is desirable that the art of welding be recognized and the processes standardized, so that its cost may be included accurately in estimates.

AUTOMATIC SUBSTATION SITUATION SUMMARIZED

An elaborate report on automatic substations, prepared by L. C. Sekutowicz, director of technical service of the Lyons Tramways, was presented in abstract. The report considered in particular the General Electric, Westinghouse and Brown-Boveri systems of automatic control. The essential operating features covered were: Starting, synchronizing, determining correct polarity, regulation of voltage and stopping; eventually starting, connecting and stopping a second machine. The author pointed out that the rotary converter must be protected on the alternating-current side from short circuits, failure of power and lack of symmetry in the three-phase circuit or inversion of phases and on the direct current side against short circuits, overloads and reverse current.

The most delicate operation involved is assuring the correct polarity. The General Electric Company uses for this purpose an exciter, and for extra reliability controls the operation through a polarized relay. The Westinghouse Company uses self-excitation and verifies the polarity by means of a small polarized motor, of which the armature is connected to the brushes and, revolving in one direction or the other, controls the excitation. The Brown-Boveri Company uses a relay known as a "polarizer," which interrupts the excitation if the polarity is wrong so as to permit the converter to slip a pole.

The report then went into detail regarding the ways in which the several functions of the control apparatus are performed, which are familiar to readers of the *Electric Railway Journal*. The principal systems were described in detail. The following advantages of automatic control were listed in the paper:

1. Elimination of the personal equation in substation operation.
2. Economy in operation.
3. Savings due to elimination of light-load and no-load losses.
4. Reduction in cost of feeders and facility for increasing transmission capacity by the addition of new substations.
5. Improved reliability of operation due to the several protective devices included in the plan of automatic operation. These include high-tension protection, limitation of overload and instantaneous suppression of short circuits.

The paper concluded with an expression of regret that the prices of automatic control equipment and of mercury vapor converters are too high to permit rapid extension under present conditions in Europe. At the same time it is hoped that conditions will change rapidly so that utilization of these improvements will be possible.

In the preparation of this report the committee prepared a questionnaire relative to the automatic substation. The questions were framed so as to bring out information regarding automatic electric railway substations in Europe, opinions as to the extent to which the control could be used on different systems, opinions as to the desirability of using remote control, savings in operating costs likely to occur with automatic substations, ideas as to the value of the general load dispatcher, extent to which automatic protective devices have been used in manual substations, etc.

Wisconsin Utilities Association

THE 1923 convention of the Wisconsin Utilities Association will be held in Milwaukee at the Hotel Pfister on March 22-23. Further details will be announced later.

European Electric Railway Financial Conditions*

A Consideration of the Increases in Expenses of Tramways, Interurban Railways and Motor Buses as Compared with Pre-War Conditions

By M. A. Mariage
Operating Manager of the Société de Transports en Commun de la Région Parisienne

As the result of an inquiry on financial conditions of electric railways in Europe in the countries included in the membership of the Union, 108 replies were received, representing about 30 per cent of the number of those addressed. The class of enterprises and the countries included are shown in Table I. The chief data sought were increases in the number of passengers carried per car-kilometer, increases in operating costs per car-kilometer, and changes in fares.

In general the length of lines has not increased since before the war except in a few special cases, as in Cherbourg, in France, for example. There has, however, been a considerable increase in passengers per car-kilometer (car-mile). This is shown in Table II, which also shows (1) that the increase has been greater in the countries which were engaged in the war than in those which remained neutral, and (2) that different systems in the same country show quite a range of increase. Thus, in France the percentage increased varies from 14 to 86 per cent, while the average is 28 per cent. The variations generally can be explained through a variation in the business activity of the different cities, while the increase is caused in the inability of the systems, because of their financial condition, to increase their service with the increased traffic.

Fares were raised but not as rapidly as the cost of operation nor to the same extent. This is shown in Fig. 1. As will be seen, the average increase in fares has lagged behind the increase in expenses, and has not yet caught up with the expenses except in Switzerland and Denmark (Fig. 1) or with cost of living or wholesale prices, except in Denmark (Fig. 3).

Table III gives the percentage increase in receipts per passenger and in fares. Here also it will be seen that generally in the belligerent countries the percentage increase in receipts per passenger carried has not kept pace with the percentage increases in fares, while in the neutral countries the percentage increase in receipts per passenger has generally been equal to or greater than the percentage increase in fares. The only explanation for this discrepancy in the countries engaged in the war is that certain fares, work-

TABLE I—REPLIES TO INQUIRY

	Tramways	Interurbans	Bus Lines
Belgium	2	2	..
Denmark	2	..	..
England	4	..	1
France	44	19	6
Holland	2	1	..
Italy	1	4	..
Norway	1	..	..
Poland	1	..	..
Spain	2	..	..
Sweden	2	..	..
Switzerland	6	6	2
Total of each kind	67	32	9

Total number of replies: 108, or about 30 per cent of the number of inquiries sent out.

TABLE II—NUMBER OF PASSENGERS PER CAR-KILOMETER AND PER CENT OF INCREASE COMPARED WITH 1913

		Actual			Per Cent of Increase	
		1913	1920	1921	1920	1921
Belgium	Société des Chemins de fer Economiques	4	5	5	25	25
	Brussels tramways	3.4	4.3	4.3	26	26
Denmark	Copenhagen tramways	4.	4.48	4.4	20	10
Great Britain	London tramways	5.5	7.5	7.2	36	30
	Glasgow tramways	8.57	10.34	9.92	20	15
France	General average	3.994	5.093	5.156	27	29
	Perpignan system	3.24	6.05	6.08	86	86
	Cannes tramways	2.8	3.2	3.2	14	14
	Strasbourg tramways	3	4	4	33	33
	Paris system	6.25	8.03	7.21	28	15
Holland	Amsterdam tramways	2.71	4.38	4.67	61	72
Poland	Warsaw tramways	5.81	11.32	8.54	95	46
Spain	Barcelona tramways	5.8	10.1	11.8	74	93
Sweden	Malmo tramways	3.4	4.6	4.5	35	35
Switzerland	Basel tramways	4.71	4.62	4.49	d2	d5

d—Decrease.

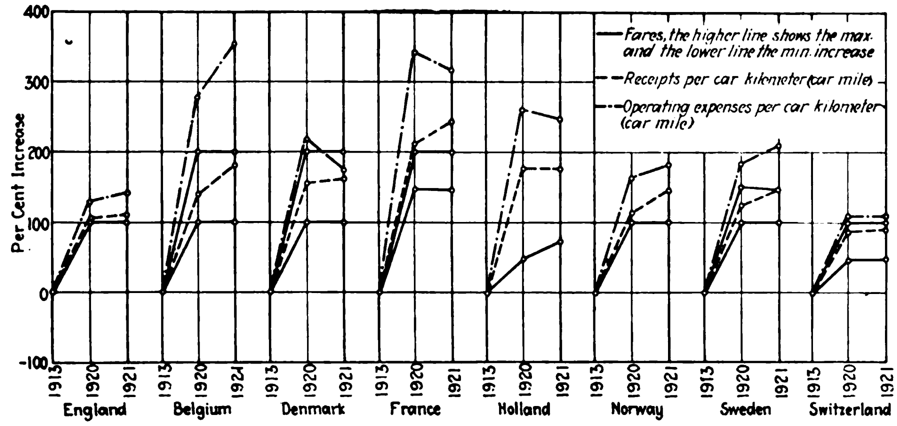


Fig. 1—Percentage Increase in Fares Compared with Increase in Receipts and Expenses per Car-Kilometer (or Car-Mile)

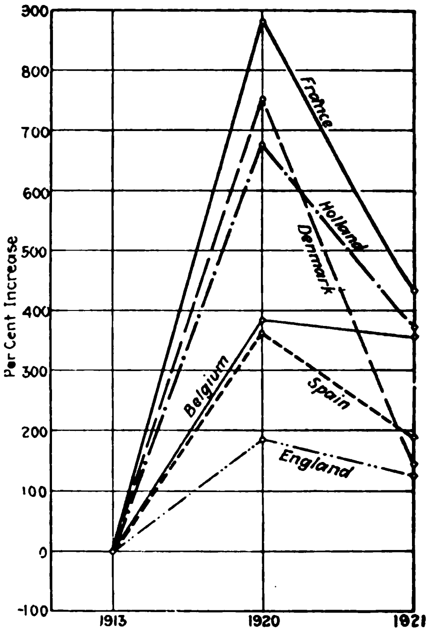


Fig. 2—Per Cent Increase in Coal Cost

TABLE III—PER CENT OF INCREASE AS COMPARED WITH 1913

	In Receipts per Passenger		In Fares	
	1920	1921	1920	1921
Belgium	86	1.02	100 to 200	100 to 200
Denmark	96	1.09	100 to 200	100 to 200
England	54	61	100	100
France	1.04	1.31	150 to 200	150 to 200
Holland	1.09	1.32	50	70
Italy	97	83	250	250
Norway	1.16	1.49	100	100
Spain	52	58	— ...	... ...
Sweden	97	1.22	100 to 150	100 to 150
Switzerland	85	97	50 to 100	50 to 100

TABLE IV—PERCENTAGE INCREASE IN OPERATING EXPENSES PER CAR-KILOMETER COMPARED WITH 1913

	1920	1921
Belgium	275	352
Denmark	215	175
France	339.5	316.4
Holland	106.6	110

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*Abstract of paper presented at the convention of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports publics Automobiles, Brussels, Oct. 2 to 6.

TABLE V—DAILY WAGES IN VARIOUS COUNTRIES WITH PER CENT INCREASE COMPARED WITH 1913

England		England (Pence)		Belgium (Belgian Francs)		Spain (Pesetas)		France (outside Paris District) (French Francs)		France (Paris District) (French Francs)		Switzerland (Swiss Francs)	
		Wages	Per Cent Increase	Wages	Per Cent Increase	Wages	Per Cent Increase	Wages	Per Cent Increase	Wages	Per Cent Increase	Wages	Per Cent Increase
Motormen	1913	69	...	4.36	...	6.33	..	4.61	...	6.972	...	7.482	...
	1920	161	130	15.00	240	11.00	70	14.86	220	23.993	240	13.71	80
	1921	146	110	18.90	330	10.00	50	15.66	260	25.440	260	14.34	90
Conductors	1913	49	...	4.12	...	4.17	..	4.50	...	7.039	...	7.10	...
	1920	150	200	14.70	250	7.50	80	13.64	200	20.709	190	13.26	80
	1921	138	180	18.65	350	7.16	70	14.37	220	22.075	210	15.03	110
Inspectors	1913	75	...	5.30	...	4.53	..	5.63	...	7.811	...	9.55	...
	1920	165	120	17.70	230	8.50	80	16	180	23.710	200	17.30	80
	1921	163	120	21.70	310	8.33	80	16.80	190	24.974	210	18.21	90
Repair shop men	1913	63	...	4.35	...	4.58	..	5.16	...	5.25 to 9.50	...	6.85	...
	1920	155	140	17.95	310	7.19	30	16.06	210	15.20 to 22	190 to 130	14.77	110
	1921	146	130	20.26	360	7.64	60	16.51	220	16.24 to 23.84	200 to 150	15.41	120

men's fares and commutation tickets, for example, were not increased in protion to the single fares.

The operating expenses of the tramway systems in Europe have increased because of the higher wages and cost of coal and other materials. Table IV gives these figures for four countries in percentage increase per car-kilometer for the years mentioned as compared with 1913. They also show a greater increase in the belligerent than in the neutral countries. Graphically these data are shown in Fig. 1.

TABLE VI—PERCENTAGE INCREASE IN THE COST OF COAL AS COMPARED WITH THE 1913 PRICE

	1920	1921
Belgium	390	369
Denmark	763	151
England	182	139
France	890	450
Holland	690	374
Spain	377	190

TABLE VII—PRICE INDICES

	1913	1920	1921
Belgium	100	...	368
Denmark	100	140	145
England	100	314	202
France	100	509	345
Holland	100	281	181
Italy	100	624	578
Norway	100	377	269
Spain	100	221	190
Sweden	100	359	222
Switzerland	100	...	190

If the figures on expenses are analyzed further, some interesting results appear. Table V shows the increases in the principal classes of labor. The average daily wage is made up by dividing the total sum paid annually in the classification mentioned by the number of men employed multiplied by the number of days worked by these men in that year. These figures show that in Belgium, France and Switzerland the wages still seem to be tending upward, particularly so in Belgium, while in England and Spain they are tending to droop slightly.

It should be said that the figures are not quite comparable because in the greater part of the countries mentioned in 1913 the average working day was nine or ten hours, whereas in 1920 and 1921 it was legally eight hours. This increase in labor cost has a very large influence on the total increased cost of operation. For instance in the large systems in Paris in 1921, the labor costs amounted to 63 per cent of the operating receipts. On that system between 1913 and 1921 wages were increased seven times, namely, on Sept. 15, 1916, June 1, 1917, Oct. 15, 1917, July 1, 1918, Jan. 1, 1919, March, 1920, and July 16, 1921. This list does not include the change to the eight-hour day, which went into effect on June 2, 1919, nor the date when a vacation period of twenty-one days a year went into effect, or in July, 1919.

Fig. 2 and Table VI show the increase in the price of coal in 1920 and 1921 as compared with 1913, though it does not take into consideration differences in the quality of the coal bought. Here the differences between belligerent and neutral countries are not so marked. The reason is that neutral countries are not producers of coal, and in England there has been a drop in coal cost comparable with that in wages.

The increased cost of new construction is shown approximately by Table VII, which gives comparative wholesale prices in the years mentioned. This does not correspond exactly with the increases in the fixed charges, because the latter includes amortization and interest on the capital. Thus, an installation which cost 1,000,000 francs in 1913 would require at 4½ per cent interest and on the basis of amortization in thirty years setting aside the sum of 61,390 francs yearly. This same property in 1921 would have cost 3,450,000 francs and with interest at 7½ per cent on a thirty-year amortization the annual charge would be 292,115 francs. Hence the increased capital charge would not be exactly 3.45 times but

$$\frac{3.45 \times 292,115}{161,390} = 4.76 \text{ times.}$$

BUS TRANSPORTATION

The bus industry in Europe is still young. In France in particular, it had hardly begun, outside of Paris, at the beginning of the war, and at that time practically all the buses were requisitioned by the military authorities. Since the close of the war, outside of Paris, most of the lines have been operated by small companies from which it is difficult to get any very definite technical data. Some figures, however, are obtainable. Table VIII is based for Paris on the reports for 1913 to 1920 of the General Omnibus Company and in 1921 on the figures of the Société des Transport en Commun de la Région Parisienne. These figures show an increase in loading after the war, as compared to pre-war figures, with a tendency to droop in 1921.

TABLE VIII—PASSENGERS CARRIED IN BUSES

In Paris Per Bus-kilometer	In London Per Bus-mile
6.38 in 1913	6.6 in 1913
7.51 in 1920	9 in 1920
6.98 in 1921	8.9 in 1921

TABLE IX—PERCENTAGE INCREASE IN BUS-OPERATING COSTS AS COMPARED WITH 1913 IN THE PARIS DISTRICT AND IN ENGLAND

Operating Expenses	France		England	
	1920	1921	1920	1921
Transportation	220	205	151	143
Maintenance	330	250	184	198
General and miscellaneous	300	260	46	114
Average	290	240	149	154

Fares have increased, but differently in various localities. In Paris they are from 20 to 150 per cent higher than before the war. The gross receipts in Paris are from 60 to 160 per cent higher, and in London in 1921 were double those in 1913. Table IX shows the increase in percentage of operating expenses in Paris and in England. Labor costs in bus service have increased about as on the tramways. It

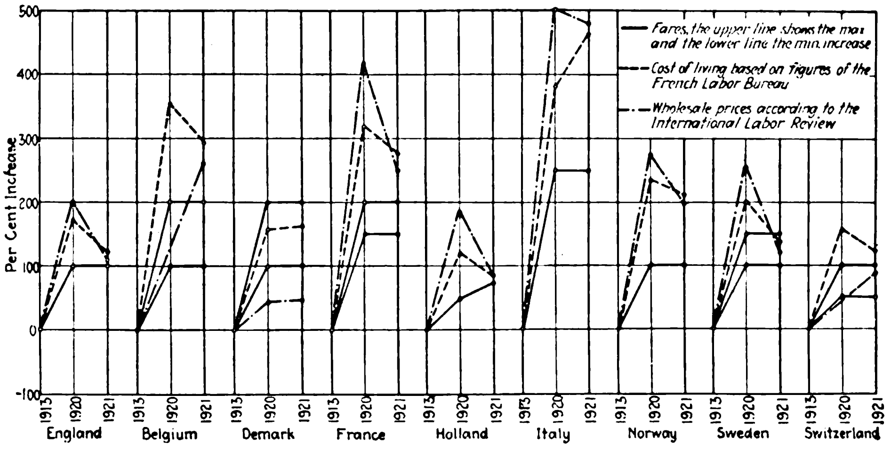

FIG. 3—PERCENTAGE INCREASE IN FARES AS COMPARED TO INCREASE IN COST OF LIVING AND WHOLESALE PRICES

has been impossible to get general figures on the increase in fuel cost, but in Paris in 1920 fuel cost eight times and in 1921 5.3 times as much as it did in 1913.

It would be interesting to get some figures on trackless trolley operation, but none of the companies replied to the questionnaire.

National Personnel Association

THE first annual convention of this association, which has taken over the activities of the National Association of Corporation Training and the Industrial Relations Association of America, will take place in Pittsburgh on Nov. 8. Among the speakers will be Prof. Michael Pupin of Columbia University, Magnus W. Alexander of the National Industrial Conference Board, George F. Quimby, industrial service secretary of the Associate Industries of Massachusetts; H. M. Jefferson of the personnel development department, Federal Reserve Bank of New York; Rowland Rogers of Columbia University; Dr. E. K. Strong, Jr., Carnegie Institute of Technology; C. S. Ching, United States Rubber Company; Dean R. L. Sackett of Pennsylvania State College, Dr. E. S. MacSweeney, New York Telephone Company, and E. K. Hall of the American Telephone & Telegraph Company.

American Association News

T. & T. Executive Committee

THE executive committee of the Transportation & Traffic Association met at association headquarters, New York, Friday, Oct. 27, to discuss plans for this year's work. It was decided that at the convention next year the program of the T. & T. Association will be so arranged as to give the members one free day during the week in which to give particular attention to the exhibits, or to visit other association meetings. The suggestion was made to the American Association executive committee that it might work out to advantage if all the associations would follow a similar plan, staggering the free days of the various associations. It was thought that this might be practical with all the associations except Engineering, which requires the full four days to complete its work.

A motion was adopted that all committee reports shall be completed and a copy sent to each member of the executive committee at least two weeks in advance of the meeting at which the executive committee will pass upon the reports. It was also decided that all approved reports should be printed and sent out to the membership in advance of the convention. This will necessitate greater promptness in getting the committee work under way and completed, and July 1 was set as the final due date.

A recommendation to the executive committee of the American Association was made that the railway association co-operate with the National Safety Council and that the T. & T., Claims and Advertising Associations should each appoint one member to carry out this co-operation.

Consideration of the report of the subjects committee occupied the further attention of the committee. The suggested study of the use of radio by the T. & T. Association was referred to the Engineering Association, but it was planned that a representative of the former association be selected to co-operate with the engineering committee to help determine what use of radio is desirable. This representative, or some one using radio, will then be invited to present a paper before the T. & T. Association as to the work done and the prospect of the use of radio.

To a committee on bus operation the executive committee assigned the task of compiling data from the experience of electric railway companies which are using buses covering details of operation and cost of this service, including trolley buses. This will not be a study of where the bus may be used, but a compilation of facts from the definite experience of member companies, perhaps including the information as to why these companies had put in bus service, in each instance.

For the work of the committee on one-man car operation the executive committee decided not to pursue the study further with respect to urban operation but directed the committee to confine its activities to the study of the subject as applied to suburban and interurban operation, with particular reference to operating practices, rules, dispatching methods, etc.

The name of last year's safety committee was changed to the committee on accident prevention, and the committee directed to continue the work along the line of further safety slogans, newspaper articles to help in the work of safety engineers, and follow up the previous work. The committee will also be requested to make an analysis of accidents with reference to causes, relative number in different localities on a given property, and to outline the manner and advisable extent of co-operation with civic bodies in safety work.

It was decided to discontinue the work of the committee on personnel and training of transportation employees, and in place of the committee report to have a paper on the "maintenance of men."

It was decided to recommend to the American executive committee that the subject of relations with employees be assigned this year for further study, including pension systems, group insurance and other plans of co-operation, such as legal and medical aid, sick and accident insurance, etc. This subject has not been studied by the association since the comprehensive report of 1916, which was never released.

To the committee on merchandising transportation was assigned a continuation of the study of developing the riding habit, but adding thereto methods of making salesmen of the employees. This will comprise a co-ordination of the employee work in connection with merchandising with the report of the committee last year. The committee will also study means of developing the freight and express business.

The committee on traffic regulation will be assigned the task of keeping in touch with all movements to standardize traffic and to see that the railway association has representation at such meetings.

Those present at the meeting were: President G. T. Seely, J. V. Sullivan, Edward Dana, W. H. Boyce, T. C. Cherry and J. K. Punderford.

New Bulletins Available

THE following special reports have been prepared by the American Electric Railway Association and are available to member companies in good standing upon request:

Public Utility Laws—A summary of the laws creating the state public utility commissions, giving an analytical digest of the main provisions covering their jurisdiction and powers over transportation companies. This is the sixth installment of this compilation, which was begun in June.

Safety Work—A summary of a questionnaire prepared by the committee on safety work showing companies engaging in organized safety work, the methods employed and some of the results obtained.

Motor-Bus Decisions — Abstracts of the principal decisions of commissions and courts on questions arising in connection with the operation of buses with particular reference to granting certificates of convenience and necessity.

Weekly Pass—Gives list of companies now operating with a weekly pass, the type of pass and conditions of its use, and a summary of results obtained since compilation of May 1.

One-Man Car Decisions — Abstracts of leading court and commission decisions on various aspects of one-man car operation, including adequacy of service, safety, economics of operation, rates, etc.

Location of Mid-Year Meeting

PRESIDENT EMMONS requests that all companies reply at once, if they have not already done so, to the circular letter of Oct. 18 requesting an expression of opinion from member companies on the desirability of holding the Mid-Year Meeting in San Francisco, and whether they will be able to be represented or not by delegates. So far approximately 25 per cent of the membership have replied.

Recent Happenings in Great Britain

Railway Electrification Important Decision—Reduction in Tramway Men's Wages—Activity on "the Underground"

(From Our British News Representative)

A MOST important decision was rendered by the Electricity Commissioners in the end of September when they refused to consent to the erection by the South Eastern & Chatham Railway of a generating station for working the company's suburban lines about to be electrified. The railway will accordingly have to take its electric power from a supply company. The electricity (supply) act of 1919 constituted the commissioners and gave them wide power for developing and consolidating electric supply in Great Britain. The policy is among other things: to prevent the multiplication of small power stations, to close down minor ones now existing and to concentrate in great stations supply for all purposes, thus securing economy.

Section 11 of the act of 1919 provides that it shall not be lawful for anyone to establish a new or extend an existing generating station without the consent of the commissioners. The proviso, however, is added that in the case of a railway consent shall not be refused unless it is proved that a joint electricity authority or authorized undertakers are or will be in a position to give the railway a supply adequate in quantity and regularity to meet its present and prospective demands at a cost not greater than would have been incurred by the railway in supplying itself. The commissioners find that there are three supply companies willing and able to fulfill these conditions. The railway failed to come to an agreement with any of these companies, but the commissioners find that satisfactory guarantees were forthcoming, that taking a supply from an outside source will save the railway a capital expenditure of more than £1,000,000 on a power station and that the railway will make an annual saving by purchasing the power.

The commissioners also state that the pooling of the railway company's supply with that of other classes of consumers will be an important contribution toward the centralization of generation in Greater London, with all the economies and benefits accruing. Thus it may be inferred that in any future schemes of railway electrification in Britain the railways will not be permitted to provide their own power stations unless a satisfactory and economical supply cannot be obtained from existing undertakers. The South Eastern & Chatham Railway case is the first of the sort under the act of 1919, and it is considered to be highly significant.

On Sept. 28, after a fortnight of negotiations, an agreement was reached on the subject of wages by the National Joint Council for the tramway industry, and the men's delegates resolved to submit the agreement to a ballot of their constituents with a recommendation to accept it. On more than one occasion the negotiations almost broke down and the help of the Ministry of Labor was invoked. When things were at their worst fear arose that the Joint Council might be dissolved. That, of course, would have put an end to national bargaining. The settlement which was arrived at is a compromise, neither side having got all that it wanted.

The original proposal of the tramway owners, both municipalities and companies, was that in view of the heavy falling off in traffic receipts owing to the slump in trade, the sliding scale of wages adopted last year should be abolished and that wages should be reduced by 12s. a week by three monthly installments of 4s. each. The men wished the sliding scale to remain as it was and that there should be no wage reductions except under its provisions. That scale took as its basis a cost of living 135 per cent above the cost in August, 1914. For every fall of five points below that in the official index figure of the cost of living, wages were reduced by 1s. a week. By the last quarterly adjustment the total reductions in wages amounted to 10s., the index figure having fallen 50 points to 85. The index figure at the end of September was down to 79, justifying a reduction of another 1s. a week under the old scale.

By the new agreement a sliding scale is retained, but it provides for a wage reduction of 1s. per week for every four points fall in the index figure. The new sliding scale is also applied all the way back to the basic index figure of 135. The present index figure being 79, it has fallen by 56 points. A wage reduction of 1s. a week for each four points accordingly means 14s. As only 10s. had come off under the old scale, the result is an immediate reduction of 4s. per week. The next adjustment is not to take place until February, 1923, and thereafter the adjustments will be quarterly.

On Oct. 10 it was announced that the employees by ballot had accepted the agreement by 22,436 to 10,541 votes. Of the men eligible to vote 55 per cent voted.

At the recent conference of the Municipal Tramways Association in Newcastle-on-Tyne, three resolutions were passed for taking action. By the first it was decided to appoint a committee to confer with experts of the Post Office on the subject of the liability of tramway authorities for electrolytic damage done to telegraph or telephone cables by stray currents from tramways. At present the tramway authorities are liable even if they observe all the Board of Trade regulations on the subject and even if the Post Office authorities have been negligent. The association naturally wants it altered. Another resolution provides for conferring with municipalities with a view to proper apportionment of the cost of highway construction and maintenance between the rails and tracks.

At present all the cost as regards the tramway area of the road falls on the tramways, and the cost is always becoming heavier owing to the increase of heavy automobile traffic. The introduction of a private member's bill in Parliament to alter the law on the subject was forecasted. The third resolution referred to the executive council with a view to action the subject of getting powers to regulate general street traffic at tramway stopping places. Sir John Simpson, Portsmouth, was elected president of the association for the ensuing year.

The London Electric Railway on Oct. 2 placed a contract with the Foundation Company, London, for the construction of the northern part of the extension of its line to Edgware. Work is already in progress on the part between Golder's Green and Hendon, a length of 1½ miles, and the new contract relates to a length of about 3 miles from Hendon to Edgware. The price is £258,000, including the electrical equipment, and the work is to be completed in fourteen months. The whole extension is a continuation northward in the open country and on the surface of the Charing Cross and Hempstead underground tube railway, which comes to the surface at Golder's Green. This is part of the development of the London Underground Railway System, the new capital for which has been guaranteed both as to principal and interest by the government under the trade facilities act, the object being to get the work put in hand at once in order to provide work for the unemployed.

The Metropolitan District Railway is taking steps to improve the internal appearance of its all-steel cars. These vehicles are quite satisfactory as regards safety, comfort, and facilities for quick loading and unloading, but it has been felt that the all-steel construction produced a corresponding "all-steel atmosphere." An artist has been commissioned to plan pleasing and harmonious color schemes. Some cars are in gray relieved with yellow and are fitted with brown and gold moquette cushions. Others are in blue relieved with white and have brown plush cushions in the first-class compartments, and brown and gold moquette in the third-class. Still others are in green relieved with two shades of gray, the cushions being brown and green plush. The upright rods from floor to ceiling have been dispensed with in favor of straps. This is a reversion to the old arrangement.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Regulation an Issue

Supervisory Control of Public Utilities Looms Big in New York Governorship Campaign

The campaign for Governor of New York drew to a close in the northern section of the state on Saturday night with Gov. Nathan L. Miller speaking to a rally in Albany. The paramount issues of the campaign are water power and the regulation of public service corporations, with the light wine and beer platform of the Democratic party as an extra "Added Attraction."

Governor Miller in his speech in Albany emphasized the fact that a start has been made, after years of talk, toward a definite program of development of water power through the agency of private capital, but with operations restricted by law and by the Public Service Commission, and that the workings of the Public Service Commission of the State and the New York Transit Commission have been put more nearly upon a judicial basis. He stressed the inaptitude of the Democratic proposal for regulation by the municipalities affected, instead of by a centralized state body, of the public service corporations operating within a particular city, and called especial attention to the fact that the Legislature, under "Al" Smith as Governor, responded to his wishes in the matter of transit regulation in the city of New York.

FARMERS APATHETIC

Outside of the industrial centers general political apathy prevails all over the state of New York, and the vote on election day promises to be perfunctory rather than enthusiastic. Astute political observers predict a falling off of the up-state vote in general outside of the cities so that the election has all the "earmarks" of being a comparatively close one.

The most enthusiastic supporter of Smith, however, does not claim that he will have the Legislature with him. This is bound to be Republican in any event, and under such circumstances, the chances are very remote of any change being made in the public service commissions law or the conservation law in relation to water-power development.

An unusual degree of permanence and stability was given the New York State Public Service Commission by chapter 134 of the laws of 1921 which provides that the terms of the commissioners shall be ten years each, one to be appointed each two years, and that a commissioner may only be removed by a two-thirds vote of the Legislature, and then only for cause, which virtually means no public service commissioner can be removed for political or emotional reasons and that he must commit a sufficiently flagrant act of misconduct to justify 143 out of 201 elected members of the New York State Legislature in removing him from office. As for changing the complexion of the law to achieve political ends that is nearly always very difficult.

So it will be seen that the election of "Al" Smith as Governor would not necessarily mean the upsetting of the policy of the Public Service Commission as to the regulation of public utility corporations, and the most the Governor could hope to accomplish would be the naming of one Democratic member of the commission in February. Neither would the election of "Al" Smith be a calamity, as it is never the policy of a new administration completely to undo progressive work started by a previous one, while in many quarters the election of a Governor of one political faith with a Legislature of another is accepted as a good balancing wheel for business progress.

$60,000 Viaduct Operation

The troubles of the South New Orleans Light & Traction Company, operating a railway opposite New Orleans, are again engaging attention. The company pleaded financial inability to repair the Newton Street viaduct, in Algiers, when ordered to do so by City Engineer Klorer. At the conclusion of the hearing before the Commission Council of New Orleans the matter was referred to Public Service Commissioner Francis Williams and he has been exerting himself to ascertain whether some solution of the matter could not be arrived at.

He maintained at the hearing, before which he appeared on behalf of the state, that a viaduct in Algiers at the point where it is now located, was imperative, and he was of opinion that the Southern Pacific Railroad, which was interested in the maintenance of the viaduct, should bear its proportion of the expense of repair and maintenance. Counsel for the railroad objected to this suggestion. However, negotiations were opened between both of these interests and a tentative agreement has been reached, which points to an amicable settlement of the difficulty soon.

The street railway will be asked to bear one-fifth of the expense of repairs, estimated by City Engineer Klorer at $75,000, the Southern Pacific Railroad assuming the remaining four-fifths. The work is to be done by the forces of the Southern Pacific Railroad, and the cost will be reduced thereby to approximately $60,000.

Feeder Lines Suggested

President Mitten of Philadelphia Rapid Transit Outlines Plans for Feeders for Frankford Elevated

Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, appeared before the transportation committee of City Council on Oct. 25 and laid before it plans for the construction of three new lines designed to furnish crosstown service in the northern end of the city and serve as feeders for both the Frankford elevated and the Broad Street subway when that link in the high-speed system is constructed.

The main features of the Mitten plan are:

> The abolition of the tortuous Route 75 which now winds its way from Ridge and Midvale Avenues to Frankford by way of Olney and Wyoming Avenues.
>
> The construction of a line beginning at the Pelham carhouse in Germantown, along Chew Street, Olney Avenue, Rising Sun Avenue, Adams Avenue, Margaret Street over to Richmond. That line would tie in Germantown with the Frankford elevated.
>
> The construction of another line that would begin at Twentieth and Wingohocking Streets, run eastward along Wingohocking Street to Wyoming Avenue to Unity Street and then to Frankford Avenue, where it would tap the Frankford high-speed line at Church Street station.
>
> The building of a third route that would originate at Twenty-ninth Street and Hunting Park Avenue, traverse Hunting Park Avenue, Erie Avenue and Torresdale Avenue to the Frankford elevated. That line would connect with the Frankford elevated at the Torresdale station.

While no definite announcement was made to that effect, it was learned that Mr. Mitten proposes to have the lines act primarily as feeders for the Frankford elevated, and with that end in view, free transfers would be issued between the new routes and the elevated.

WILL CONSULT COMMUNITIES

Mr. Mitten announced that as further extensions are contemplated, the company would consult the residents of the neighborhoods affected before planning new routes.

Mr. Mitten came to City Hall ostensibly in response to a resolution introduced by Councilman McKinley requesting the company to run a line over Torresdale Avenue to Frankford. Mr. Mitten surprised the Councilmen by voluntarily offering to build the two additional lines.

An official statement said:

> To make possible early development of these proposed lines, co-operation on the part of the city in the matter of street opening and necessary bridging is essential, and to that end the City Council was invited to go over these routes with President Mitten and his engineers on Oct. 30, by which time it is expected the P. R. T. will have a double-deck bus at hand to be used for this purpose.

Mr. Mitten explained that none of the extensions would be self-supporting at the start, but would rather add to the cost of operation of the entire road. He added that service to the people was now the dominant note.

Political Favoritism a Factor in Securing Bus Permits

In a review of the New York Transit Commission's inquiry into the municipality supervised bus system, Clarence J. Shearn, special counsel of the commission, declared on Oct. 29 that the whole Hylan-Whalen bus system "smelled to heaven."

Judge Shearn said that the testimony taken by the commission showed that bus permits were given out through political favoritism, that the insurance firm of which the brother of the Mayor's son-in-law and secretary is a member profited by the sale of bus insurance and that John A. McCarthy, former business associate of Charles F. Murphy, the Tammany leader, had obtained bus permits in the names of dummies.

The points which Judge Shearn said had been established at the hearings before the Transit Commission during the week ended Oct. 28 he summed up as follows:

1. That the Hylan-Whalen system of "revocable permits" for bus operators is vicious and demoralizing.
2. That the genuine need and popular demand for a flexible crosstown bus service has been capitalized by politicians for private profit and the system has been made part and parcel of a political machine.
3. That one method of greasing the path to favor is to pay a public official who owns a garage four times the usual rate for bus storage, while another is to buy a bus of a district leader on his promise to help get a permit to operate.
4. That the bus system has been used not to serve the public, but to provide a soft berth for needy individuals who have a pull.
5. That to hide political favoritism, or worse, a large number of buses on the best paying line in the city are permitted to be run in the name of dummies.
6. That John A. McCarthy, the discoverer of Hylan, has a fleet of buses on the most profitable lines, each one in the name of a dummy.
7. That an ex-detective and brewery collector turns up on the "cream of all the lines," with three buses, costing $18,000, one being concededly hidden in dummy ownership, and manages these in conjunction with McCarthy's fleet, aided by Billy Murphy, a nephew of the Tammany boss.
8. That the insurance firm of Sinnott & Canty, the senior member of which is the brother of the Mayor's son-in-law and private secretary, has divided commissions fifty-fifty with a young insurance canvasser on forty-eight casualty insurance policies solicited from the bus owners since July 1, 1922.
9. That while in the short time available it has only been possible to scratch the surface thus far, the whole Hylan-Whalen bus system "smells to heaven."

Arrangements Made for Taking Over Line

The Cincinnati & New Richmond Railway, which will operate the eastern division of the Interurban Railway & Terminal Company from the East End to New Richmond, Ohio, has been incorporated with a capital of $10,000. The incorporators are: William E. Harton, general manager of the South Covington & Cincinnati Street Railway; Lawrence Langdon, counsel for the Union Gas & Electric Company; Walter Beaty, engineer; Howard High and Frank Woods, local bankers. The company will be organized with Mr. Harton as president; Mr. Langdon, vice-president, and Mr. Beaty, secretary and treasurer. The division was discontinued several months ago because of financial difficulties. Mr. Langdon and his associates concluded arrangements a month ago for taking over the line.

Mr. Langdon said that officials of the Cincinnati & New Richmond Railway were negotiating with L. G. Van Ness, electrical engineer with offices in the Union Trust Building, to operate the line in connection with the Cincinnati, Georgetown & Portsmouth Railway, of which he is general manager. If this plan is carried out, according to Mr. Langdon, the Cincinnati & New Richmond Railway will operate its cars on the tracks of the Cincinnati, Georgetown & Portsmouth Railway from Cincinnati to California, Ohio, and then on its own tracks to New Richmond. Mr. Langdon also said that one-man cars would be operated. A few more details will have to be worked out before the line will again be put in operation.

Praises Rehabilitation Accomplishments

In announcing a payment of $200,000 on the $500,000 installment due the Detroit United Railway on Dec. 1 to apply on the purchase of the city lines, the Mayor of Detroit stated that the department of street railways had done more work in rehabilitation of its lines during five months of municipal ownership than had been done in any previous three-year period. Attention was called by the Mayor to the advisability of continuing the precedent established by the department in making such allotments on a separate bank account, and to the wisdom of cash deposits with which to meet fixed charges arising from operation.

Oct. 1 was referred to as marking the completion of four and one-half months of operation of the municipal lines in Detroit. During this period the department had to revamp the old company's organization and then attack the problem of deferred maintenance, facing at the same time the problem of carrying the heaviest load of the railway year—the summer months.

It was pointed out that the department has not had the advantage of the usual administration statistics which were the property of the old company. With a full year's experience behind the department, decreased cost for succeeding years under the same relative conditions are expected. It has been necessary for the department to run from day to day and month to month, feeling its way along throughout the construction season now near a close.

The Department of Street Railways, the Mayor stated, has exerted every possible effort to bring the property under its control up to the best possible operating conditions. The policy has been, first of all, to provide for quarterly payments of interest and the semi-annual payments of principal to the former owners, and thereafter to put every available dollar into the rehabilitation of property, reserving only a proportion monthly which might act as a protection reserve during the months when traffic naturally decreases.

What Public Ownership Costs

The "Financial Post" Lists Costs Since Toronto Took Over the Transportation Problem

It is just over a year since the Toronto Transportation Commission took over the street railways system, says the *Financial Post*, published at Toronto. In that period rapid progress has been made in the rehabilitation of the property. By night and day work has been carried on without regard to cost in labor or equipment and the results have satisfied a public demanding better service. Hundreds of new luxurious red cars have likewise appeased the public demand for a change. But what is all this costing? The *Financial Post* goes on to explain:

The appropriations last year and this by the city hall have amounted altogether to $23,500,000.

Fares have been advanced to four tickets for 25 cents compared with six and eight tickets—nearly double. This has cost the citizens about $4,000,000 additional.

Every man woman and child in the city has been charged with an expenditure of $45 each, and every passenger carried has paid about double fare—and the financial outpour continues.

In addition the city is losing $1,000,000 a year in its percentage of fares and is able to collect only a fraction of taxes that were formerly paid by the Toronto Railway.

Nothing has yet been paid by the city to the Toronto Railway on the purchase price of the system.

Nor has there been any statement made to indicate if there is a surplus of income over operating cost.

MONEY, MONEY EVERYWHERE

While the Toronto Transportation Commission has been making a most spectacular showing the fact remains that modern engineers say that practically nothing in the construction line is impossible if there is enough money available—and the T.T.C. has been troubled with no shortage of funds.

Every investor knows that the test of a private undertaking is not during the progress of the construction when all charges are met out of capital, but after the work is completed when all charges and expenses must be met out of revenue and when revenue is based upon the basis of a fair price for the produce or service. Of course the T.T.C. is fortunate in operating under an act which permits the charging of a fare to meet all expenses, but even under public ownership the people will in the long run be inclined to ask value for their money and that is when the test will come, when the novelty of the new cars and smooth rails has worn off and the people want service for what they spend. For the present, because they have starved under a narrow and shortsighted franchise administered in a manner which gave them just cause for complaint, they are willing to pay anything for better service.

Adopts Trolley Bus

United Railways & Electric Company Changes Motor Bus Service to Trolley Bus

The United Railways & Electric Company, Baltimore, Md., has substituted trolley buses for the motor bus service open since July 1 from Gwynn Oak Junction to Randelstown via Richland over Liberty Heights Avenue. The change was made on Nov. 1 to fulfill the agreement made by the company with the residents, who desired a form of transportation giving outward evidence of some permanency. They agreed to underwrite the expected deficit of $32,000 in the first five years of operation.

Three Brill rail-less cars form the fleet, two of which are needed to operate the 30 minute headway during the morning and evening rush hours. But one vehicle is needed for the hourly service during the normal hours of the day and after the evening rush hours, as the running time for the 6.3 mile line is only twenty-five minutes. This schedule allows a layover of five minutes at each end of the route.

REGULAR SERVICE PROVIDED

The first bus pulls out of Richland at 5:45 a.m. for Oak Junction leaving there at 6 a.m. for Randallstown. The next bus leaves at 7 a.m. and a bus leaves every thirty minutes thereafter until 9:30 a.m., when hourly service is given until 4:30 p.m. From 4:30 to 7 p.m. buses run every thirty minutes after which hourly service is given until twelve midnight.

The one way through fare is 14 cents divided into two 7-cent zones, the dividing line being at Richland. Fares are collected in the pay enter, pay leave plan, using a Johnson fare box with no overhead check register, that is, passengers boarding irrespective of the direction of travel in the first zone pay the first zone fare of 7 cents on entering, and if they ride into the second zone must again pay another zone fare on leaving. Passengers that board in the second zone pay only as they leave the bus. No transfers are exchanged with the Woodlawn Avenue cars at Gwynn Oak Junction, with which the buses make connection to reach the center of Baltimore.

At Richland, which is midway of the route, a 25 ft. x 60 ft. garage has been built.

SMALL IN CHARGE

The rolling stock as stated consists of three standard Brill rail-less cars with Westinghouse standard automatic foot control, two independent trolley poles fitted with O B swivel trolley wheels.

The highway over which the buses operate is for the most part plain macadam the surface of which has been treated with tar and gravel. Generally it is only 18 ft. wide, although for some distance it has a 2 ft. concrete shoulder on either side.

Local Commission Details Under Consideration

Internal argument concerning salaries to be paid and methods of supervising, employment, delegation of authority, etc., is resulting in rather slow organization of the new Utilities Commission of Louisville, which will be financed by the local utilities. The Louisville Railway, in its new franchise, agreed to pay $10,000 annually toward defraying the expense of a utility bureau. The Louisville Home Telephone Company, also agreed to a similar sum to be paid the city annually.

The Cumberland Telephone & Telegraph Company, which has a franchise expiring, wants to come in on the same sort of basis, and it reported that the Louisville Gas & Electric Company, is investigating the idea, and desires to come under a utility commission, which would check up the various companies, and be in position to show the city what these companies are doing, which would make it much easier to regulate rates.

The City Council is objecting to the proposals embodied whereby an engineer would be appointed to supervise the railway, at a cost of $5,000 annually; and a certified accountant for the telephone company at a similar salary. The Council contends that the salaries are too high. The reasoning may be faulty, but it is pointed out in justification of the stand the city has taken that $5,000 is more than is paid the City Engineer, and equal to the limit that any city employee may draw. The money, however, comes out of funds from the utilities.

There is some discussion of consolidating the various funds and creating a utilities bureau to look after all such matters as come up. This procedure would save in some ways, and make for a more efficient organization.

News Notes

Franchise Granted.—The Crawford County Commissioners have granted the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, a franchise for twenty-five years. The company threatened to abandon its line in Crawford County if the franchise was not renewed.

Recommends More Equipment.—Robert M. Feustel, consulting engineer, of Fort Wayne, Ind., has submitted a report to Mayor Plant on the Ottawa (Ont.) Street Railway. Eighteen miles of track extensions, forty-seven new cars, additional snow plows, more car-house equipment, etc., within the next five years, are recommended in the report.

Vote Against Municipal Ownership.—An election was held on Oct. 20 in Aberdeen, S. D., on the question of the city's taking over the Aberdeen Railroad which discontinued car service on Aug. 1 of this year. The official canvass showed that there were 677 votes cast in favor of municipal ownership and 2,798 cast against the proposition.

Preliminary Report Made.—The report prepared by the public utilities committee of the St. Paul Association referred to in the *Electric Railway Journal* issue of Oct. 7 was a preliminary report and was merely given to the St. Paul City Planning Board for its information. The report has not been completed. The report deals with the proposal for an operating consolidation of the electric railways of the Twin Cities.

Mrs. Sawtelle Dies of Injuries in Auto Crash.—Mrs. Elmer S. Sawtelle, wife of the assistant general manager of the Tool Steel Gear & Pinion Company, Cincinnati, died as the result of injuries received in an auto accident near Wheeling, W. Va., on Oct. 23. She was returning with her husband and two of her children from a trip to Washington, D. C., when the car skidded and overturned. The husband and the two children, twelve and eight years old respectively, escaped uninjured. A third child, four years old, had been left at home. Mrs. Sawtelle was prominent in social circles at her home in Hartwell, Ohio, near Cincinnati and had always been very active in Sunday School and missionary work.

Missouri Reverts to the Days of Jesse James.—The many robberies of conductors and passengers on street cars, in the past few weeks, have brought out the offer of a reward of $500 by the receivers of the Kansas City (Mo.) Railways, for arrest and conviction of such robbers. The receivers point out that the crimes are punishable not only under state laws, but, since the receivers are officers of the Federal Court, are punishable for contempt of court by the United States Federal Court for the Western District of Missouri. Notices of the reward have been posted conspicuously in many places. It is said that in practically every case of hold-up of conductors, the passengers have also been robbed and terrorized.

Must Have Report Ready on Nov. 10.—Special committees representing the Cincinnati (Ohio) Traction Company and Ohio Traction Company and the Cincinnati Street Railway have been requested to have ready a report on progress they are making in discussing a readjustment of their affairs for Mayor George P. Carrel's traction committee when it meets on Nov. 10. The date was fixed when Froome Morris, vice-mayor, pointed out that conferences can go on indefinitely if no time is fixed. Mr. Morris asserted the question of deferring collection of the annual franchise tax, in order to keep fares from increasing, will be up for discussion on Jan. 1. Mr. Morris further stated that the traction situation should be in definite shape by that time.

Financial and Corporate

New Financing Arranged

Another Step Taken Toward Perfecting Reorganization of Pittsburgh Railways

At a meeting on Oct. 30 attended by Mayor Magee, members of the City Council and President Thompson final steps were taken to put into effect the Pittsburgh Railways reorganization contract, which has been the subject of negotiations for more than a year and a half. Mr. Thompson announced that he had raised the $5,000,000 necessary to make effective the contract between the city of Pittsburgh, the new railway and the Philadelphia Company.

CHANGE IN FORM APPROVED

Mr. Thompson said that the Union Trust Company, Pittsburgh, of which H. C. McEldowney is president, will undertake to provide the necessary funds under the contract upon conditions, explained to the Mayor and Council, all of which were very satisfactory and approved. A slight change in the form in which the financing was expected to be done was approved by Mayor Magee and Council.

The conclusion of these negotiations opens the way for a program of improvements for the Pittsburgh Railways, the need of which has long been felt. This money will provide new cars, carhouse, shop equipment and facilities for performing better service. Steps will be taken for the winding up of the receiverships by foreclosure of the general mortgage or by other sales of the property of the railway so that a new corporation may be formed. The reorganization will be made possible by the Philadelphia Company, city of Pittsburgh, boroughs and townships and holders of personal injury claims agreeing to accept payment over a period of ten years.

Mayor William A. Magee gave out the following statement:

> After a full discussion it was agreed that city officials accept the proposed financing of President Thompson, namely, that $5,000,000 for improvements be raised in the following manner; $2,400,000 on car trust certificates; $600,000 on car trust certificates or otherwise, this total of $3,000,000 to purchase new cars. The other $2,000,000 to be raised on short term loans and to be invested in carhouse and other improvements and betterments.
>
> It was agreed that the law department prepare a resolution to be presented to Council, formally adopting the above plan.
>
> It is understood the company now will take the necessary steps to recover possession of its property by foreclosure, and by the discharge of the receivership and begin the operation of the railways.

PRAISES UNION TRUST OFFICIAL

In speaking of the reorganization plans, Mr. Thompson said:

> The successful financing of the plan to terminate the receivership of the Pittsburgh Railways has been largely the result of the vision of H. C. McEldowney, president of the Union Trust Company. This great banking institution and its executive head know Pittsburgh, believe in it, are confident of its future and are enthusiastic in their efforts to do all in their power to promote its growth and prosperity. They have been fully aware that good street railways transportation is vital and essential to the continuing prosperity of the Pittsburgh district and they have expressed their confidence in the future by agreeing to provide the $5,000,000 necessary to accomplish the reorganization.
>
> The successful negotiations, which promise a speedy termination of the receivership and the organization of the street railways properties, are also the result of the foresight and hearty co-operation of Mayor Magee and the members of Pittsburgh Council and too much credit cannot be given them for their patience throughout the many tedious conferences necessary to effect a complete understanding that was fair to the people of Pittsburgh and to the investors holding securities in the railway properties. They have worked hard to effect the best possible plan and they have shown a knowledge of conditions that indicates intense study of the situation by them.
>
> The first steps toward reorganization of the Pittsburgh Railways were taken two years ago. The problem was to get $5,000,000 of new money to provide those improvements to equipment and operating facilities considered essential to modern management. Everyone who knows anything of street railway operations here or elsewhere in the United States knows that there has been very little, if any, financing of late and that has been one of the problems of the receivers of the Pittsburgh Railways. It has been quite an accomplishment, therefore, to be able to obtain this financial assistance at home as it indicates confidence in the promised service and management, in the co-operation of the Mayor, the City Councilmen and the surrounding municipalities and in the future of the great district served by the railway lines.

Discontinuance Waits on Commission's Ruling

Service on the Springfield & Washington Railway, operating between Springfield and South Charleston, Ohio, will be discontinued within a few months if the State Public Utilities Commission gives the necessary consent. This was the gist of a statement by W. W. Keifer, counsel for the company, who said that the line was daily losing money for its owners.

"There are too many automobiles competing with us," said Attorney Keifer in explaining why the company could not make money, despite the economies affected after G. F. Baker acquired a majority interest in the road by purchasing the holdings of his brother, Floyd Baker, several months ago.

At that time, the new owner announced his intention of introducing several policies to reduce expenses, plans whereby freight and passenger revenue might be increased, and also his idea for a system of bus feeders operating from most of the way stations along the electric line. The plans in some cases were carried out. But, according to Mr. Keifer, the condition which the company faced was one that could not be remedied if the company were to operate from a business standpoint, and it was therefore decided to apply for permission to discontinue the line and junk its equipment. This was one of the first lines to be built in Ohio.

Successor Company Functioning at Spartanburg

The South Carolina Gas & Electric Company, Spartanburg, S. C., on Oct. 1 took over all the plants, property and business of the South Carolina Light, Power & Railways Company. The new company purchased the property and business at a foreclosure sale on July 31, which sale was consummated in the order issued by Judge Watkins of the United States District Court at Anderson on Sept. 30.

The members of the board of the new company are Isaac Andrews, Dr. Ellwood F. Bell, Ben Hill Brown, Baylis T. Earle and Henry M. Earle, Paul W. Fisher, F. B. Lasher, C. C. Hood, E. W. Moher, George B. Tripp, Spartanburg; and T. F. Wickman, New York.

The new officers are as follows: George B. Tripp, president; Isaac Andrews, vice-president; F. B. Lasher, vice-president; Paul W. Fisher, secretary and treasurer; A. S. Jolly, assistant secretary and assistant treasurer.

The new company plans to make extensive improvements to its various plants and properties. These will include increasing the capacity of the hydro-electric plant at Gaston Shoals on the Broad River, improvements and additions to the steam plant and gas plant in Spartanburg, the erection of an additional transmission line from Spartanburg to Gaffney, additions to the substation plans of the company located in Spartanburg and Gaffney, the erection of additional electric lines in the city and the adjacent territory, the addition of several miles of gas mains in various parts of the city which will take care of the requests of many householders who have been anxious for the gas service but which service heretofore could not be furnished, and various other improvements.

$10,414 Surplus in Toledo in September

Operations of the Community Traction Company, Toledo, Ohio, resulted in a surplus of $10,414 for the month of September. An additional $384 of interest on the cash balance has been added to the stabilizing fund, bringing it up to $167,322 as of Oct. 1.

Increase in car riding was the most encouraging aspect of the monthly report.

Daily average riding was 162,638 revenue passengers. In comparing this with the car mileage operated there was shown a density of riding of 7.82 revenue passengers per car-mile. This is compared with 7.53 for August and 7.43 for September a year ago.

Ratio of operating expense to gross revenue was increased to 69.709 per cent as compared with 68.840 per cent for the previous month, largely due to the increased expenditures for maintenance.

With increased riding so far in October it is predicted that revenue passengers will total nearly 5,000,000 for the month.

I. R. T. Plea Allowed

Commission Acts Favorably on Application for Security Issue in Connection with Reorganization

The New York Transit Commission on Oct. 27 gave its approval to the application of the Interborough Rapid Transit Company for authority to issue and dispose of the new securities which will underlie the Interborough-Manhattan reorganization plan. Orders were granted permitting the company to issue $10,500,000 in new 6 per cent ten-year notes, $6,153,060 of which will be used to purchase new equipment, and to issue $34,330,000 of 7 per cent ten-year notes, secured by the pledge of existing bonds of the face value of $27,570,000 and $32,032,000.

The commission's approval is the latest step in the internal reorganization of the Interborough Rapid Transit Company, which had its inception in conferences with Judge Julius M. Mayer of the United States Circuit Court, to avert bankruptcy. The plan agreed upon provided for a reduction of the 7 per cent lease of the elevated lines of the Manhattan Railway to 3, 4 and 5 per cent, the elimination of $114,000,000 of securities of the Interborough Consolidated Corporation and its complete divorce from the Interborough Rapid Transit Company, and a provision for the election of the board of directors of the Interborough Rapid Transit Company by groups, nine by the Interborough stockholders, three by the Interborough bondholders, three by the Manhattan stockholders and three by public authority. Under the agreement the dividend rate on Interborough stock is to be restricted to a maximum of 7 per cent, with no dividends at all to be declared for the next five years.

In an opinion in which Chairman George McAneny and General John F. O'Ryan, the other members of the commission, concurred Commissioner LeRoy T. Harkness reviewed the steps which led up to the agreement for the reorganization. Mr. Harkness said that outside of earnings, $18,112,500 would be provided for the company, of which $7,612,500 would come from the postponement of sinking fund payments on Interborough bonds accruing during the three and one-half years from July 1, 1922, and $10,500,000 from the sale of the new 6 per cent notes. In commenting upon the plan Mr. Harkness said:

> In addition, the earnings available for service and proper corporate purposes will largely be increased by the elimination of the present 7 per cent Manhattan dividend rental. The extension of the Interborough 7 per cent notes for ten years will relieve the company of its present embarrassment of having this heavy matured debt hanging over its head and give time for the resumption of more normal conditions when complete and adequate refinancing may be effected. The Interborough directorate is to contain responsible representation of all groups (including the city) having large financial interests in the properties operated by the company.
>
> It is by a comparison of these results with the existing conditions of the Interborough Company that the beneficial results of the plan are apparent. Furthermore, the only alternative of the plan would seem to be a receivership, which would be the source of incalculable damage to security holders and the public as well. In the formulation of the plan and the remarkable success in securing the assent of thousands of widely scattered security holders, and thus avoiding receiverships and probable disintegration, Judge Mayer and those associated with him have performed a service not only to the security holders, but to the public as well.

Sale of Millers Falls Branch Authorized

The Massachusetts Supreme Court has authorized D. P. Abercrombie, receiver for the Connecticut Valley Street Railway, Greenfield, Mass., to sell the property comprised by the Millers Falls' division, on which service was discontinued recently. The division had a total mileage of 9 miles, consisting of a 5-mile stretch from Turners Falls to Lake Pleasant and branches of 2 miles each extending to Millers Falls and Montague. The lines to Lake Pleasant and Millers Falls were built in 1895 and the one to Montague several years later. It is understood that the property will be disposed of soon at public sale to the highest bidder.

Certificates of Valuation Issued to Two Pennsylvania Companies

Altoona & Logan Valley Electric Railway Valued at $6,600,000, and Southern Pennsylvania Traction Company at $6,700,000

UNDER the public service commission law of Pennsylvania, public utilities can apply to the commission for certificates of valuation. Recently two of the electric railways have received these certificates of valuation from the Public Service Commission; the Altoona & Logan Valley Electric Railway Company being valued at $6,600,000 and the Southern Pennsylvania Traction Company at $6,700,000. Both of these companies are controlled by the American Railways Company of Philadelphia.

In arriving at these figures the commission had before it inventories and valuations made by A. L. Drum & Company, consulting engineers, Chicago and Philadelphia. In the case of the Altoona property the engineers submitted valuations made on two bases, viz., prices current on Dec. 31, 1919, and average prices for the years 1914-1919, inclusive. A summary of the cost to reproduce new the property of the Altoona company (including the Home Electric Light & Steam Heating Company) under the two bases noted is reproduced herewith. In addition to the two bases used on the Altoona property a valuation based on unit prices as of Jan. 1, 1922, was made for the Southern Pennsylvania Traction Company. A table showing the summary of these three bases is printed herewith.

For both companies the amount of depreciation was determined on each of the bases, representing the amount of existing depreciation due to wear or mechanical deterioration ascertained by field inspection and measurement.

The Altoona property consists of a 53-mile electric railway system in Altoona with two interurban lines, one to Lakemont Park and Hollidaysburg, and the other to Bellwood and Tyrone,

SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE PROPERTY OF THE ALTOONA & LOGAN VALLEY ELECTRIC RAILWAY, INCLUDING THE HOME ELECTRIC LIGHT & STEAM HEATING COMPANY AS OF DEC. 31, 1919

	Basis No. 1	Basis No. 2	
	Prices Current Dec. 31, 1919	Average Prices Years 1914-1919, Inclusive	Per Cent of 1919
Physical Property:			
Land	$68,585	$54,868	80.00
Track	1,877,266	1,379,476	73.48
Bridges	217,953	167,154	76.69
Paving	640,348	399,950	62.46
Electrical distribution system	388,730	355,938	91.56
Rolling stock	1,041,870	735,160	70.56
Power station equipment	457,335	340,601	74.48
Shop machinery and shop tools	52,186	42,532	81.50
Buildings	361,030	263,268	72.92
Furniture and fixtures	9,114	8,102	88.89
Stores, tools and miscellaneous equipment	126,920	118,128	93.76
Expenditures not apparent in inventory	41,044	41,044	100.00
Engineering and superintendence	244,936	181,497	74.10
Administration, organization and legal expense	231,339	231,339	100.00
Taxes during construction	15,114	15,055	99.60
Interest during construction	461,902	303,388	65.68
Working capital	59,000	59,000	100.00
Cost of financing	314,733	234,825	68.72
Total	6,609,405	4,931,325	74.61
Lakemont Park	408,137	297,236	72.83
Total physical property	$7,017,542	$5,228,561	74.51
Developmental Costs:			
Expenditures for obsolete equipment and construction	$323,218	$323,218	100.00
Cost to unify system	100,000	100,000	100.00
Loss of interest during operation	491,228	365,999	76.54
Total development costs	$914,446	$789,217	86.31
Total cost of reproducing and developing the property	$7,931,988	$6,017,777	75.87
Home Electric Light & Steam Heating Company	$925,887	$714,375	77.16
Grand total	$8,857,878	$6,732,152	76.00
Cost new less depreciation	$8,077,427	$6,163,700	76.31
Certificate of valuation issued by Public Service Commission of Pennsylvania, Aug. 7, 1922	....	$6,600,000	

COMPARATIVE SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE PROPERTY OF THE SOUTHERN PENNSYLVANIA TRACTION COMPANY AS OF DEC. 31, 1919

Basis No. 1—Prices Current Dec. 31, 1919
Basis No. 2—Average Prices Years 1914 to 1919, Inclusive
Basis No. 3—Prices Current Jan. 1, 1922

	Basis No. 1	Basis No. 2		Basis No. 3	
	Prices Current Dec. 31, 1919	Average Prices Years 1914-1919 Inclusive	Per Cent of 1919	Prices Current Jan. 1, 1922	Per Cent of 1919
Physical Property:					
Land	$94,766	$75,812	80.00	$94,766	100.00
Track	1,984,829	1,449,612	73.03	1,671,775	84.23
Bridges	83,920	61,541	71.42	71,931	85.71
Paving	758,280	546,536	72.08	747,254	98.55
Electrical distribution system	418,443	382,009	91.29	300,115	71.72
Rolling stock	1,182,914	842,294	71.21	1,219,280	103.07
Power station equipment	454,851	340,851	74.94	379,017	83.33
Substation equipment	58,634	42,032	71.69	60,031	102.38
Shop machinery and shop tools	14,014	11,422	81.50	12,410	88.55
Buildings	277,942	208,003	74.84	238,727	85.89
Furniture and fixtures	6,080	5,405	88.90	3,952	65.00
Stores, tools and miscellaneous equipment	94,803	84,469	89.10	102,380	107.99
Expenditures not apparent in inventory	125,613	125,613	100.00	125,613	100.00
Engineering and superintendence	249,324	186,665	74.87	219,176	87.91
Administration, organization and legal expense	241,805	241,806	100.00	241,806	100.00
Taxes during construction period	9,065	9,159	101.04	8,744	96.46
Interest during construction	484,423	369,058	76.19	439,758	90.78
Working capital	69,000	69,000	100.00	62,700	90.87
Cost of financing	326,985	249,114	76.19	296,837	90.78
Total cost of physical property to reproduce new	$6,935,691	$5,300,401	76.42	$6,296,272	90.78
Developmental Costs:					
Expenditures for obsolete equipment and construction	$464,535	$464,535	100.00	$464,535	100.00
Cost to unify system	100,000	100,000	100.00	100,000	100.00
Loss of interest during operation	485,499	372,445	76.71	440,739	90.78
Total development costs	$1,050,034	$936,980	89.23	$1,005,274	95.73
Total cost of reproducing and developing the property as of Dec. 31, 1919	$7,985,725	$6,237,381	78.11	$7,301,546	91.43
Cost new less depreciation	$7,068,944	$5,554,859	78.58	$6,481,706	91.69
Value of power contract	$265,033	$265,033	100.00	$265,033	100.00
Certificate of valuation issued by Public Service Commission of Pennsylvania, July 11, 1922	....	....	......	$6,700,000	

and it also controls the Home Electric Light & Steam Heating Company, which does a general light and power business in the boroughs of Tyrone and Bellwood and intermediate settlements and territory.

The Southern Pennsylvania Traction Company property consists of 54 miles of electric railway in the city of Chester and suburbs, and suburban lines to Media, Eddystone and Darby and lines connecting with the electric railways in the cities of Philadelphia, Pa., and Wilmington, Del. This company is a subsidiary of the Wilmington & Philadelphia Traction Company.

In addition to the inventory of the existing physical property, the engineers submitted a report on the developmental costs of the properties, which is divided into three heads:

(a) Expenditures for obsolete equipment and construction.

(b) Cost to unify system.

(c) Loss of interest during early years of operation.

This method of computing developmental costs obviates reporting an estimated percentage of total physical property by submitting a tangible statement of capital invested in the property actually superseded owing to the development in the art of transportation (and in order to bring the property to its present state of efficiency). The amount included for superseded property was the depreciated value of the property at the time of supersession.

It may be interesting to note that in the case of the Southern Pennsylvania Traction Company approximately 16 per cent of the mileage was superseded before it had been used ten years, and in the case of Altoona approximately 10 per cent was superseded before it had been used ten years.

In no case is a general contractors' profit included in either valuation. In lieu of contractors' profit and overhead expenses there is substituted the necessary plant acquired and expenses incurred by the company that it may do the work itself and save the item of contractors' profit. These items are storeroom and material yard expenses, construction tools, contingencies and omissions, loss and waste, liability insurance, special supervision and engineering and superintendence.

Tax Exemption Up Again

Adoption of the pending resolution proposing a constitutional amendment putting an end to the issuing of tax-exempt securities will be urged upon Congress at its short session, it was stated on Oct. 23 by high fiscal officers of the Administration. They declared the question of tax-free bonds was the most important, not alone of the national tax problem, but of some of the industrial ones as well.

It was indicated that the proposed legislation would have the full support of the Administration. President Harding was expected to renew in his annual message to Congress in December his recommendations for such a change in the organic law. Secretary Mellon and other treasury officials also were prepared to reiterate their support of the resolution.

Aside from the proposal to end the issuing of non-taxable securities, recommendations with respect to taxation to be made to Congress by Secretary Mellon in his forthcoming annual report were expected to be few and to deal largely with such changes in the existing law as have been found to be desirable through its application.

It was indicated that no general revision of the law, such as was made a year ago, was contemplated. Re-enactment of the excess profits tax has its advocates in both branches of Congress, but this is opposed generally by the Administration, as is also the proposition to tax undivided surpluses of corporations.

Financial News Notes

Balance Shown.—The stabilizing fund of the Community Traction Company, Toledo, Ohio, showed a balance of $10,414 for the month of September.

Nine Months Net $971,166.—For the nine-month period ended Sept. 30, 1922, the Market Street Railway, San Francisco, Calif., reports a railway operating revenue of $7,093,838 with expenses amounting to $5,143,215. The net income was $971,166.

Preference Stock Offered.—Stone & Webster are offering $1,300,000 of the 7 per cent cumulative prior preference stock of the Puget Sound Power & Light Company, Seattle, Wash. The par value is $100, redeemable at $110. The price is $105 and accrued dividend to yield 6.65 per cent.

Net Income $772,186.—For the three months ended Sept. 30, 1922, the Brooklyn (N. Y.) Rapid Transit Company reports a total operating revenue of $9,136,132 against $8,700,386 for the same period in 1921. The operating expenses increased from $5,625,956 in 1921 to $5,994,057 for the same three months of 1922. The net income was $772,186 for the 1922 period against $702,362 for the three months ended Sept. 30, 1921.

Increase in Balance Reported.—The Republic Railway & Light Company and subsidiaries, Youngstown, Ohio, have reported gross earnings of $7,643,551 for the twelve months ended Sept. 30, 1922, against $7,727,960 for the same period in 1921. The balance for depreciation, dividends and surplus amounted to $563,761 for the twelve months ended Sept. 30, of this year, an increase of $291,314 over the balance for the same period a year ago.

Offering of Gold Bonds Announced.—H. T. Holtz & Company, Central Trust Company of Illinois and Hamilton & Company are offering $2,500,000 of the Southwestern Gas & Electric Company's general mortgage 6 per cent gold bonds, series of November, 1922. The bonds are dated Nov. 1, 1922, and are due Nov. 1, 1957. The price of the bonds is 90 to yield 6.75 per cent. The Southwestern Gas & Electric Company operates the electric railway system in Texarkana, Ark.

Traffic and Transportation

Commissioner's Advice Ignored

Toledo Council Votes Against Use of One-Man Cars Despite Proof of Their Value

One-man cars tested for three months on the Bancroft Belt line and three days on the East Broadway and Cherry Street lines have been eliminated from Toledo by vote of City Council. This action followed the disapproval of the cars by the railroads and telegraphs committee at a previous meeting.

There was practically no complaint from citizens other than a lobby of street railway employees and union officials who had approved them when the wage agreement was made in March.

Street Railway Commissioner W. E. Cann was unable to present much of his argument to the committee because of the prejudiced views of the members before the hearing. In fact the members paid very little attention to the actual results of operation.

INVESTIGATION COMMITTEE VOTED DOWN

Councilman B. J. Dalkowski, who led the opposition, offered to have a committee appointed to investigate the cars after Council's action. He was voted down eighteen to two. He was told that technically there wouldn't be any cars to investigate.

Commissioner Cann said the equipment would be immediately turned back into two-man service.

From the results of the Bancroft Belt line he had figures to show that costs of operation were cut 21.9 per cent while actual service was increased 6 per cent.

Comparing months of May and August, the cars turned in 34,875 car-miles in the former month as against 36,635 car-miles for the one-man equipment in the latter month. This increase of 2,060 car-miles is 6 per cent gain.

Actual wages paid to motormen and conductors in May amounted to $3,265, as against $2,378 in August to one-man operators, showing a saving of $887 for the one month. The additional car mileage would require $112 for power and $61 additional maintenance allowance, leaving a net saving of $713, or 21.9 per cent.

ACCIDENT RECORD GOOD

Comparing periods of June 24 to 30 and Oct. 1 to 7 it is shown that passenger revenue increased 6.77 per cent on the Bancroft Line as compared with 2.09 per cent over the entire system.

In the face of these almost unbelievable figures of economy the Council took its action to forestall the use of one-man cars on any of the lines.

It was also shown from the accident report sheet that nearly nineteen out of twenty accidents on the line were merely bumping or scraping of automobiles or other motor vehicles and not attributable to the one-man cars. Not more than three door accidents were experienced in all the operation and those are not all to be blamed on the structure of the one-man car, in the commissioner's opinion.

Following Council's action Commissioner Cann asked the body where he stood when as technical adviser to the Council in such matters they wouldn't take any of his advice. No member rose to define his position. He said he might refer schedules and other details of the work to that body as well as major questions if they desired to do all the work.

Rate Reductions Effect Saving of $20,350,000

A review of rate reductions of the past year by the Railroad Commission of California has established the fact that an annual saving of $20,350,000 in rates and fares to the public of the state has been effected. Computed upon an annual basis the aggregate saving is made up as follows: electric rates, $6,000,000; gas rates, $2,900,000; railroad rates, $10,450,000; express rates, $1,000,000. In the words of H. W. Brundige, president of the commission, this annual saving has been brought about notwithstanding the fact that utility rates have been maintained at all time at levels distinctly below "cost of living" figures compiled by the federal government. The commission is of the opinion that this annual saving in rates and fares marks the swing of public utility charges toward normal levels.

Violators of Jitney Ordinance Sentenced

Four drivers of jitneys in Kansas City, Mo., were sentenced to jail for contempt of court through violation of injunctions against operation, and have served sentences. Two served three days, and two served six days. This is the first real action of the kind ever taken locally.

A Kansas City ordinance requires jitney operators to secure the consent of a majority of "front footage" on routes covered, preliminary to operation. The Circuit Court of Jackson County upheld this ordinance in April this year, and issued an order restraining operation contrary to the ordinance. Many jitneys ceased running at that time. Complaints of contempt of court for violation of the injunction were filed against several, and after delays, they were recently brought to trial and the above sentences meted out. No operator has secured the necessary consents, and few jitneys are being run, except those in interstate traffic.

Traffic Regulations Changed

Street Cars No Longer to Be Permitted to Fit in with Moving Traffic in Los Angeles

Operation of street cars at curves in the downtown section of Los Angeles has been ordered changed by the City Council as part of an extensive readjustment of traffic regulations.

Heretofore cars have started around curves against the traffic signal. For instance, a car turning from west to south would start when the signal opened north and south bound traffic and would fit in with the moving line of vehicles. Under the new plan, cars making such a turn will start when east and westbound traffic is open. The old plan was ordered several years ago by the police department to avoid squeezing automobiles between street car and the curb in narrow streets.

The Los Angeles City Council made a move toward keeping the car tracks reasonably clear of automobiles, when, in the same program, it authorized an ordinance against automobiles or trucks stopping anywhere than against the curb unless halted by a blockade or by traffic signal.

Second line parking has been one of the first causes of the congestion and delaying street cars in the downtown Los Angeles. Merchants have pleaded that they have not had a chance to make deliveries, as passenger cars monopolize all the curb parking space. Under the new traffic plan, the curb will be marked into 20-ft. and 30-ft. spaces, the former to be used by passenger cars for forty-five minutes, and the latter to be used by commercial vehicles for fifteen minutes. A passenger car may load and unload in a commercial vehicle zone, but must not stand more than one minute.

Efforts will be made to compel pedestrians to move with the traffic officer and to curb "jay-walking."

The greater part of this program was presented by the Greater Los Angeles Traffic Commission, made up of men and firms interested in the proper handling of traffic.

Houston Agrees to Curb Jitneys

An agreement has been reached between the Houston Electric Company and City Council in connection with the problem of jitney competition. At one time this matter threatened to reach a climax in higher fares by the electric company in order to guarantee earnings allowed by the Federal Court and meet interest on bonds sold locally. The city was all prepared to ask the voters to decide whether jitneys should be abolished or retained.

The city has now agreed to cut down the number of jitneys in operation from about 300 to 250 by Jan. 1. These are to be on the lines reached by street cars. The company had discontinued all improvements pending some action by the city, but has now resumed its extensions, paving, and other work, promised to be carried out when it raised funds from local investors.

Saginaw's Fate Up

People Will Decide Whether Franchise Providing Motor Coach Extensions Is to Be Adopted

One of the most strenuous campaigns in the history of Saginaw is drawing to a close, and on Nov. 7 the people will know whether electric railway service is to be resumed with motor coach extensions. At the general election on that day the electors will vote on a franchise that was submitted by the Council after it had been presented with signers numbering thousands. While the measure has had its opponents, it has not lacked for support, and as the opposition grew, the support did likewise. An educational campaign through the press and public meetings has been going on for the last two weeks and will continue up until Monday, Nov. 6.

The Exchange Club, one of the city's many luncheon organizations, has backed the citizens' committee that succeeded in having the franchise initiated and has gone to the extent of blocking the entire city and on election day will have workers in every voting precinct. This organization has left nothing undone to have the measure adopted.

The opposition centers with the United Club. This organization months ago attempted the financing of a locally-owned motor coach system and succeeded in getting $5,000 in cash and $20,000 in subscriptions for a $400,000 company. After it failed nothing was again heard of the organization until the franchise was submitted to the Council, and with the slogan of "On the job" they started knocking the franchise at meetings throughout the city.

PROVISION MADE FOR ELECTRIC CARS

While it is impossible to make a prediction at this time as to the success of the franchise, many who have in the past opposed grants to public utilities are unwilling at this time to say that the measure will be defeated.

The franchise provides for street cars on lines formerly owned by the Saginaw-Bay City Railway Company, in bankruptcy since August, 1921, and motor coach extensions. The period of the grant is twenty-five years. The rate of fare is twenty tickets for $1; 10-cent cash fare; four tickets for 25 cents, free transfers. This rate of fare is to extend over a period of two years, after which the Public Utilities Commission is to fix it.

The company is to be relieved of all paving and repaving but is to keep the pavement between its tracks and one foot outside in repair and pay for all necessary cost of extra foundation required because of its tracks being in the streets. New tracks are to be laid in several streets during 1923.

At least two-thirds of the board of directors will be Saginaw men, and Otto Schupp, trustee of the bankrupt railway, has been asked to accept the presidency of the new company if the franchise carries. Mr. Schupp, to whom the franchise is to be granted, has promised the people that he will not assign the contract until the new company deposits $400,000 with which to make the improvements and rehabilitate the property and names the Saginaw officers. The company is not to be connected in any way with any of the local utilities controlled by the Commonwealth Power, Railway & Light Company.

All competition is to be eliminated, and the same legislation is provided to stop competition on interurban traffic that use the company tracks as a means of egress and ingress from and to the business district.

The contract also provides that when the utilities commission fixes the new rate of fare, the franchise given the new company is not to be capitalized, no consideration is to be given if during the first two years there has been a loss because of the rate of fare as established, and the stock and bonds of the Saginaw-Bay City Railway Company, are not to be included in fixing the value of the property upon which it will be permitted to earn a profit.

Transportation News Notes

Elimination of Skip-Stop Tabled.—For the time at least the effort started in the Fort Wayne, Ind. City Council to make the Indiana Service Corporation cut out its skip stops and stop at every street intersection has been discontinued.

New Service Started.—The Northern Texas Traction Company, Fort Worth, Tex., has begun operation of cars on the recently constructed South Adams spur of the Hemphill Street line. A new residential district with several thousand persons is served by this extension.

Refuses Lower Fare Request.—The Georgia Public Service Commission has denied a petition by citizens of Rome, Ga., requesting a reduction in fares. The present fare on the lines of the Rome Railway & Light Company is 6 cents, while in nearly all other Georgia cities the fare is 7 cents.

Go to Theater on Half Fare.—The Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, has cut its rates from Port Clinton to Toledo for the 5:30 and 6:30 p.m. cars. This is done to give Port Clinton people a theater car at prices equal to the regular half-fare rate.

Denies Petition.—The Georgia Public Service Commission has denied a petition by the Atlanta Board of Education requesting half fares for school children. The contention of the Georgia Railway & Power Company that such reduction would be discriminatory, has been upheld by the commission in its decision. The commission voted four to one to reject the petition, which was originally filed several months ago. The existing fare in Atlanta is 7 cents.

Motor Cars at Chattanooga.—The motor-driven railroad car has made its appearance in Chattanooga. It is a gasoline propelled combination passenger and baggage car, on the Tennessee, Alabama & Georgia Railroad. The cars will displace steam propelled trains now used on certain schedules. It accommodates forty passengers.

Demands Lower Charges.—The East St. Louis City Council on Oct. 24, unanimously passed a resolution demanding a reduction in utility charges and requesting the Illinois Commerce Commission to make an investigation. The resolutions declare there has been a reduction in the cost of material and labor, which it is stated are now only 36 per cent above the average in July 1913. The present fare on the lines of the East St. Louis & Suburban Railway in East St. Louis is 8 cents.

Defends Skip-Stop Plan.—The Memphis (Tenn.) Street Railway will defend before the Public Utilities Commission the use of the skip-stop system. The company claims a saving of $100,000 a year is effected on account of this method of operation, besides a saving in fuel. The railway in its defense also says that since the establishment of this system average car-miles have been increased. The skip-stop system was installed as a war-time measure in the four largest cities of Tennessee, Knoxville, Nashville, Chattanooga and Memphis. Nashville and Chattanooga have since abolished it.

Mail Service Established. — After seventeen years of ineffectual discussion with the federal postoffice officials the first traction mail service between Fort Wayne and Garrett has been started. Thirty square feet of mail space has been alloted the Fort Wayne postoffice on the Fort Wayne & Northwestern Railway running between Fort Wayne and Garrett. It has taken twenty-four to forty-eight hours for letters mailed in Fort Wayne to reach Garrett because of Garrett's location away from railroads running through Fort Wayne which have a federal mail service and the change will, of course, cut out all this delay.

Will Repeal Ordinance.—Legislation enacted by ordinance at Johnstown, Pa., requiring that every trolley car be "manned by a motorman and conductor," will be repealed by the City Commissioners in order that one-man cars can be operated in the city by the Johnstown Traction Company. With the repeal of the old ordinance, the City Council is stipulating, under a new ordinance, a reduction in trolley fares to school children. The new bill has already passed first reading, and provides for a 5-cent fare to students. Mayor Joseph Cauffiel opposed the repealer and also the new bill, claiming that the trolley company should be made to give a 4-cent rate, twenty-eight tickets for $1 to school children. The passenger rate in the city is now 7 cents.

Personal Mention

Mr. Worley at Michigan

New York Engineer Selected to Become Professor of Transportation at Wolverine University

John S. Worley of Thompson & Worley, New York, has been selected by the board of regents of the University of Michigan to fill the position of professor of transportation and railroad engineering there. The position was created by the board of regents of the university at a meeting on Oct. 27. Mr. Worley will retain his interest in the firm.

Mr. Worley was born in Jackson County, Missouri, on April 19, 1876. He attended Odessa (Mo.) College and the University of Missouri, from 1895 to 1897. He received the degree of B. S. and M. S. from the University of Kansas in 1904. From 1903 to 1904 he was assistant engineer of construction of the St. Louis & Northern Arkansas Railway, and for the following five years was principal assistant engineer of Riggs & Sherman Company, Toledo, Ohio. During those five years he was also chief engineer of the Marion & Bluffton Interurban Railway of Indiana in charge of constructing 38 miles of that road. He was the senior member of the firm of John S. Worley, later Worley & Black, from 1909 to 1913. Mr. Worley also was associated with M. W. Thompson, New York City, from 1910 to 1913 in making appraisals and reports on railway properties and conducting railway litigation.

Mr. Worley has been a member of the engineering board of the Interstate Commerce Commission since 1913, and from 1920 to 1921 was the commission's consulting valuation engineer.

He was admitted to the Missouri bar in 1919, and is now a junior member of Thompson & Worley, financial experts, New York City. He is a member of the American Society of Civil Engineers.

A. D. Flinn to Direct Engineering Foundation

Alfred D. Flinn has been elected director of the Engineering Foundation, which is fostering organized industrial research on a nation-wide scale. Mr. Flinn is the first incumbent of the new post, created by the Foundation's governing board, composed of the four founder societies of civil, mining, mechanical and electrical engineers, to meet the expanding activities of the Foundation.

Mr. Flinn will retire as chairman of the Engineering Division of the National Research Council, a position which he has held since October, 1921, but will continue as secretary of the United Engineering Society in order that the Foundation may continue intimate relations with the founder societies. Mr. Flinn has been secretary of this society and of the Foundation since January, 1918, and is widely known by engineers throughout the country.

C. E. Taylor has been appointed chief engineer of power stations of the Wilmington & Philadelphia Traction Company, Wilmington, Del. G. T. Bromley was previously chief engineer of this department.

J. E. Carey, who has been assistant purchasing agent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has been appointed purchasing agent. F. E. Henderson, who formerly held the position, is now superintendent of railways.

C. H. Andrews, former manager of the North Carolina Public Service Company at Greensboro and later general superintendent of the Southern Utilities Company of Florida, has been attached to the operating department of the Carolina Power & Light Company of Raleigh.

R. S. Hecht, chairman of the board of directors of the New Orleans (La.) Public Service Corporation, has sailed for Rio Janeiro as the official representative of the American Bankers' Association, members of which will meet in the city during the Brazilian Centennial Exposition. He holds commissions also from various other American associations.

W. P. Guinan, who has been manager of the business department of the Montgomery Light & Water Company, Montgomery, Ala., has been transferred to the Dominion Gas Company, Hamilton, Ont. Mr. Guinan was formerly associated with the Danbury & Bethel Gas & Electric Company, Danbury, Conn. He has been with the Doherty Company for the past fifteen years, and in that time has been stationed with the properties in Denver, Col., Joplin, Mo., and Mount Vernon, Ill., under the management of the Doherty interests.

E. F. Gould, assistant general manager Aurora, Elgin & Chicago Railroad, resigned at the time the property was recently sold and reorganized under the name of the Chicago, Aurora & Elgin Railroad. Mr. Gould served in this capacity during the two and one-half years the line was in receivership. He had been connected with the property as electrical engineer and as consulting electrical engineer for the several properties controlled by Mandelbaum, Wolf and Lang, Cleveland, for several years prior to the receivership. Altogether his connection in various capacities with the Aurora, Elgin & Chicago Railroad extended through eighteen years. Mr. Gould graduated from Worcester in 1899 and was with the General Electric Company for five years after that.

Sir Henry Thornton Elected President of Canadian Company

Sir Henry Worth Thornton, manager of the Great Eastern Railway of England, who before going to England was general superintendent of the Long Island Railroad and president of the Northwestern Railway, Meadville, Pa., has been elected president of the Canadian National Railways. He will assume active charge within a month. He is relinquishing his connections with the English railway.

In 1914 Sir Henry joined the English company after three years association with the Long Island Railroad as assistant general superintendent and general superintendent. Much of his previous work had been with the Pennsylvania Railroad as draftsman, topographer, assistant in the engineers corps of the Pittsburgh division, supervisor of yards at Columbus, Ohio, assistant engineer of the Cincinnati division, engineer of maintenance of way of the Erie & Ashtabula division of the Northwest system, superintendent of the Mariette division of the Northwest system, and superintendent of the Erie & Ashtabula division of the Northwest system. He was also for a time during this period, from 1894 to 1911, connected with the Cleveland & Marietta Railway and the Cleveland, Akron & Columbus Railway.

Sir Henry's work in England has been conspicuous. He received the rank of colonel during the European war and was advanced to brigadier-general in appreciation of his work as director of the Channel transports. In 1919 he was raised to the knighthood for his service during the war as general manager of the Great Eastern Railway.

C. D. Baker, who for some time has been assistant general superintendent of the Long Island (N. Y.) Railroad, is now general superintendent. W. E. Canning has been moved up to the office of superintendent from the post of superintendent of freight, and Ralph Peters, Jr., has been made assistant superintendent.

R. M. Harding, since 1919 local manager of the Columbus Electric & Power Company, Columbus, Ga., has been elected a vice-president. The company is a consolidation of the Columbus Power Company, the Columbus Railroad and the Gas Light Company of Columbus, which was effected on June 1. Norman W. Mumford, Harry H. Hunt and Henry G. Bradlee, all of Boston, Mass., were also elected vice-presidents.

Percy L. Radcliffe, formerly superintendent of fare collections of the Detroit (Mich.) United Railway, has been made assistant general superintendent, reporting to Harry Bullen, general superintendent. H. F. Rech is acting as assistant superintendent of power, J. M. Mude as chief engineer, W. J. Vaugh as superintendent of distribution, Hugh Savage as superintendent of shops and W. M. Spaulding as general timekeeper. R. G. Skeman is filling the post of auditor, formerly held by Irwin Fullerton.

E. H. Sharpe, special representative of the executive department of the Pacific Electric Railway, Los Angeles, Calif., and in charge of the lately-created bureau of news, has resigned to be connected with the shippers' committee against dismemberment of the Southern Pacific-Central Pacific systems. Mr. Sharpe will assist in putting matters pertaining to this issue before the public. The shippers' committee against dismemberment, E. C. Thomas, general agent of the passenger department, has been transferred to the executive department to assume the duties formerly handled by Mr. Sharpe. Mr. Thomas has heretofore been in charge of advertising. George H. Blyth, chief clerk to the passenger traffic manager, was promoted to the position vacated by Mr. Thomas, and will henceforth be advertising anager of the company.

John Harry Stedman Dead

John Harry Stedman, Rochester, N. Y., secretary and a director of the Ohmer Fare Register Company, Dayton, Ohio, died in Rochester Oct. 28.

Mr. Stedman was well known in electric railway circles. For many years he was a regular attendant at conventions, where his cheerful manner, fund of humor and attractive personality made him extremely popular. He was prominent in many ways in his own city.

Mr. Stedmand was active in church work, was a member of many clubs, and was sought extensively as an after dinner speaker. He was also a verse writer of no mean ability. In his active days he had numerous business interests and at the time of his death was still a director in a number of corporations. He did much to develop the modern form of street railway transfer.

In commenting on his death the Rochester *Democrat and Chronicle* said in part:

> The world would be a brighter place to live in if it contained more men of the type of J. Harry Stedman. He showed the possibilities of enrichment of human intercourse, and by example taught the lesson that life need not be the dull and drab affair that so many of us make it by traveling in a single rut.

Mr. Stedman had not been in good health for some time and among the resolutions adopted at the Chicago convention of the American Electric Railway Association was one sending greetings of the members to him and the hope that he would live for many years. This resolution reads as follows:

> Whereas for many years J. Harry Stedman was a regular attendant at the conventions of this association, always willing to do his part in making the convention a success, always cheerful himself and cheering others with his wit and humor; and
>
> Whereas during the last few years he has been unable, because of poor health, to attend the meetings of this association, now, therefore, be it
>
> *Resolved*, That the members of this association send their best wishes to him, regretting that he is unable longer to attend their meetings, but hoping that he will live many years and that each will be full of the great joy which he deserves because of the pleasure he has given others.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Terminal Contract Let for $163,000

The contract for building the new joint terminal station of the Salt Lake & Utah Railroad and the Bamberger Electric Railroad, on the site of the present building, has been let to Jacobsen & Hodgson, Salt Lake City, for $163,000. Construction is to begin immediately. The firm of Young & Hansen, Salt Lake City, is in charge of the architectural work. T. E. Thomas, Ogden, was awarded the contract for plumbing and heating work, his figure being $21,300. The contract for the electrical work was let to the Salt Lake Electric Supply Company for $9,494.

The terms of the contract stipulate that the new building shall be completed and be ready for occupancy within 150 working days.

The new structure will be two stories high. It will have a frontage on South Temple Street equal to that of the present building, plus the distance from the east side of the building to the corner of West Temple and South Temple Streets, with a considerable frontage on West Temple Street.

Plan to Build Railway in Iceland

Besides Albania, the island of Iceland is the only country in Europe without any railway. It has now been decided to build an electric railway to connect the capital of the island, the town of Reykjavik, with the important agricultural districts of Arnes and Rangarvalli in the east of the country. According to its size Iceland is, in available water power, the richest land on earth. The line will be of 1 meter gage and about 100 km. long.

Conference in Geneva

There is to be a meeting of the rating committee of the International Electrotechnical Commission in Geneva, Switzerland, beginning on November 18. The member delegates from the United States to the meeting are expected to include representatives from the American Institute of Electrical Engineers, the Power Club, the National Electric Light Association, and other societies interested in electrical standardization. Dr. C. O. Mailloux of New York is president of the United States Committee of the Commission and also of the International body. The chief work to be taken up at Geneva will be to secure final agreement on the basis of rating of all classes of electrical machinery.

In addition to C. O. Mailloux, Clayton H. Sharp, H. M. Hobart, C. E. Skinner, Schuyler Skaats Wheeler, Gen. George H. Harries, Frank V. Magalhaes and Clarence L. Collens have been made delegates to the meeting.

ELECTRIC RAILWAY MATERIAL PRICES—OCT. 31, 1922

Metals—New York

Copper, electrolytic, cents per lb	13.81
Lead, cents per lb	6.62
Nickel, cents per lb	39.00
Zinc, cents per lb	7.45
Tin, Straits, cents per lb	37.00
Aluminum, 98 to 99 per cent, cents per lb	20.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	35.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$7.125
Somerset mine run, Boston	3.75
Pittsburgh mine run, Pittsburgh	3.25
Franklin, Ill., screenings, Chicago	2.625
Central, Ill., screenings, Chicago	1.87
Kansas Screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$40.00
Standard open hearth rails, gross ton	40.00
Railroad spikes, drive, Pittsburgh base, cents per lb	2.80
Tie plates (flat type), cents per lb	2.42
Angle bars, cents per lb	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.17
Steel bars, cents per lb	2.10
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	1.40

Hardware—Pittsburgh

Wire nails, base per keg	2.90
Sheet iron, (28 gage), cents per lb	2.90
Sheet iron, galvanized, (28 gage), cents per lb	3.90
Galvanized barbed wire, cents per lb	3.55
Galvanized wire, ordinary, cents per lb	2.60

Waste—New York

Waste, wool, cents per lb	15.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	14.00
Colored	12.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	75.00
White lead, (100 lb. keg), cents per lb	11.50
Turpentine, (bbl. lots), per gal	$1.64
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength, all sizes, A quality), discount*	85.0%
Putty, 5 lb. tins, cents per lb	6.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	15.625
Rubber-covered wire, No. 14, per 1,000 ft	6.50
Weatherproof wire base, cents per lb	16.00

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b.	
Chicago, dressed, per sq.yd	$3.35
Common, per sq.yd	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.34
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	50.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., N. Y	2.00
Sand, cu.yd., N. Y	1.00

Old Metals—New York

Heavy copper, cents per lb	12.50
Light copper, cents per lb	11.25
Heavy brass, cents per lb	8.25
Zinc, old scrap, cents per lb	4.25
Yellow brass, cents per lb (heavy)	7.50
Lead, heavy, cents per lb	5.50
Steel car axles, Chicago, net ton	$19.25
Old car wheels, Chicago, gross ton	16.50
Rails (short), Chicago, gross ton	21.25
Rails (relaying), Chicago, gross ton	30.00
Machine turnings, Chicago, net ton	11.25

60,000 Hp. Added to Steam Plants

The Southern Power Company, Charlotte, N. C., through Vice-President and Chief Engineer W. S. Lee, has announced plans for the immediate construction of additions to steam plants to be completed by Sept. 1, 1923, with a generating capacity aggregating 60,000 hp. Contracts for practically all of the equipment have been let and construction work will be begun immediately.

The new additions will be at the steam plant at Mount Holly, where equipment will be installed to generate 40,000 hp., and at the Eno steam plant at University Station, N. C., the capacity of which will be increased 20,000 hp. The Southern Power Company has under construction at present two hydro-electric plants. Of these, Dearborn plant, at Great Falls, S. C., is expected to be ready for operation by next March. The Mountain Island station, near Mount Holly, N. C., will probably be ready for operation in August of next year.

The two steam plants and one hydro-electric plant in North Carolina, and the Dearborn plant in South Carolina, all to be completed within less than a year, will have an aggregate generating capacity of 200,000 hp. Even with this enormous amount of power in sight, however, the Southern Power Company has been compelled to withdraw from the power market.

The company began signing contracts for power in anticipation of new developments immediately after contracts were let for the Mountain Island and Dearborn stations. Applications for more than 35,000 hp. were already on file, and since work has started the demands for prospective power have been so active that the company has sold all the power it dares sell against its new developments, so that the power situation today is approximately what it was a year ago, that is to say, there is no power in prospect beyond the amount which is already under contract.

The Southern Power Company has at present generating capacity in its hydro-electric and steam plants very nearly totaling 400,000 hp. The new developments, including both steam and hydro, will give it a maximum generating capacity of approximately 600,000 hp.

Approve Extension on Bueter Road

The County Commissioners of Fort Wayne, Ind., have approved a franchise petition of the Indiana Service Corporation to extend street railway tracks on Bueter Road to the International Harvester Company property.

The corporation is prepared to begin work on this important extension at once. Service to the Harvester company is to be made possible by running city cars on the Lewis Street line to the city limits and then on the tracks of the Fort Wayne, Van Wert & Lima traction line as far as Bueter Road. The new line will be placed along Bueter Road running south to the Harvester plant.

The present arrangement is made to fulfill an agreement made by the Indiana Service Corporation with the Harvester company to provide street railway service to the plant. The new plant is rapidly nearing completion and car service is imperative. Two former routes proposed by the traction company for the line were turned down. The franchise is for two years.

Rolling Stock

Savannah Electric & Power Company, Savannah, Ga., on Oct. 3 replaced the single-truck cars on the Battery Park line with large double-truck cars.

Great Northern & Piccadilly Railway, London, England, early in October placed a contract with the Metropolitan-Vickers Electrical Company for rolling stock at a price of £159,767.

Lincoln (Neb.) Traction Company has followed up a trial installation of twenty Economy meters with an order of thirty-one more, with which to equip completely all safety and single-truck cars. These meters are of the car inspection dial type.

Quebec (Can.) Railway has planned to install two gasoline railway motor cars for service on its line between Levis and St. George. The new cars, which will be built by a Canadian firm, will have accommodations for about thirty passengers and a compartment for baggage.

Track and Roadway

Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio, has practically completed the Columbus Avenue improvement in Fostoria.

Columbus, Delaware & Marion Electric Company, Columbus, Ohio, on Oct. 16 started work on the new right-of-way from north of Worthington into Columbus. It is thought the project will not be completed before the spring of 1923.

Los Angeles (Cal.) Railway will lower the track between Pimiento Street and Redondo Boulevard to conform to the new grade and will reconstruct and pave. The work of ballasting and paving the tracks on Whittier Boulevard is well under way.

Dallas (Tex.) Railway will commence a $500,000 line extension on Haskell and Lindsley Avenue. Delay has been caused by plans for paving these streets. Richard Meriweather is general manager and in charge of the work for the company.

Indiana Service Corporation, Fort Wayne, Ind., has put in operation the new extension to the Hoffman Street line. This extension is serving a large part of the Bloomingdale section of the city which has been without car service. The company has also recently opened up the newly built extension to the Lakeside line.

Power Houses, Shops and Buildings

Altoona & Logan Valley Electric Railway, Altoona, Pa., is constructing an addition to the power plant at Sixth Avenue and Thirty-second Street, the addition to be of brick and concrete with steel trusses, size 63 ft. x 70 ft. The basement will have a height of 10½ ft. and main floor 24 ft. A new 1,500-kw. generator, with 3,500-hp. engine will be installed, along with a new surface condenser.

Cumberland County Power & Light Company, Portland, Me., will soon put into operation its new 10,000-kw. power station, located on the tidal flats at the South Portland end of the Portland-South Portland bridge. The building itself is 45 ft. high, of brick and steel construction. It contains three boilers of 700 hp. each and two 5,000-kw. turbines. The construction has involved the use of 250 tons of steel and 500,000 brick.

Trade Notes

Johns-Pratt Company, Hartford, Conn., manufacturer of Noark fuses and protective devices, vulcabeston packing and insulation, and Johns-Pratt molded products, announces the appointment of George W. Mapother as New York district sales manager for the electrical division. Mr. Mapother will make his headquarters at the New York office of the company, located at 41 East Forty-second Street.

H. P. Hevenor has joined the staff of Dwight P. Robinson & Company, Inc., as consulting engineer. He was until recently a member of the firm of Engel & Hevenor, Inc., where he specialized in track construction, taking part in numerous large projects in the East, Middle West and South. Mr. Hevenor is a member of the A.S.M.E., Brooklyn Engineers' Club, New England Street Railway Club, the A.E.R.A., and other associations. He has been identified in the past with several concerns prominent in the track construction field.

New Advertising Literature

Root Spring Scraper Company, Kalamazoo, Mich., has published a nineteen-page booklet describing the root spring scrapers, lifeguards and accessories.

The J. G. Brill Company, Philadelphia, Pa., has issued Catalog No. 266. It is a twenty-three page illustrated booklet descriptive of its light-weight cars for city, surburban and interurban service.

Link-Belt Company, Chicago, Ill., announces the completion of a new general catalog, No. 400, which embraces its entire line. It contains 832 pages, is cloth bound and can be obtained from any Link-Belt branch office. This catalog not only includes the complete Link-Belt line, but also the products of the H. W. Caldwell & Son Company plant of that company.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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A Prompt Inauguration of Committee Work Will Help the Industry

PRESIDENT EMMONS of the American Association and his colleagues the presidents of the affiliated associations are making their committee appointments and the prospects are good for immediate resumption of committee activities. The earlier the committees can get started to vigorous work the better, because the period is all too short between now and July 1, when reports must be completed.

There is another good reason for starting committee work soon after the annual convention. The presentation of reports there and the resulting discussion furnish a certain amount of stimulus to renewed effort. This stimulus dies out with time, and if the organization of the new committee work is not started within a few weeks of convention time the committees have the task of getting up fresh interest as well as laying out their detailed duties. There is, furthermore, a certain snap to promptness which helps in getting up speed.

After all, the annual convention and the mid-year meeting form only the more spectacular part of the association functioning. The steady grind of committee work is the basis of the association's greatest usefulness, and every week lost in getting started is a real loss to the association.

Trackless Trolley to Be Given Real Trial in Near Future

AS LONG as discussion about the trolley bus related to installations in far Shanghai, or even comparatively nearby England, it provoked only casual interest in this country. The situation has changed materially during the past few months. This is largely due to the fact that reputable manufacturers have recognized this field as a reasonably attractive outlet for their product and they have put enough real development work into the trolley bus to render it appealing to transportation interests. The subject was considered important enough by the members of the American Institute of Electrical Engineers to induce them to devote the opening meeting of the New York section to it this fall. An attendance of several hundred men at the meeting indicated that the program committee made no mistake in selecting this topic.

The most convincing proof that the trolley bus will operate satisfactorily is that it is operating well on Staten Island, New York City; in Windsor, Ont.; in Toronto, Ont., and in Baltimore, Md. After having had experience with eight buses for a year or more, the Department of Plant and Structures of New York City on Nov. 4 put fifteen more into commission. The head of that department is enthusiastic for the trolley bus and says that it is the most economical form of surface transportation today. It will take time, and the data that come with time, to determine the accuracy of this assertion. Until the data are forthcoming, this type of vehicle will receive, and is receiving, much favorable attention partly for the reason that the overhead lines which feed it give an appearance of permanency to its route. Whether the savings of the bus trolley will offset the lower first cost of the gasoline bus remains to be considered. Some railway men, at least, think that they will. For example, the management of the New York State Railways has concluded that the trolley bus is the thing for certain crosstown and extension service in Rochester, and some of it heavy service at that. This conviction has taken the form of an application to the City Council for a franchise and construction will be pushed immediately such franchise is granted. The Virginia Railway & Power Company, long a believer in the possibility of this type of vehicle, has just placed an order for a couple of buses for Petersburg. All of this indicates that the merits of the vehicle are now in rapid process of determination.

What the Elections Mean to the Railways

ON THE national aspects of the Nov. 7 elections there is no need for comment here, but in some of its local phases, the election does have an intimate bearing on the work of some of the utilities. In Chicago the machine backed by Mayor Thompson, which has consistently fought the street railways, has been dealt a heavy blow, though this particular election is of interest only in its relation to the prospect of Thompson's re-election. In New York the people have returned to the governorship Al Smith, a Democrat, and have repudiated Governor Miller. The utility issues there were the water power matter and "home rule" in utility regulation. It is doubtful whether the voters over the State were sufficiently well informed on the water power matter to let it weigh with them, but in New York City it is probable the voters succumbed again to the 5-cent fare fetish of Mayor Hylan, whom they re-elected to office a year ago.

When Mr. Smith was Governor before, in 1919-1920, he realized that the electric railway problem was an economic one, and although measures of relief came grudgingly at first, still they came. When Governor Miller went into office, he insisted that a constructive policy be followed in dealing with utility regulation and as a result the utility commissions were reorganized and work started of unifying the traction systems in New York City and establishing a proper fare. A good beginning has been made on this program, but the real fruition of the work remains to be seen. The vote gives concern to the prospect of any real accomplishment on account of the hostility of the Governor-elect to the Transit Commission. In his talks on the stump Mr. Smith was of course bidding for votes, but should the attempt be made by him to abolish the Transit Commission or otherwise change the commission law, the conclusiveness of the vote in his favor would seem to indicate that the Republican Legislature will not hold out against him. In such event all the work of the Transit Commission would probably go into the discard. This would be a crime against the city and would throw the traction situation back into chaos.

In New Jersey the case in some of its aspects is somewhat similar to the result in New York. There also a Democrat and a pronounced advocate of 5-cent fares has been elected Governor, but he has with him a Legislature of the opposite political faith.

There was also a water power issue in California, but it was in the form of a constitutional amendment which would have pledged the credit of the State to the extent of $500,000,000 to engage in the business of developing hydro-electric power. The measure appears to have been lost by a vote of nearly two to one. In San Francisco, however, an amendment to the city charter was passed which opens the way to the purchase of the United Railroads by the city, if a price can be agreed upon.

Even late popular idols with the public were brought up with a halt on Tuesday, for in Detroit, where Mayor Couzens recently put over municipal ownership of the car lines, the vote was two to one against his proposal to oust the Detroit United interurban cars from the city streets, the proposed amendment to relieve the municipal railway of the cost of paving between the tracks was defeated and an issue of $5,000,000 of bonds to extend the municipal railway was voted down.

Problems of Rush Hours and Slack Hours Differ

THE problems of the rush hour and non-rush hour in city transportation service differ radically. In the former the chief purpose sought is to carry quickly and safely to their destinations all persons who present themselves for passage. As a rule some slight discomfort in travel is not considered by the public so important at these hours as speed and safety, and most passengers will board the first car or train which comes along in preference to waiting, even if they are reasonably sure that there is a seat on the following car.

During the non-rush hours conditions are different both with the company and the public. The latter, while perhaps just as critical of delays as during the rush hours, is more insistent on comfort in travel. In these hours, also, the company has more opportunity to build up travel. It also has more incentive to do so because it can thereby fill in the valleys in its daily traffic curve.

Many rules as to economical car operation apply to both rush-hour and slack-hour traffic. Such rules include through routing and means for increasing running speeds, such as reduced street congestion, rapidity of passenger interchange and double berthing on crowded streets. Other rules are more applicable to one period than the other, and among these is accurate timing of runs. In the rush hours, indeed, it is less easy to maintain schedules exactly. But in the non-rush hours, much can be done and should be done along this line. It helps traffic in two ways. An unusually long gap between cars will not only send prospective passengers walking but will crowd the delayed car so that it is likely still further to be put off its schedule. This means that the need for accurate time operation, especially in the slack hours, should be drilled into the operating force.

Picking Men for Jobs in All Electric Railway Departments

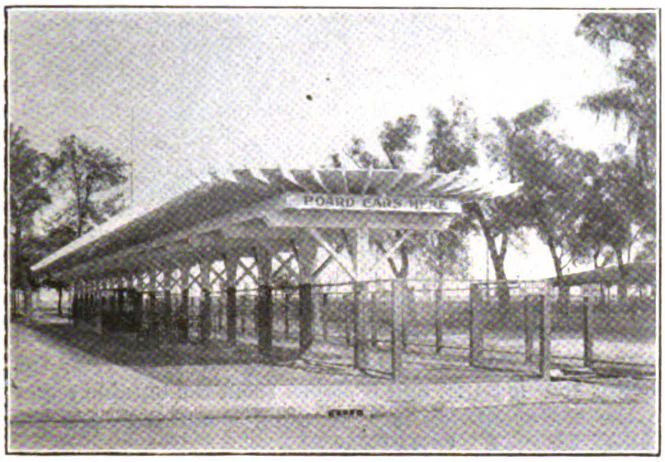
FOR many years past the American Electric Railway Association and its subsidiaries have shown an active interest in the subject of selecting and training employees. Committees on education, on apprenticeship and on selection and training of employees have studied the field, tried experiments and written reports. These committees have been continued for a time, discontinued and later revived, usually in modified form. The problems with which they have struggled are never-ending ones, so that this cycle may be expected to continue for all time. This year the American Association has decided to continue the recently revived committee on education, while the Transportation & Traffic Association will discontinue that on selection and personnel of transportation department employees. The action of the latter association does not imply that the subject has been exhausted, but merely that effectiveness seems to demand concentration along somewhat different lines this year.

This committee, during its short career, has done much to stimulate interest in the human side of electric railway operation and has left a number of tangible records of its activities. Besides the record forms, outlines of procedure, etc., which the T. & T. Association committee has prepared, it has done the following general things which are of value: First, it has emphasized the need of greater care in the selection of employees. In fact, as the studies of the committee have progressed, this phase of the subject has seemed to assume greater and greater importance. It has become clearer than before that much money and effort can be saved by eliminating the unfit and less fit individuals while they are still in the applicant stage. Second, the committee has shown that science can be of help in the selection of employees, without the use of academic or high-brow methods. This idea has only been partially impressed upon the industry, but progress is being made in the selling campaign. Third, the committee has furnished some excellent illustrations of the ways in which rational selection methods have been used on a number of properties. While experiments made so far have possibly shown more of what ought not to be done than what ought to be done, they are none the less valuable because of this fact. By a process of elimination faulty methods will be discarded and the proper ones continued until finally there will be reasonable assurance of a high average in selecting employees.

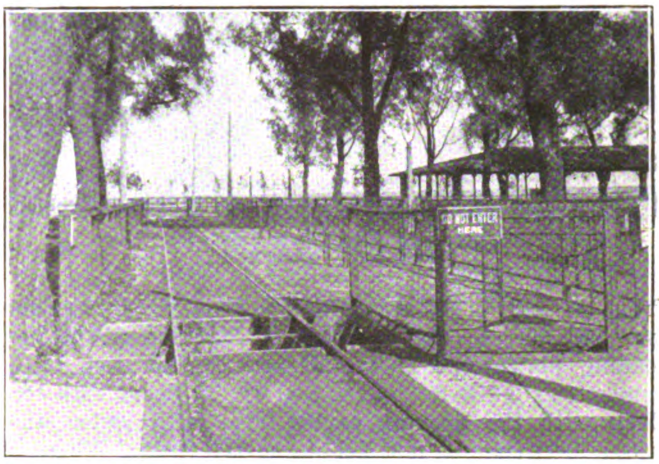
During the past year or so the psychological aspects of employee selection have come to attract a good deal of attention. It is to be hoped that something tangible will come out of this interest. It is obviously just as important to pick out a man with a good brain as one with a good arm, and psychology ought to be of help in doing this. However, this is only one aspect of the subject, and those which are less spectacular ought not to be lost sight of. During the coming year electric railways ought to, and doubtless will, try out many of the suggestions that have been made by the committee with a view to assisting them in picking employees intelligently. This will result in an accumulation of valuable data. Later, when the subject is again taken up for discussion, either under the wing of the parent association or of one of its subsidiaries, considerable progress ought to be in evidence. While the Transportation & Traffic Association has recently taken the initiative, the subject is one of general importance.

Expediting Traffic at a Busy Beach

New York State Railways Builds Loading and Unloading Terminal on City Property at Charlotte Bathing Beach in Such Form as to Facilitate Rapid Handling of Passengers with Minimum of Obstruction—Sightliness an Important Feature of the Design


BOARD CARS HERE

Loading Platform, Showing Shelter, Turnstile Station and Change Booth


DO NOT ENTER HERE

General View of Unloading Platform, Showing Water Barrier and Turnstile

On THE shore of Lake Ontario 6½ miles north of the business center of Rochester, N. Y., the city has recently acquired property which it has turned into a small park. The beach at this point is of fine, clean sand and is wide and gently sloping from the street level to the water. The city has provided bathhouses and automobile parking spaces and has beautified the spot until it is one of the most attractive in the city.

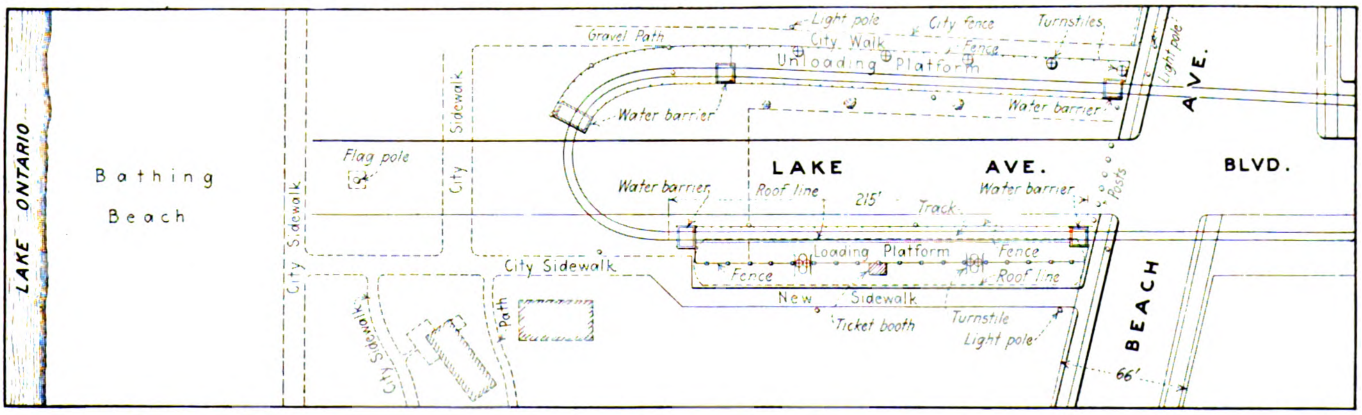
All of the above has much to do with the transportation problem which the development of the bathing beach has imposed on the New York State Railways. The beach is located at the end of Lake Avenue Boulevard, one of the principal north and south streets of the city on the west side of the Genesee River, on which street the railway company has a double-track line. This track leads directly to the business center of the city. It is located in large part inside the curb line, a location which minimizes vehicular interference.

During July and August, 1922, the number of fares collected to and from Charlotte was 500,170, indicating that 250,085 persons trolleyed to the beach monthly. The maximum number of fares collected on one day was on July 15, when the number was 23,785. The track has ample capacity for handling this large traffic but the problem of handling the people at the terminal was a serious one. It was, however, successfully solved, in co-operation with the city authorities, during the season recently closed. The accompanying pictures and drawings show how this was done.

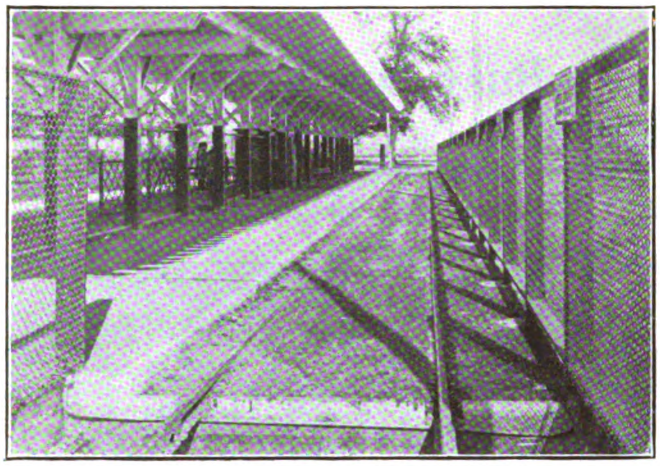
Loading and Unloading on Opposite Sides of Street

The first step was to build a single-track loop with the two sides on opposite sides of the street and of a length within the park sufficient to permit the simultaneous loading and unloading of four cars or two trailer trains. The unloading platform was located on the outbound side of the street and the loading platform on the inbound side.

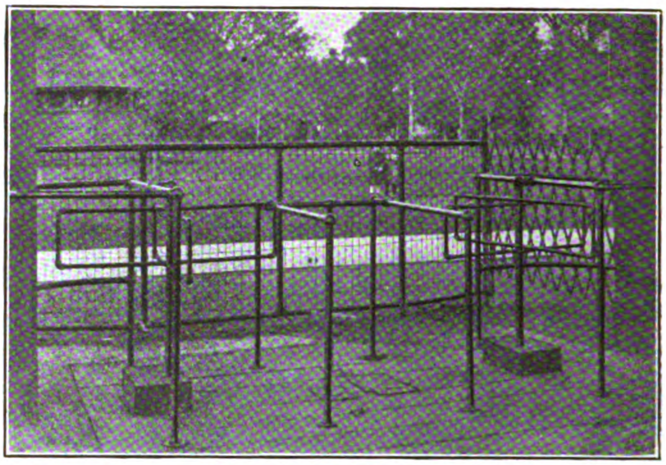
The unloading area was fenced in with large-mesh woven-wire fencing, 4 ft. high, this type being adopted to offer as little obstruction as possible to the view of the park and the lake. A form of cross-woven fencing was selected on account of its flexibility and attractive appearance. A stone screenings platform 12 ft. wide was provided between the track and the fence, and in the fence turnstiles constructed of iron piping in the company's shops were installed. To prevent ingress


LAKE ONTARIO
Bathing Beach
City Sidewalk
City Sidewalk
City Sidewalk
Flag pole
Path
Gravel Path
Light pole
City fence
Turnstiles
City Walk
Fence
Unloading Platform
Light pole
AVE.
Water barrier
Water barrier
LAKE AVE.
BLVD.
Water barrier
Roof line
215'
Track
Water barrier
Posts
City Sidewalk
Loading Platform
Fence
Fence
Roof line
New Sidewalk
Ticket booth
Turnstile
Light pole
BEACH
66'

General Layout of Charlotte Bathing Beach Terminal of New York State Railways, Rochester Lines



Loading Platform from Track Side with Water Barrier in Foreground



Close-up View of Fare Collector's Station, Showing Turnstiles, Auxiliary Fence and One Pantograph Gate

from the park to the unloading platform, water barriers were installed across the track at each end of the unloading platform. These barriers consist each of a cement basin, 10 ft. square and 18 in. deep, with top flush with the ground, partly filled with water, the water level coming just below the rail base. Where a tie rod is exposed over the barrier it is covered with rubber hose to prevent injury to a person who steps into the basin by accident.

Warning signs were conspicuously placed to supplement the warning which is furnished by the presence of the barriers, and the barriers are well illuminated at night further to prevent accident. As an extra precaution against the entrance of passengers to the unloading platform from the park end, the unloading platform was extended at the far end nearly to the curb line of the street, and an extra wide barrier was installed across the space at this point from fence to fence.

Loading Platform Details Well Worked Out

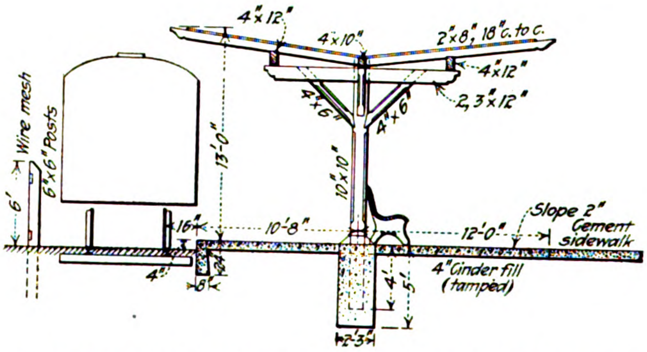
The loading platform is 10 ft. 8 in. in width and raised 4 in. above the rail level to facilitate boarding of the cars. It is a fill of stone screenings, edged along the track with a concrete curbing 2 ft. deep.

Water barriers of the same type as those used on the unloading side of the terminal are used on this side, only one being used, however, at each end.

The loading area was fenced in with more substantial fence construction, the fence being 6 ft. high as compared with the 4-ft. fence across the street.

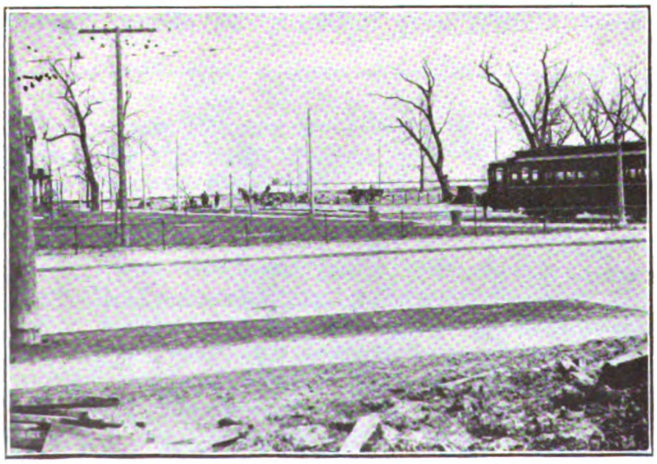
Along the outside fence line an attractive and substantial shelter was erected, the roof being supported on a single line of posts. The total spread of the shelter roof is 24 ft. and it slopes from the outside edges to the center, which is 1 ft. 3 in. lower than are the edges.

The accompanying cross-section gives the details of construction, which is necessarily substantial on account of the anticipated heavy snow loads. The columns are 10 in. x 10 in., long leaf yellow pine, spaced on 11-ft. centers, and set 4 ft. deep in a concrete base 5 ft. deep and 2 ft. 3 in. square.

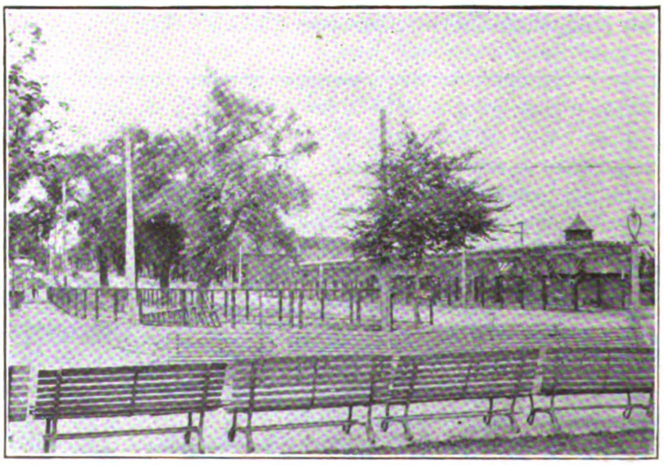


Cross-Section of Loading Terminal Platform and Shelter at Charlotte Bathing Beach

The roof of the shelter projects on one side over the car roof and on the other over a stone screenings platform 12 ft. in width. The latter platform, in turn,



Site of the New Charlotte Terminal Before the Beginning of Construction



General View of the Terminal as Seen from the Park Side abuts on a wide concrete walk leading from Beach Avenue past the shelter to the beach.

Two turnstile entrance stations were provided, a "close-up" of one of these being shown in an accompanying illustration. The design of these stations was carefully studied to provide for facility of entrance, ease of fare collection and control of ingoing stream of passengers so as to prevent overcrowding. In the plan these stations are shown in diagrammatic form only, but the details can be appreciated from the picture. A station occupies the space between two adjoining posts, and in the center is a railed stand for the fare collector. A fare box (not shown in the picture) hangs on the railing in front of him as he faces the incoming stream of passengers.

On each side of the conductor's station is a pipe turnstile, made in the company's shops, which can be unlatched by means of a pedal in the floor. Thus the collector controls one turnstile with his left foot and one with his right.

In front of the turnstile station is a substantial pipe-framed fence, with the ends flared slightly away from the line of the posts and with pantograph gates at the ends. This furnishes control of the ingoing streams of passengers, only enough of whom are admitted at one time to fill three cars comfortably.

In the main fence, also, is located one 10-ft. gate, which is kept open when the turnstile stations are not in use. Out of the bathing season there is not enough traffic at the beach to warrant the operation of the turnstile stations.

Midway of the length of the entrance platform is a change and ticket booth, an essential feature of the operation of the terminal because the local fare is 7 cents or a 6½-cent ticket.

On the north side of Beach Avenue the city has installed a number of posts to prevent vehicles from going farther north on Lake Avenue Boulevard than this point. This permits pedestrians to use the street as a walk. Some of these posts, however, have been made removable, so that vehicles can be admitted to this space if desired.

Printing Interurban Tickets as Used

Cash Register Adapted as Ticket Printing and Issuing Machine Materially Expedites Ticket Selling—Accounting and Auditing Greatly Simplified

By T. B. MacRae
General Auditor Chicago, North Shore & Milwaukee Railroad

A NOVEL departure from the customary method of selling railroad tickets was recently instituted by the Chicago, North Shore & Milwaukee Railroad. Tickets are now printed and issued by a cash register at the heaviest stations on the line. This scheme, which is being followed in eighteen stations, at two of which two machines are required, has proved to be practicable from both the ticket selling and auditing standpoints. Besides materially expediting the speed at which tickets can be sold, the agent is relieved of the tedious task of checking his sales when the ordinary type of ticket was in use. In a few of the stations change makers are used in conjunction with the register to make possible a still quicker transaction.

The ticket machine is essentially a cash register with additional features built into it for issuing railroad tickets. It is not yet a stock machine, but is manufactured upon order only. The tickets printed by it are much larger than we desire and this disadvantage has not yet been overcome. The ticket delivered is perforated so that there is a stub portion, which is torn off by the conductor and used for a hat check, and a ticket portion that is collected and sent to the auditor's office in the usual way. The detachment of the stub automatically invalidates the ticket. The machine prints the destination on both the stub and the ticket in numerals, the amount for which the ticket was sold, the date of sale and the number of the ticket. The reading portion of the ticket and the signature are printed from a die which can be changed at any time. We anticipated that passengers would object to a number being used for the destination, but no trouble has arisen on that score. On the contrary, the fact that the price of the ticket is also shown has in some cases prevented disputes between the passenger and the conductor as to the destination. Thus the number of the station and the price printed furnish a double check in case of error. The tickets are printed on paper water-marked with the name of the railroad.

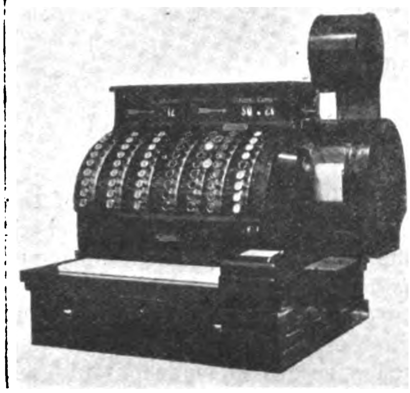
A blank roll sufficient for recording the sales of about 900 tickets is placed in the machine by the agent, and as each ticket is issued a record is made on this roll of the number, the destination and the price. It is impossible for the agent to get a ticket out of the machine without leaving this record, and this part of the mechanism is locked from the agent.

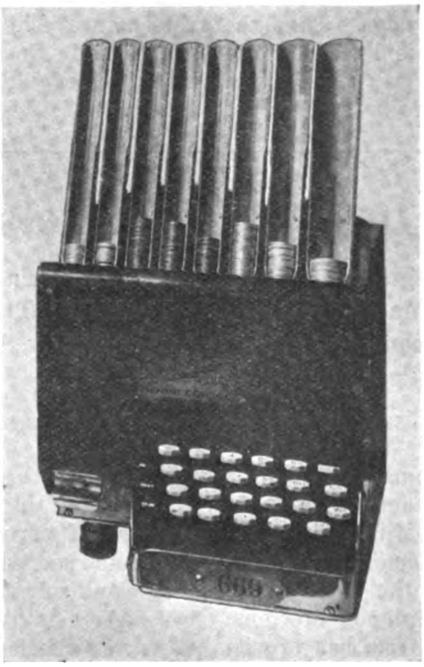
With the machines now in use, tickets can be printed for ninety-nine destinations and for any amount up to $99.99. In selling a ticket the agent presses the number corresponding to the destination, the proper keys for the amount and then touches an electric button and the machine delivers the ticket. For a half-fare ticket the depression of the proper key causes a "½" to be printed on the ticket also. If an agent sells any other form of ticket, for example a mileage book, a ticket is printed with the number of the selling station as the destination, while the amount shown is that of the price of the book. The ticket issued is kept by the agent and forwarded to the auditor with the daily report as evidence of the transaction.

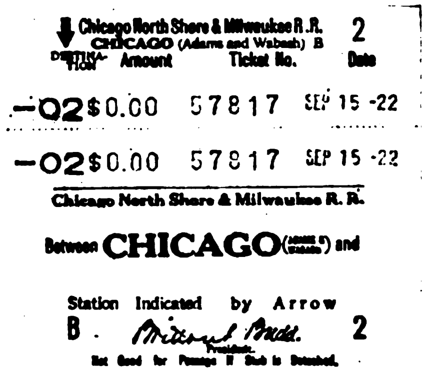
At the close of the day's business the agent removes the carbon record from the machine to accompany his report. The difference between the commencing and closing amounts is shown by the tabulator in the day's sales. To insure the accuracy of the report it is only necessary for the agent to check each amount recorded against the destination. A simple form of daily report is required which takes but a few minutes to prepare. As a daily report is required from each agent on the line, this machine, which eliminated an elaborate report and insured accuracy, met with instant favor on the part of the agents. The tape sent in requires more clerical help to audit than the regular form of report, but this is more than offset by the reduction in accounting along other lines.

When we started to use the ticket machine we were not confronted with the problem of issuing round trip tickets and, instead, a passenger is given two tickets good in either direction. We abandoned the use of round-trip tickets some five years ago to reduce the stock of tickets required and had the tickets printed so as to be valid between two points in either direction. For use in an emergency each station is supplied with a sealed ticket case and when the seal is broken the fact is immediately reported to the auditor's office.

The adoption of the cash register was the result of much study on the problem of improving the ticket-selling system and reducing the cost of that item. It is steam railroad practice, in general, to appoint an agent for each station and to hold him responsible for the proper accounting of that station. Due to the difference in operating conditions on most interurban railways it is not practicable to appoint an individual agent for each station. It has been found necessary to have two or more agents for each station and each agent naturally objects to any one else selling from his ticket case, for in the event of a shortage it would be impossible to place the responsibility for the loss. Each ticket seller, therefore, has to be provided with a ticket case, and following this practice there are at least three cases at each station on the North Shore Line. Each regular agent has one and the third is for an extra agent who might be sent to the station in the absence of the regular agent. Three times as many ticket accounts must be kept in the auditor's office as would be the case if there were only one person responsible, and a much larger stock of tickets must be carried. In addition the extra ticket case has to be audited each time an extra agent is sent to the station.







Chicago North Shore & Milwaukee R.R. 2
CHICAGO (Adams and Wabash) B
DESTINATION Amount Ticket No. Date

-02 $0.00 57817 SEP 15 -22

-02 $0.00 57817 SEP 15 -22

Chicago North Shore & Milwaukee R. R.

Between CHICAGO (Adams & Wabash) and

Station Indicated by Arrow
B . 2
President.
Not Good for Passage if Stub is Detached.

LEFT, TICKET-ISSUING CASH REGISTER AND, CENTER, CHANGE-MAKER IN WABASH AVENUE STATION, CHICAGO. RIGHT, SAMPLE TICKET —AS DESTINATION "2" SHOWN IS NUMBER OF ISSUING STATION AND NO PRICE IS PRINTED, THE TICKET IS NOT GOOD FOR TRANSPORTATION

In order to overcome these conditions, the accounting department worked for a long time on a scheme to place rolled tickets in each station. This plan provided for a sealed carton constructed in such a manner that tickets could be removed in any quantity but none could be replaced. As the rolled tickets were to be supplied by the traveling auditor and sealed in the carton by him, the objections of the agents were overcome and a substantial reduction in expenses in the auditor's office was contemplated.

This plan, however, was abandoned when the auditor was approached by a representative of the National Cash Register Company with a proposition to install a machine to print tickets as they were required. An experimental machine was bought and installed in the station at Wabash Avenue and Adams Street, Chicago. The operation of this machine was carefully watched by both the operating and accounting departments. Some apprehension was felt at first that the machine would slow up traffic, but actual operation showed that an agent could sell tickets much faster with this device than from a ticket case. The record of this particular machine is 2,200 tickets in a period of eight hours or nearly 300 an hour. The cash register will deliver in an hour almost as many tickets as an ordinary agent will sell in a day. Our heaviest station is now selling about 500 tickets per shift of eight hours. As a result of this initial test, all of the heavy stations have been provided with these machines.

The accounting department is now experimenting with a tabulating machine, also manufactured by the National Cash Register Company, which, it is claimed, will greatly reduce the clerical help required to audit and compile the statistics, not only from the register tape records, but also for the regular daily ticket reports. The results secured so far appear to bear out the claim.

Arkansas Utilities Exhibit at State Fair

THE Arkansas Utilities Association saw the opportunity to sow good seed with a display at the Arkansas State Fair. Every branch of the public utility industry was represented. On Oct. 11, Utility Day, addresses were made by Governor McRae, former Governor Brough, Mayor Brickhouse of Little Rock, State Director of Public Information Earle W. Hodges and others. The importance of the utilities and the fact that their interests and those of the public are linked were points emphasized by the speakers. So successful was the program that Director Hodges was asked by the fair management to arrange part of the program for Saturday, when Rev. H. G. Knowles made an address on public utilities.

"The Customer Is Always Right"

That Is, He's Right or Wrong, or Neither, or Both—In Any Case the Railway Can Assume that the Customer Wants a Two-Cent Transfer, Not $10,000, and that He Really Had No Smaller Change than a Double Eagle

By Frank H. Warren
Claim Agent of the Chicago, South Bend & Northern Indiana Railway
South Bend, Ind.

During the course of our recent business indisposition, when the funeral notice was almost on the press, the electric railway industry has been beset by a rapidly shifting multitude of high-sounding, plausible maxims, each warranted to rescue any business from the slough of failure and set it upon the highest pinnacle of success and prosperity. Among those with which we have been bombarded in these recent years are advertising salesmanship in transportation, merchandising transportation, operators as salesmen, local investors, zone fares, and numerous others. Just now we are urged to cultivate public good will as the most important asset we can have. It reminds me of the allopath and the osteopath and the homeopath and the chiropractor and the divine healer and the rubber and the surgeon and all the other varieties of healers of human physical ailments. The truth is that all the methods suggested have some merit, but none is a cure-all.

In our business distress we have looked with hopeful eyes upon every fair sounding catch phrase, and have gone from one to the other, getting a little help here and there, while nature in the form of general labor, business and economic conditions, has been busy, and the patient is improved. Just how much of the improvement is due to the medicine and how much to nature we know not. We have faith that all have done some good, but if the medicine has done nothing more than sustain our hope and courage while nature produced the cure, it was worth taking.

Out here in the Middle West, if not elsewhere, we have been tendered one prescription which some have been reluctant to try, because some of the ingredients look dangerous. This policy is the one on which Marshall Field is said to have founded the greatest retail business in the world, "The customer is always right."

Now the fact is that any given situation will be one of three: First, the customer is clearly and indisputably in the right; second, he is clearly and indisputably in the wrong; and, third, it is uncertain whether he is right or wrong, or he is partly right and partly wrong.

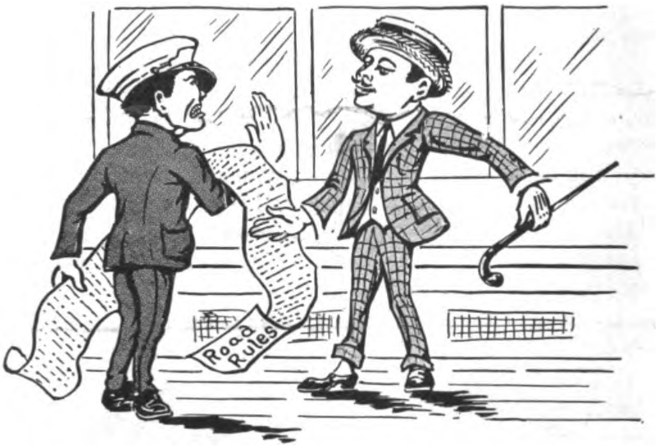
In the first instance our application of the policy can be prompt and decided. It is the height of foolishness to try to defend an indefensible position. But every industry has an occasional man who considers it criminal and traitorous ever to admit of an error. Such a man has no usefulness whatever in meeting complaints. An immediate acknowledgment of the justice of the customer's contention is the first step, followed promptly by the correction of the mistake. And in this correction we can well afford to be generous.

My position is that of a claim agent, and when a man comes into my office, having invested 5 cents with us as a passenger, and makes demands of me amounting to from 100 to 100,000 times his expenditure with us, it is simply out of the question for me to be generous according to his standards of generosity. No business, be it public utility or private, can do otherwise. Spend $10 with a shoe dealer and then demand of him a thousand or ten thousand dollar damage and see how generous he is. Observe how the policy "The customer is always right" works then. But limit your demands to the amount of your purchase and the policy will become active.

When a customer makes a demand involving the amount of his expenditure with us—5 cents or 10 cents—we can be as generous with him as can any private business in the world, not excepting Marshall Field & Company. We can be more generous because our sales unit has so low a value. This is where the transfer question comes in. When a customer comes into the office with a transfer that has been improperly rejected, we can take up that transfer, give the passenger his 5-cent or 7-cent fare or a new transfer and send him on his way rejoicing. Or when he has a story of a refusal to give him a transfer, we can punch one for him and send him out happy and friendly. We do not need to question him like a criminal; we do not need to delay him with a long investigation. We can surely assume here that the customer is right and treat him accordingly.

It Should Not Be Necessary to Ask the Ouija Board Whether the Passenger Is Right

In the second case, where his own story shows that the passenger is wrong, it is perfectly proper, as any private business would do under the same circumstances, to try moderately to show him where he is wrong. Failing in this effort, we could place him in class one for the purpose of this particular instance and deal with him exactly as we did with the class one man. But do we? We do not. We hold him to the rules. Lord, how close we hold him to the line. He is up against a wall of steel, cement and reinforced concrete. Not a fraction of a hairbreadth do we move. And the money involved is 5 cents or 10 cents or the value of a transfer! My grocer would not hesitate one second to take the opposite course; I tried him and he attempted to make me take back a 10-cent overcharge of which he had no knowledge. Recently a young man came into an office and complained that he had been refused a transfer because he rode past the transfer point while interested in a conversation. He was wrong under the rules, and the rules were just as rigid in the office as they were on the car. An explanation and a transfer would have sent him out a friend, and he possibly would never have made another similar complaint. He got the explanation but no transfer, and left the office an enemy to that company. If the office man who met him had accepted the policy that the customer is always right, he would have handled the case much differently and much better.



THE RULES ARE THERE, BUT THE CONDUCTOR NEED NOT ABUSE IN FOLLOWING THEM

In private business the enforcement of this policy lies among the other duties of supervisory or administrative officers; it cannot be left in the hands of clerks. To at least an equal extent it must rest with similar officials of a street railway.

The application of the policy lies almost exclusively in the handling of complaints. In private business, complaints may be broadly divided into those about merchandise and those relating to service. From this division alone it is at once apparent that a business whose merchandise is service will occupy a peculiar position as to this policy. My experience in private business is almost entirely limited to that of the purchaser, and from that experience it seems that the policy operates as to merchandise complaints and has little or no application to service complaints. As applied to merchandise it means the practical guarantee by the seller that merchandise shall satisfy the purchaser according to the latter's own standards of quality. If the purchaser says the shirts are bad and not as described by the seller, and if he persists in that opinion, his position is accepted as correct and the transaction handled accordingly. The firm that goes farthest in operating on this principle is usually accorded the highest business standing.

Is this principle of business practical for the street railway industry? If it isn't practical, the sooner its suggested use is abandoned the better. If it is practical, just how and where can we use it?

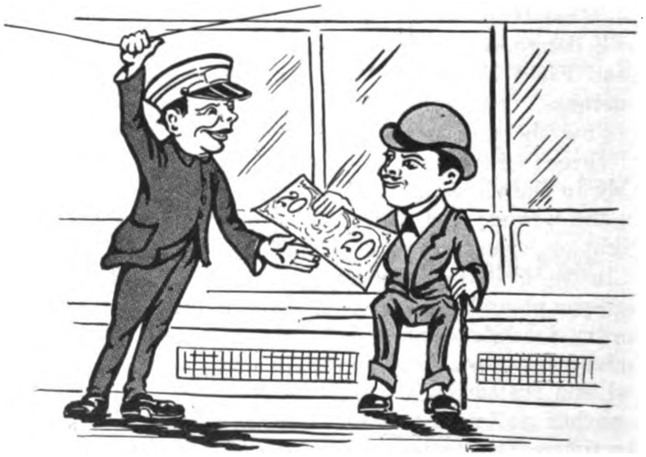
We have no merchandise in the sense that private business has, and therefore we can have little if any use for it in its commonest field in private business. We cannot redeem our merchandise because that presupposes a return of the article. Nor can we exchange articles, for the same reason. We might replace them perhaps, but that act with us would require a sacrifice that no private business would make.

To be perfectly fair about this thing and not thoughtlessly charge the street railway man with lower business ethics than the man of private business—if the merchant could not get back the complained-of article, if the customer had had full use of it, if the shoes had been worn out although they did pinch the wearer's toes and cause corns—would there be any refunding, or replacing or exchanging by the merchant? I rather imagine the answer is no. But this is just the situation in which every street railway company finds itself in complaints about its "merchandise," and the commonest of all applications of the policy is closed to it. This is so fully appreciated by its patrons that I have seldom known of a street railway being asked to refund. Unused tickets are not in point. We are asked to redeem them and we do redeem them, but while our patrons unhesitatingly demand this of us, it takes an unusual amount of "nerve" for the customer of a private business to demand his money back just because he decides he doesn't want what he bought. It's too much like branding himself as an imbecile.

There is a field for applying the policy in the handling of certain kinds of complaints about the operator's refusal to issue or refusal to accept a transfer.

When the complaint is directed at the conduct of employees, this policy can hardly be followed. Such complaints are nearly always personal matters. Private business will not follow the policy in similar complaints. Complain of your serving of meat at a good hotel and the meat will be promptly changed; complain of the discourtesy of the waiter and you will be told that the management does not uphold such conduct and will take up the matter at the earliest convenient time. They cannot accept the customer's judgment there, and neither can utilities. Or, rather, while they may be able to accept the patron's judgment, they cannot apply the prompt remedy as in the meat instance. Such a course is incompatible with maintaining an organization, is not fair to the employee, and would in the end be opposed to the best interests of the patron.

All of this refers to the attitude of supervisory officials, but that is by no means the limit of use of the policy. Clerks in stores cannot refund money or replace inferior or defective articles; they can only refer the customer to the proper person. Nor can operators on cars issue or accept transfers contrary to their instructions, redeem transfers with money or do anything that



TAKE THE BILL AND GRACIOUSLY ASSUME THE PASSENGER IS REALLY CAUGHT WITHOUT CHANGE requires the payment of money or the giving away of our merchandise. But they can know the company policy and they can refer the customer to the proper person. It would be highly valuable for these men to know that the company is anxious to make things right and say so without committing the company to definite action in a specific case. Any clerk knows what is the policy of the company he works for, he is certain of his ground and need not hesitate to express himself. Our operators should have equal knowledge and confidence.

WHAT'S THE HARM IF THERE IS ROOM, AND IF NOT, HE CAN BE APPEALED TO AS A GENTLEMAN

In many cases the operator himself can apply the policy. It is a change of mental attitude more than anything else. "The customer is always right" should mean to the man on a car that when a passenger comes up and says "I wanted to get off at that street. Didn't you hear the bell?" the customer is right—he did want to get off there, he did give proper notice, he has performed his part absolutely right, and the operator assumes this to be the fact even when he knows it is not the fact. He assumes that the bell didn't work, or he didn't hear it, or he forgot it, and says, "Oh, I beg your pardon!" stops the car at once, and lets Mr. Passenger off. "The customer is always right."

When an operator is tendered a large bill in payment of a 5-cent fare, this new policy prompts the operator to believe that the passenger is compelled to tender such a bill. Instead of assuming that the passenger is trying to ride for nothing or is just plainly mean or contrary, he assumes that the passenger is doing his very best and that for any one of a dozen reasons he has been caught without small change. The one thing he does not assume is that the annoying act of the passenger is intentional. This attitude of mind will provoke the correct handling of such a situation unless the operator is utterly unfitted for his job.

It may be that not every situation an operator faces can be met on this theory, but it is certain that a great many of them can be so met. In a series of meetings held on this property recently those presiding at the meetings had presented to them many specific cases, and there were few, if any, to which practical transportation men could not apply this policy. Operators using this policy show a consideration for their passengers that others do not have.

The objections to all this are two—the first one is that it can't be done, that it isn't practical for a street railway. The second—but little different—is that such a letting down of the bars would result in serious financial losses and the breaking down of all our organization by letting the customer run the business. The only real proof of the practicability of such a policy is its actual successful use somewhere, and sooner or later somebody will put on a satisfactory demonstration. As to the second objection, it seems no more valid in the street railway business than in private business. I have no doubt that when the policy was first proposed and discussed in the Marshall Field & Company organization it met with strenuous opposition, and there were predictions of enormous losses through abuse by their customers. No doubt there is some abuse, but the gains far outweigh the losses.

This standard can be applied to specific transactions, but hardly to general company policies and plans. Extensions of lines, frequency of headways, types of cars, financing and other similar matters cannot be handled according to this standard. The customer cannot be the judge here, although his opinions are entitled to consideration. No private business could let the customer decide whether or not a new store should be opened, additional clerks employed, the stock of goods increased or diminished, the building remodeled, a stock company, corporation or partnership handle the business, and similar matters that are essentially the problem of management.

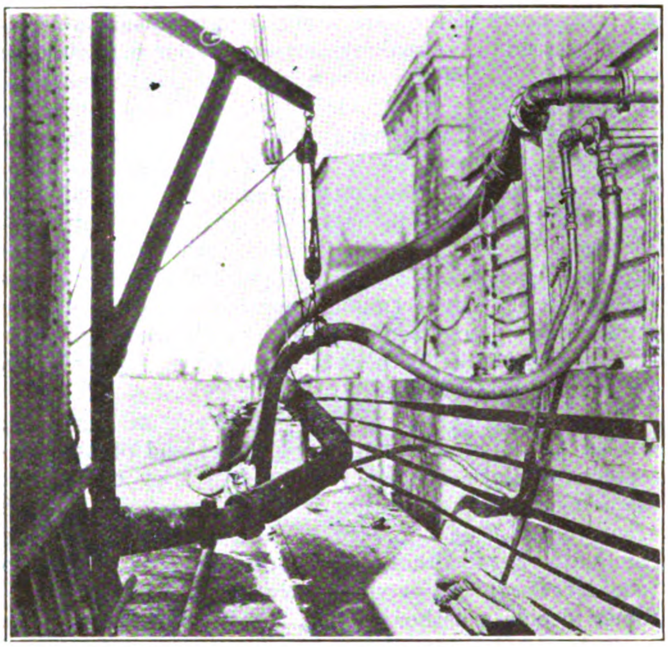
Introducing and extending this standard of business dealing should be an aid in the creation of good will. We have demanded and taken our pound of flesh these many years, and, like Shylock, have paid the penalty. It is time to consider the other tack.

Power Plant Uses Barge for Oil Storage

THE New York Central Railroad has two power plants which supply the New York terminal electrified zone. One is in Port Morris, New York City, the other at Yonkers. To avoid any possibility of a coal shortage tying up the power supply, several boilers were recently changed over from coal to oil fuel. To insure prompt supply of oil to the boilers at Yonkers, where six boilers have been remodeled for oil burning, an 8,000-bbl. barge loaded with Mexican crude oil was engaged for an indefinite period, as floating storage, and tied up to a dock alongside the plant.

Steam was carried from the plant through a 2-in. flexible connection to the barge, where it passed to the oil-heating coils and to a small simplex oil pump, both the coils and the pump being part of the permanent equipment of the barge. Another flexible connection ran from the pump discharge to the oil main, which extended through the wall of the boiler-room basement. After being heated to 160 deg. in the tanks of the barge, the oil was forced into the main by the simplex pump and made the circuit of the boiler-room basement. The pressure of 80 lb. at the pump allowed the burners to operate at 75 lb. A steady flow of oil was maintained considerably in excess of that required by the burners, the portion not used coming back to the dock through the return side of the main and passing to the barge tanks through a flexible connection. This excess flow was necessary to prevent the oil from cooling below a workable temperature.

Since the first oil-fired boiler started operation on Sept. 27 it has been running daily, while the other five were being changed over one at a time. On Oct. 24, when the accompanying photographs were taken, three



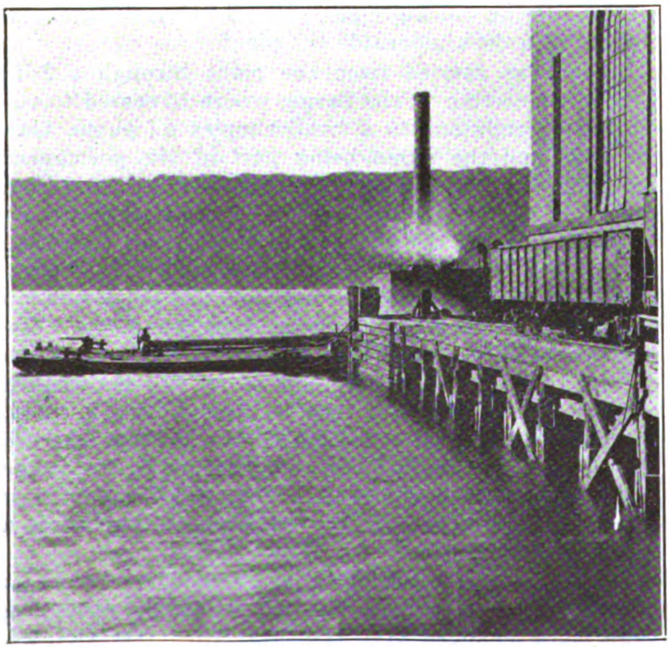
Flexible Oil and Steam Connections Between Barge and Power House

boilers were running on oil and a fourth was practically ready to put on the line. At the same time the work on the settings of the fifth and sixth boilers was well along, and the installation of the inside oil-handling equipment was nearly completed.

This inside equipment is now in operation, and the oil is pumped directly from the barge to three tanks, each of 2,500 gal. capacity. These are located in the basement and will soon be surrounded with a concrete wall 12 in. thick. The space between the tanks and the wall will be filled with sand to reduce the fire hazard. After being heated from 160 deg. to 180 deg. by thermostatically controlled coils submerged in the tanks, the oil gravitates through a twin strainer to a pair of 7½ x 5 x 6-in. duplex pumps connected in parallel. These force it through a heater, where its temperature is raised to 190 deg. before it passes to the burners.

As no outside storage, aside from the barge, has been provided, it will be necessary for the present to keep the barge tied up to the dock whenever fuel oil is burned, replenishing the supply from time to time from other barges. At some future time, if operation with fuel oil is continued, two 30,000-bbl. tanks may be installed outside, probably on a foundation made by driving piles and building up land in an adjoining docking space.

These changes were supervised by the electrical department of the New York Central Railroad under the direction of E. B. Katté, chief engineer of electric traction.



Oil Barge Tied to Power Plant Dock for Oil Storage

Letters to the Editors

Further Reference to Way Committee Report on Substitute Ties

Nov. 7, 1922.

To the Editors:

It seems most regrettable that the mix-up in the way committee's report should be further held up to the light. It was the hope of all concerned that the withdrawal of the unfortunate statement regarding substitute ties before the presentation of the report would, to a considerable extent, effect this; but in view of the fact that the report with the statement had already been distributed, the editorial of the *Journal* in the issue of Oct. 7 was inevitable.

The comment of the sponsor of the way committee, however, in the issue of Oct. 28 cannot be permitted to pass unchallenged. The editorial columns of the *Journal* are not the place to settle differences of opinion of committee members, and in fact the serious feature of the situation is less with regard to differences of opinion than with the far more important fact that the way committee report as issued, if not a minority report, was far from a unanimous one, as was evidenced by the unanimity with which the members at the convention agreed to the withdrawal of the statement in question.

The reports of the committees of the American Electric Railway Association have in the main had high prestige, due very largely to the extreme care taken to prevent radical unconsidered action. If the association is to maintain the same standing for these reports there must be the same regard that nothing is said or done that is not solidly based upon fact as indicated by a material consensus of opinion in the committee having the matter under consideration, and, where difference of opinion arises, by the display, equally prominent, of the opinions and the beliefs of those in opposition.

The grave facts in the case at issue are that what at best was a minority opinion was allowed to appear, even though it was later withdrawn, without making equally prominent the fact that there was at least a minority which disagreed. It is in this fact that far more mischief lies than in any other feature. Incidentally, without attempting to argue pro or con the criticisms in the *Journal* editorial of Oct. 7, these are facts:

1. There will be found not a few who question whether or not incasement of wood in concrete, in the way that ties are incased, does materially increase its life as effective tie material.

2. Whatever the beliefs of individual members of the committee, the statement of alleged economy or lack

of economy should not appear in a report unless substantiated by good evidence.

3. Statements regarding the behavior of materials or methods should be entirely frank, particularly where a comparison is involved. There will be found very few maintenance of way engineers of electric railways (or for that matter of steam roads, although on the steam roads the conditions are radically different from those in the tracks in which substitute ties are usually laid) who will contend that a wood tie is "thoroughly suitable." "ENGINEER."

Journal Criticism of Substitute Tie Report Reinforced

NEW HAVEN, CONN., Nov. 6, 1922.

To the Editors:

Referring to Mr. Cram's letter in the *Journal* of Oct. 28 on the subject of substitute ties, it seems to the writer that it is an unfortunate and untimely reopening of a supposedly closed incident: unfortunate, in attempting to explain something which has been repudiated by the committee; untimely, because the committee withdrew the part of the report commented upon before the matter came up formally at the convention. The letter therefore calls attention to something which it might have been best to let drop.

It may be well, however, in view of the fact that the letter has been published, to add another comment, and, as a member of the sub-committee on this subject, the writer desires to do so.

The basis of the report, as stated in your editorial and as printed in the report, was a questionnaire—a "personal solicitation" to "companies that might have experimented with some form of tie other than wood," and 40 per cent of the replies were from companies having had no experience on which to base an opinion.

How it can be inferred from your editorial that the report was "discussing steel ties in particular," as stated by Mr. Cram, is not clear, as you simply state the volume of business of two steel tie companies as an indication that there was a visible demand for substitute ties.

To take up Mr. Cram's remarks on your numbered criticisms in detail:

1. Incasing either wood or steel in concrete will undoubtedly prolong its life from decay or corrosion, but the life of a wooden tie does not depend entirely on its liability to decay, as there are instances of track failure from tie failure where the ties are as free from decay as when they were placed. While steel ties are invariably incased in concrete, this is not necessarily true of wooden ties, which may be covered only on the top and two sides, or possibly, on the top and part of two sides, in which case it is doubtful if the concrete does afford full protection from decay.

2. Since it must be assumed that the railway companies will purchase their ties, whether they are of steel or wood or any other substitute, the committee must have been thinking of "buying features" and therefore "selling features" are implied.

If it is not clear that the use of substitute ties does not call for an added investment, the information can be obtained from some of the companies which have used both kinds.

3. "That the steam roads are still searching for the proper form of substitute tie" has little bearing on the matter and only beclouds the issue, since a track built in a permanently paved street is not comparable with one built on private way for steam road operation. Is it true that the wood tie is ideal except for decay and scarcity? I doubt it, and believe on the contrary that it has few virtues for paved track and is a makeshift.

4. Are there any data at present available showing that a greater labor expense is entailed in rerailing track laid on substitute ties over the same operation where wooden ties are in use? Is it not true that where a steel tie forms an integral part of the substructure it acts as a reinforcement, and by increasing the bearing area on the soil makes for less liability for track settlement?

5. Assuming that there are 40,000 miles of single track in operation, it by no means follows that there are 105,000,000 wooden ties in use. These figures are based on a 2-ft. tie spacing. This spacing is not universal even for wood ties, and certainly does not hold where substitute ties are used; nor does it take into account the mileage where no ties are installed, but the track is supported on yokes. This figure then must be materially reduced—if it has any bearing on the subject.

The editorial does not state that only 140 companies out of a total of 950 companies use substitute ties, but says that one tie manufacturer has sold its product to 140 companies during the past twelve years, and as there are at least three other tie manufacturers who have also been selling their product during all or a part of this time, the number of railways using substitute ties must be in excess of 140.

The report as originally printed did, unintentionally or otherwise, reflect on the present forms of substitute ties, and was changed at the convention for that reason, and also because it did not agree with the "general experience of the committee members." In other words, the paragraph deleted was a minority report, which through error was incorporated in the printed report. This paragraph created much adverse criticism among the members. WILLIAM R. DUNHAM, JR.,

Member Committee on Way Matters, 1921-22
Member Sub-committee No. 4.

Interesting Figures on Vehicular Movement in Baltimore

THE UNITED RAILWAYS & ELECTRIC COMPANY
OF BALTIMORE

BALTIMORE, MD., Nov. 3, 1922.

To the Editors:

We have recently made a very comprehensive check of the vehicular movement in and out of the delivery district of Baltimore and the results obtained are very interesting. For instance, our records show that, between the hours of 6 a.m. and 12 o'clock midnight, there were 76,234 pleasure automobile movements in and out of this district, not to mention 37,024 commercial automobile, 21,036 street car, 4,224 bus and taxicab, and 13,821 horse-drawn vehicle movements.

In order to give the industry the benefit of this study in its entirety, J. A. Stoll, superintendent of traffic, will prepare an article for you to use, which will be illustrated by sketches, etc.

It is our intention to inaugurate a "Traffic Counting Day" in Baltimore—an annual affair, so to speak—and the comparisons from year to year will be interesting.

H. B. FLOWERS,
Second Vice-President and General Manager.

Electric Railway Publicity

Devoted to How to Tell the Story

From Abuse to Popularity

Three Years Ago Muskegon Mobbed Its Railway and Junked the Property—Today the Company and Public Are Partners

THE Muskegon Traction & Lighting Company, Muskegon, Mich., has proved that a public service corporation can win the confidence of the public if the proper campaign is conducted.

Three years ago in August the feeling against the Muskegon company was so bitter that the citizens staged an all-night riot. A mob held the city from early in the evening until the next morning. It started over an increase of fare from 5 to 6 cents, put into effect without any publicity.

Buses soon started operating while the cars were being repaired and new rolling stock purchased. Attacks by the city officials and politicians, which had been directed against the company during all campaigns, were renewed with the old bitterness. Troubles seemed to have reached the limit of endurance.

John Ross, then president of the local company, insisted that the American Light & Traction Company, the parent organization, send a trained traction man to Muskegon to act as manager. The company sent George W. Steinwedel to take charge of the situation.

THE CARDS FACE UP ON THE TABLE

The fight to win public confidence for the corporation, something it never had held, was started. Mr. Steinwedel decided the way to do this was to place the cards on the table. The people, however, refused to believe the figures given out by the company, even when prepared by auditors chosen by the city. The new manager used extensive newspaper publicity to place his case before the public. Mr. Ross had held that if the public had received proper notice of the increase in fares in August, 1919, there would have been no riot and mob rule. He believed that the people had been misguided. Mr. Steinwedel freely admitted the company had made grave mistakes in the past; that it had failed to make extensions when it had the money and that there was a real basis for some of the complaints against the service. But he told the people it was not a question of yesterday, but of tomorrow; a question as to whether the people wanted street cars or jitneys.

He reorganized the company's personnel in line with his policy to serve the public. He hammered away at the point that courtesy was demanded and that the public was entitled to all the consideration.

Then came the show down. Jitneys were taking a great portion of revenue from the company, and the company asked permission to stop operating its cars. The Public Utilities Commission granted this permission with the provision that the city must vote on whether it desired the jitneys or street cars on competing lines. A spirited campaign followed. The jitney followers packed the halls and brought in speakers. Indications pointed to a victory for the jitneys.

During that campaign, however, the real estate men, merchants and business men brought out facts regarding the probable reduction in property value once the street cars were eliminated. The city administration, which had changed at about the time the new manager assumed control and was now in the hands of business men, was also a factor in convincing the public of the value to the city of an electric railway. When the votes were counted they stood five to one for the traction company.

The public began to believe the company reports. It liked the new policy, and was convinced that the company did consider it a partner in the business. Finally the fare was increased to 10 cents cash or four tickets for 30 cents, and the public did not object. People are riding the cars once more. At one time, however, the feeling was so bitter that many walked to avoid patronizing the company.

The company notified the city recently that in view of the changed attitude of the people it would borrow money and make many needed improvements. It is laying new steel rails and is considering the purchase of several new cars. The city rebated the penalties on taxes for two years because the company maintained service at a loss. The action was generally approved, but three years ago this would have caused much feeling. The company has notified the city that during May and June it made a profit over both operating expenses and interest charges.

Conductors and motormen have the new spirit. In the old days the public cursed the company and the employees tried to defend it. That caused the patrons to continue the arguments.

In hundreds of ways the company today is showing the public that it wants to give service. It follows up all complaints and is constantly striving to improve service with the resources available. The public has joined and is aiding the company. The people today talk for the company, and it is seldom that a critical word is heard, whereas previously few dared openly to defend it.

"We have proved that the public wants to be fair if it knows the facts and is treated fairly," said Mr. Steinwedel, now president of the company. "The public will go half way any time."

Seven Words Turn the Trick

A SLOGAN developed by the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., is a direct shot into the ranks of automobile riders, and at the same time is an appeal to the pocketbook of the taxpayer. "Ride the trolleys and preserve the pavements," is the legend appearing in company advertisements. These seven words present a problem and solve it, and put the idea into the reader's mind that it is, somehow, his duty to ride on the trolleys. Seven words could do little more toward winning passengers.

Humanize the News

The Addition of Four Seats on the 8:20 A.M. Car Is More Important to the Commuter Than a Technical Article on Kilowatt-Hours and High-Tension Lines

HUMANIZE public utility information and it will be sought by newspapers for front-page, leading column stories. Let trained newspaper men, and not engineers, handle the news as directors of public relations. Give all the information, give it correctly, and give it first. These points have been emphasized recently by Fuzzy Woodruff, feature writer of the Atlanta *Constitution*, and by J. S. S. Richardson, city editor of the Philadelphia *Public Ledger*, in addresses to utility men. Mr. Woodruff said in part:

> What could be of more vital interest to any member of the great masses than a story that an extra service had been added to his particular car line in order that he would be able to devour his matutinal egg and drain his morning cup without decorating his shirt front and scalding his insides in his hurry to catch the last car that would get him to work before the boss arrived on the scene of action? What could be of more intense interest to the housewife than a yarn to the general effect that the power of a mountain stream is being harnessed in such quantities that every curling iron and every electric pressing iron in Georgia could be kept hot twenty-four hours a day without using enough water to fill more than half of the bath tubs in Atlanta once a week?
>
> Then why haven't the newspapers long ago realized the news value of the public utilities? For the simple reason that public utility men are not newspaper men. They've wasted precious time and untold labor and Lord knows how much white paper in sending out to the public startling information to the effect that the U. S. Geological Survey says that Georgia is developing so many more kilowatt-hours than Alabama, and that Alabama has so many thousands more undeveloped horsepower than Georgia, about which the public doesn't care a damn, and accordingly for which the newspapers care hardly enough for the news editors to open any letter received from a public utility.
>
> The public utility has been talking in terms of the kilowatt-hour and high-tension lines, which are as far removed from the public heart as the internal affairs of Timbuctoo, and have forgotten all about the new street car that holds four more passengers and has aisle accommodations for six more people and some sort of a contraption that allows the conductor to make change one-fifth of one second faster and accordingly gets a man to work two minutes earlier than he is accustomed to, which is as close to the public as the watch in the vest pocket of a fat man is to his general cosmogony.
>
> Then the question is, "How are you going to get this message over?" I think the technique is fairly simple. Quit sending in a lot of stuff to newspapers on forbidding looking and formal stationery that tells the editor more surely than if the words were shouted by megaphone that somebody is trying to put something over on him.
>
> When you've some news that's real news, call the newspapers. Tell the city editors you've a yarn. Be sure you have it and when the reporter arrives be sure he gets the human viewpoint of the yarn in question. Don't write it for him. Let him write it himself. He'll put more individuality in it than you will, because his job depends on doing that thing. And pretty soon, you'll find that your office has become a house of call. Pretty soon the reporters and the city editors will be fighting for your news. You won't have to fight for space. You won't have to ask for display. If your stuff carries the human appeal and the personal touch you'll get both in great big gobs.
>
> Public utilities haven't any publicity problems, if the heads of the utilities will only remember that an engineer and a traffic expert and an electrical genius and a financial wizard may be splendid engineers and invaluable traffic experts, and glowing electrical geniuses and wondrous financial wizards, but they are not newspaper men and their training hasn't told them the value of humanizing news.
>
> Always "tote fair" with reporter or editor. If there are some facts you want suppressed, tell the newspapers why those facts should not be published. Pretty generally they will accede to your view, but never give a newspaper inaccurate or incomplete information. The newspaper is bound to find it out. All your work in building up confidence is then and there destroyed.

There's no such thing as "no news" in a public utility office, according to Mr. Richardson. The news is there, but the man to see it is too often lacking. He said:

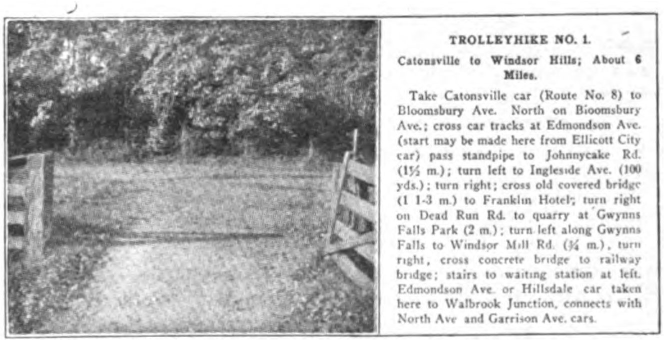
> In company with other reporters, I have called at the executive offices of gas companies for information which, from the viewpoint of the public and from the viewpoint of the public utility concerned, was of great importance. All too frequently we received the old reply, "Nothing to say," when that reply meant a pronounced and serious setback to public relationship with the company. Gentlemen, if you value the friendship of the public, which I am certain you do, guard against that statement: "Nothing to say."
>
> It should not be necessary to dig up facts about the public utility business. Every company represented here is a veritable mine of interesting news matter that should be on tap at all times through a liaison officer of the organization, who appreciates the vital relationship existing between a community necessity and the people who are dependent upon it.
>
> Don't wait for the newspapers to ask you for the facts. Make the news readily available to them. Withholding the facts until forced by public opinion to release them is not a good way to make friends. Beat the public to it. The public likes it.
>
> If you have a man in your office who has the God-given faculty of winning a man's confidence and can handle a matter of publicity or non-publicity, as the case may be, give him the authority to speak for you. He will soon get acquainted with the men of the papers and they will learn to trust him.

The Pennsylvania Railroad, said Mr. Richardson, receives more advertising in the form of news than any other public utility in the world. He continued:

> Even on a highly perfected and carefully organized system such as the Pennsylvania, wrecks occur, in spite of all that can be done to prevent them. Prior to ten years ago a newspaper city editor got his information of such an occurrence from any one of half a dozen sources, a correspondent near the scene of the catastrophe, the friendly interne of a hospital to which had been sent a summons for aid, a telephone operator or even a subscriber. Never the railroad. Nowadays when there is a wreck, nine times out of ten, the first information comes from the railroad.

Baltimore Plans Trolleyhikes

ANOTHER company has been quick to realize that—paradoxical though it may seem—hikers are potential trolley riders. The first instance noted in the *Electric Railway Journal* was that of the Philadelphia (Pa.) Rapid Transit Company, which suggested in posters that the street railway provided rapid and easy approach to hiking territory. Now the United Railways & Electric Company, Baltimore, Md., in its issue of *Trolley News* for Oct. 1, maps out four "trolleyhikes," and illustrates these with scenes en route. The hikes are made to appeal to those in search of pleasure and those in search of health also. And after the hike, the hikers are to "get on a car for home." The directions explain what car lines are available and the transfer points.



TROLLEYHIKE NO. 1.

Catonsville to Windsor Hills; About 6 Miles.

Take Catonsville car (Route No. 8) to Bloomsbury Ave. North on Bloomsbury Ave.; cross car tracks at Edmondson Ave. (start may be made here from Ellicott City car) pass standpipe to Johnnycake Rd. (1½ m.); turn left to Ingleside Ave. (100 yds.); turn right; cross old covered bridge (1 1-3 m.) to Franklin Hotel; turn right on Dead Run Rd. to quarry at Gwynns Falls Park (2 m.); turn left along Gwynns Falls to Windsor Mill Rd. (¾ m.), turn right, cross concrete bridge to railway bridge; stairs to waiting station at left. Edmondson Ave. or Hillsdale car taken here to Walbrook Junction, connects with North Ave and Garrison Ave. cars.

THE UNITED RAILWAYS & ELECTRIC COMPANY IS TURNING HIKERS INTO RIDERS WITH INTERESTING "TROLLEYHIKE" SUGGESTIONS

Iowans Discuss Practical Problems

Sioux City Convention Has 100 per Cent Representation of Companies—Monthly Commutation Ticket, Relations Between Department Heads, Car Maintenance, Current-Collecting Devices, Energy Saving, Lightning Protection of Cars, Lifeguards, Automatic Doors Among Topics Discussed

LAST week the operating men in Iowa and some few from more distant points in Illinois and Wisconsin flocked to Sioux City for the mid-year meeting of the Iowa Electric Railway Association. Approximately 100 delegates attended the two-day meeting Nov. 2 and 3, representing every city in Iowa having electric railway service. With such an excellent turnout of the men who are operating the mechanical and transportation departments, and with the able direction of Chairman John Sutherland, this fall meeting will be recalled with a feeling of time profitably and most pleasantly spent.

The formal program included five papers dealing with problems uppermost in the minds of operating men. Frank V. Skelly explained the introduction and results of the identification card system of fares on the Tri-City Railway, Davenport, while the subject of public relations was dealt with by Joe Carmichael, director of the recently established Iowa Committee on Public Utility Information. Among the visitors was B. W. Arnold, Eastern Wisconsin Electric Company, Oshkosh, Wis., who addressed the meeting on the relations that should exist between a manager and his master mechanic. Henry Cordell, master mechanic, Chicago, North Shore & Milwaukee Railroad, presented a paper relating his experience in maintaining trucks. A paper on current collection was prepared by C. M. Feist, Sioux City. Discussion on these varied subjects was animated and instructive.

Besides the entertainment at the banquet, which developed into a short-story contest, those present were taken to the shops of the Sioux City Service Company, where C. M. Feist presides. Much interest was manifested in a new snow sweeper designed and built in the shops. In the construction of the revolving sweepers ordinary broom straw attached to blades was used in place of the conventional rattan broom. This was described in *Electric Railway Journal* for Dec. 18, 1920, page 1252.

As a fitting climax to the meeting it was announced on the last day that E. L. Kirk, formerly general manager Sioux City Service Company, had been elected president of the Sioux City Gas & Electric Company following purchase of the service company by the United Gas Improvement Company, which owns the gas and electric company. The merger of the two companies was completed on that day.

The convention was concluded Friday with the election of an executive committee. M. Welsh, Waterloo; W. C. Jacobi, Omaha; E. R. McMahon, Des Moines, and L. C. Lemon, Davenport, make up the railway members of the committee. Manufacturer representatives on the committee are Robert Deneen, Chicago; F. R. Grant, Des Moines, and Nic Le Grand, Rock Island.

The executive committee is empowered to select its own chairman for the year. The newly elected chairman will succeed Mr. Sutherland. Selection of next year's meeting place also is left to the committee. It is probable, however, that the convention will be held at Des Moines.

Experience with the Monthly Commutation Ticket

In relating the results of the monthly identification card on the Tri-City Railway, Frank V. Skelly mentioned that the card had been subject to some misuse because of the holders splitting the tickets in two. The same misuse has been experienced by the Cedar Rapids & Marion City Railway according to F. M. Ford of that company. This is possible because the cards, which are printed on both sides of thin cardboard, are thick enough to be sliced in two. Mr. Ford said he had spoiled five cards before he was able to split one when he tried the trick. To overcome this feature it was necessary to send all the remaining tickets back to the printer in order to have one side of the cards blanked.

E. J. Anderson, Davenport, added that in cities where the identification card system had been adopted people will use the cards and then pass them out of the windows to friends in order to save three or four cents. In connection with this abuse the presenting of expired transfers by passengers is another evil that is quite prevalent. He described a container for holding transfers that is designed to make this misuse very difficult. The holder, made of aluminum, has several compartments in which are placed the pads of transfers, a different color being used for each direction of travel. Instead of punching the time, the conductor tears off the transfer at a length varying with the hour.

Car Maintenance Kinks

The reading of the paper by Henry Cordell opened the subject in which master mechanics were interested. The problem of detecting defective axles came up. W. G. Lamb, Waterloo, claimed that the scheme of smearing white lead over the axle was very effective in locating cracks in the axle. It has been his experience that cracks most frequently occur in the fillet adjacent to the gear seat. Mr. Cordell said the same method was used on the North Shore and all axles with even a slight crack are scrapped. He added also that it is his practice to scrap axles when the collar wears down to $\frac{3}{16}$ in., which is a safer limit than that set by the M. C. B. rules.

The relative brakeshoe cost for cars in city and interurban service as told by Mr. Cordell was illuminating to those who thought that city service gave the worst possible conditions. The city cars of the Chicago, North Shore & Milwaukee Railroad have a brakeshoe cost of 27 cents per 1,000 car-miles, while in the interurban service the cost is about $1 per 1,000 car-miles. Although the number of stops in the interurban service is less than in city service the braking is done at a high rate from high speed.

In its relation to motor maintenance, C. M. Feist, Sioux City, claimed that field coil testing is extremely important. In his shop it is the practice to test the field circuits with a low reading voltmeter after the failure of a motor, to determine if its breakdown was caused by some abnormal condition in the electrical circuit. With this instrument it is possible to detect a short circuit of only one turn in the field.

T. E. Wood, Omaha, said he had had excellent results from the dipping and baking of armatures. As a result of treating armatures in this manner, 55 per cent less were removed from the motor, there was an 82 per cent reduction in the number of open circuits and there was an 80 per cent reduction in the number of armatures rewound. These figures were arrived at by taking the record of 168 armatures one year before and one year after dipping and baking.

The question of how to insure against failure of brake rigging brought out two different methods. Mr. Cordell said that he believed it better to increase the factor of safety by using a very large rod of the best steel obtainable. To avoid any charge of failure Mr. Lamb said that he had installed double rods for brake rigging on fifteen interurban cars of the Waterloo, Cedar Falls & Northern Railway.

Although Mr. Feist did not touch on sliding collectors in his paper, those present were anxious to hear what the experience had been on the North Shore Line. Mr. Cordell said that the line wear with the Miller trolley shoes installed on all the high-speed equipment was very much less now with heavier cars and about ten times the traffic than when all wheels were used on the old lighter equipment. Mr. Cordell makes a practice of building up the old shoes as fast as they are worn out. This is done by building up the grooves by welding with the hardest metal that is available and then case-hardening the shoe. After the shoe has been restored the additional life of these shoes is about 4,000 miles, as against about 6,000 for the new shoe. A trolley tension of about 35 lb. is used.

DEPARTMENTAL CO-OPERATION

Commenting on Mr. Arnold's paper, F. V. Skelly added that monthly meetings of the department heads were first started on the Tri-City Railway some time ago and that these meetings were found so valuable that it soon became necessary to hold them weekly. He claimed that this getting together of the heads of the various departments was most effective in furnishing opportunity for difficulties to be ironed out and for each one to gain a better understanding of the other's problems.

As a typical instance of what can result from keeping the department heads well informed, Mr. Arnold cited an instance that occurred recently on his property in Wisconsin. At one of the weekly meetings he had mentioned that it was his intention to connect with a bus line the towns of Plymouth and Fond du Lac, which are the terminals of two interurban lines. Shortly after, one of those whom he had told of his plan heard that an independent bus operator was soon to operate over that same route and besides parallel the interurban for some distance. With this information at hand Mr. Arnold said he immediately leased a bus and had it running the next day.

Besides the formal papers the program included a number of subjects for informal discussion. The first of these was the experience with lifeguards. Mr. Cordell said all the safety cars of the North Shore road were equipped with the H. B. lifeguards. Installed in the customary way, the guards would be tripped by the snow and hit the rails. As a result of this there was a large breakage, and to overcome this a chain has been attached to each end so that when the guard is tripped it is held a few inches from the rail. He claimed that the guards were just as effective when held a few inches from the rail as when skimming along the ground.

F. B. Hudson, Omaha, said that he had found the extended fender very bad in traffic because the fenders themselves introduce a hazard to pedestrians at congested corners when people were walking in front of the car. In Waterloo, Mr. Lamb said the cars were originally equipped with extended fenders, which were in such constant need of repair that one or two men were required to keep them in order. Not only was the maintenance cost high but the space occupied in each bay of the carhouse would have permitted two more cars to have been housed. For these reasons he has converted the lifeguard to a type similar to the H. B. lifeguard by installing them under the cars, and in this location their maintenance is practically nothing.

Mr. Arnold does not have much faith in lifeguards, for he said if the car doesn't kill you the fender will. He said the H. B. lifeguard was the only one that had been approved by the Wisconsin Railroad Commission and that he, like Mr. Cordell, uses a chain to keep them from dropping on the rail. Also, the front end of the guard has been bent up like a shoe so that it will skim along the ground and not get caught.

In talking about automatic doors, the question revolved around whether the doors should open inwardly or outwardly. The consensus of opinion seemed to be that a folding door should swing out. Mr. Anderson was of the opinion that traffic can be handled with more speed when the doors open outwardly because he has observed that many passengers will set down bags, bundles, etc., on the platform, which prevents the closing of a door opening onto the platform. Mr. Wood said the maintenance of a door opening toward the street was high, while Mr. Lamb said he would not sanction the use of a door opening onto the platform. In Waterloo, a door swinging beyond the car is an indication to automobilists that passengers are about to alight and therefore that they cannot pass. This rule is enforced very rigidly and so a stop sign was painted on the car door, which, of course, shows only when the door is open.

LIGHTNING ARRESTERS ON CARS GIVE RESULTS

Where, when and how to install lightning arresters was a moot question in Iowa, the same as anywhere else. Mr. Dugal, General Electric Company, said that lightning protection is a problem of spending a limited amount of money to the best advantage to protect property and to insure continuity of service. The three important units of an electric railway system which need protection are the power house, substation and the cars. It is generally conceded that the best protection available is none too good for the power house and the substation, and for their protection fairly reliable lightning arresters have been developed. However, when it comes to protecting the electrical equipment on a car from lightning, he said that it is established that an arrester on every pole of the line would not give immunity. He remarked that the Illinois Traction System had concentrated its protection on the cars and that now it is not losing any more hangers or insulators with no arresters on the line than when the line was protected. Furthermore, the Illinois Traction System has not lost a single armature from lightning during the past two years. Mr. Dugal's advice was to locate the arrester as near the source of power as possible and connect it to ground with the shortest direct circuit.

Mr. Anderson said that lightning arresters are now being located on the roof of the city cars of the Try-City Railway. Nearly every one was convinced that the roof of the car was the ideal location for obtaining the maximum protection, but balanced against this was the difficulty of inspection and its unsightly appearance on the roof. Practices varied as to whether or not the arresters were removed in the winter.

The lines of the Tri-City Railway are also equipped with pole arresters, which are tested three times a year. Their trouble has been that whenever lightning passed through an arrester it always blew it all to pieces.

DISCUSSION ON ENERGY SAVING

On the subject of kilowatt-hour meters for determining car energy construction, F. J. O'Brien, Chicago, explained that there is a wide difference in the efficiency of unchecked motormen, a difference approximating 30 per cent between the average good man and the average poor man. Meters serve to improve operating efficiencies, particularly with the poor men. This induces substantial saving in car energy consumption. Energy input, he said, is the correct measure of the relative efficiency of different men operating under similar conditions. He added that more than 100 street and interurban railways are completely equipped and the saving resulting in many cases has more than wiped off the capital charges plus operating expenses of the meters in the first year.

William E. Rolston, Sioux City, said he believed that measuring kilowatt-hours was fundamentally the correct principle because it was kilowatt-hours that the cars used. The measurement of coasting is not a correct way of determining power consumption and, in fact, it often may be most misleading. He cited a certain instance where the motorman had formed the habit of coasting down one hill and up the other, but not applying power until the car had reached a relatively low speed so that the coasting distance would be a maximum. Such operation increased the energy consumption while improving the man's coasting record. A kilowatt-hour meter on a car, he believed, was just as important as having a carbon dioxide recorder on a boiler.

When he was connected with the Chicago, Lake Shore & South Bend Railway, Mr. Rolston said an occasion arose when it was necessary to supply the Interstate Commerce Commission with figures showing the cost of handling freight. Although it was known that the energy consumption in the heavy freight service of the New York, New Haven & Hartford Railroad was about 30 watts per ton-mile, no one had any idea how much energy was being consumed by the two 70-ton locomotives which were in question. However, for this purpose two a.c. meters were installed and it was found that the engineers were using 65 watts per ton-mile. By giving these men a little instruction it was found possible to reduce that energy consumption to 52 watts per ton-mile in a month's time. In several months time the figure was lowered to 45 watts per ton-mile.

Further, Mr. Rolston explained why he was convinced that the energy consumption of a car was a more accurate index of the work done by it than the mileage run and consequently such a unit is the logical one on which to base inspection and maintenance periods. While in Kansas City he had found from tests that cars on one line were using 40 per cent more energy than those on another for the same mileage.

Monthly Identification Card Betters Public Relations*

By F. V. Skelly

Superintendent Tri-City Railway of Illinois, Rock Island, Ill.

THE identification card plan of fare, which is the invention of Richard Schaddelee, vice-president and general manager United Light & Railways Company, Grand Rapids, Mich., the holding company for the Tri-City Railway of Illinois, was first used on the lines of the Mason City & Clear Lake Railroad, Mason City, Iowa, a city of 30,000 population. Its use was begun Aug. 15, 1920, in connection with a fare increase from 5 to 10 cents, at which time a charge of $1 per month was made for the card. This was reduced in June, 1921, to 50 cents per month. In November, 1921, its use was begun at Muscatine, Iowa, 15,000 population, the card being offered in connection with an increase in fare from 7 cents to 10 cents. The street car patrons at Muscatine were highly pleased with this form of fare, its use becoming immediately popular and remaining so.

The application of a readiness-to-serve charge to street railway fares has been a comparatively recent development, despite the fact that electric companies and telephone companies had been using this form of rate for a long time. Regardless of whether a transferable weekly pass, or an identification card of the type used by the railway subsidaries of the United Light & Railways Company is used, the principle is equitable, in that it gives to the regular patron—the person whose constant riding helps to make the continuance of street railway service possible—a reduction in his average cost per ride, varying in degree with his use of the cars. There is also a psychological effect in connection with the identification card system, in that the purchaser of the card, as soon as he has paid the demand charge, feels that he is riding for a 5-cent fare. We are sure that this has added considerably to the popularity of the plan.

At the start-off a vigorous advertising campaign was conducted announcing the change in fares and stressing the savings available for users of the identification cards. It was readily seen that the sale of these cards by the operators on the cars would produce much confusion the first few days of each month, and it was therefore decided to place them on sale in various mercantile establishments throughout the tri-cities, announcements to this effect being made in the newspapers. No difficulty was encountered in securing the co-operation of these business houses; in fact, several who had not been interviewed requested that they be allowed to handle them. No commission or other payment was made for this service. During the last week in February each car also carried a full-sized window card giving the names of firms which had these cards for sale.

Fare boxes which had been used in the days of the 5-cent fare, but which had been discarded after the 7-cent fare became effective (as it was found that certain passengers were "rushing the box" and depositing varying number of pennies instead of the full 7 cents), were again placed on the cars and the operators instructed in the method of registering the new fares. The new system was somewhat more complicated than the former one, as there were three classifications of adult fares in place of one; i.e., the 10-cent cash fare, the 8¾-cent token and the 5-cent identification card fare. The overhead registers remained on the cars, but in place of ringing up all fares, the operator now rings up only the 10-cent cash fares on one dial of the register and the tickets and employees' passes on the other. Tokens are recorded as such by the token-registering dial of the fare box, and the difference between the amount of money accounted for by the reading of the overhead registers as to 10-cent fares and the amount of money in the fare box is considered to be passengers using the identification cards. A separate record is kept by the operator of the 4-cent children's fares. This method of accounting is perhaps the simplest form that could be devised for this type of work, as it requires a minimum amount of attention to operate.

The identification card has been in service for eight months. The number of cards sold per month is as follows: March, 8,516; April, 9,395; May, 9,327; June, 9,379; July, 9,033; August, 9,029; September, 9,765; October, 9,966. The downward trend during the summer months is to be expected, as the valley of the yearly passenger curve usually occurs in July or August, with the peak in December. We confidently expect sales will be in excess of 10,000 cards in November.

The average daily number of rides per indentification card outstanding for the month of March was 1.75, or 54.27 per month. The average fare paid by identification card passengers for March was 5.87 cents, a considerable reduction from the 9-cent fare in force prior to that time. The percentage of identification card passengers to total for March was 52.54, and these passengers contributed 42.06 per cent of the passenger revenue. In September the average number of rides per card per day was 1.79 or 53.75 per month; the average fare paid, 5.85 cents; the percentage of identification card passengers to total passengers, 57.66, producing 47.68 per cent of the passenger revenue. The maximum cost per rider occurred in the month of April, 5.91 cents per ride. The average receipts per revenue passenger were highest during the month of March, at 7.33 cents, gradually decreasing, as the number of identification card passengers increased, to 7.07 cents in September. The passenger revenue, however, remained about the same.

The drop in revenue through the reduction in the average receipts per revenue passenger, from an average of 8.6 cents with the 9-cent fare, to a rate of 7 cents with the identification card, was not quite as great as had been calculated, due to the increased patronage. This loss in passenger revenue was, of course, offset to a considerable degree by the reduction in operating expenses as a result of the use of one-man cars, so that the net operating revenue of the company remained at about the same point. Industrial conditions in the tri-cities are, of course, at a very low point, and even the slightly improved business of the past two months has been reflected in the number of revenue passengers carried.

For the convenience of the public, the identification card had been printed on both sides, so that it would not be necessary to turn the card when showing it to the operator. Some ingenious individual conceived the idea of splitting the card and using half for himself and half for another person, and by inserting the card in a case this trickery could not be uncovered by the operator. To obviate this, the company had the unnumbered side of the card blacked out, and future orders will be printed on one side only. The cards vary in color from month to month, the month being printed in a color which contrasts with that of the card. It has been our experience that but three combinations of colors can be effectively used; i.e., a yellow card with the month printed in green, a white card with the month printed in blue, and a red, or salmon, colored card with the month printed in green. The dark-colored card with the month printed in a contrasting light color, such as a blue card with a yellow month, is not at all effective.

It is possible that some few of the cards may have been passed out of the car window for the use of those awaiting to board the car, but in such cases the company received at least 5 cents in revenue. The wording of the card covering this point states that "this card is not transferable and will be taken up if presented by any other than purchaser." The effect is, of course, purely psychological, for although there is a space provided for the purchaser to sign his name, this is rarely done. It would be quite difficult for an operator to determine whether or not the holder of an identification card was the purchaser, unless he was acquainted with the passenger and had time to make a minute examination of the card, which is, of course, impracticable. The passenger has an advantage, however, if the card is signed, for in a number of cases a lost card with signature has been returned to the owner.

The introduction of the identification card, with its attendant low cost per ride, has had a market effect upon the public attitude toward the company. When the 9-cent fare was in force complaints on the part of the public and the newspapers were frequent. Since the change there has been little, if any, complaint regarding the 10-cent fare, the answer to this being that it is possible to obtain a fare approximately 5.5 cents through the purchase and frequent use of the identification card. Even as few rides as sixteen per month, or two round trips per week, using the card, will bring the average fare to 8.1 cents.

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*Paper presented at mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2, 3, 1922.

Employees of the firms selling cards have aided the company materially. One salesman, by the use of a little diplomacy, changed altogether the attitude of a woman who called for "one of those street car licenses" by explaining the advantage from the patron's standpoint of the use of the card, so that she went away in an entirely different frame of mind.

Under existing industrial conditions the officers of the company are well satisfied with the manner in which the card system is working out, and the increase in the number of passengers carried is much greater than has been found to be the case in other cities where an equivalent reduction in fare has been made. This points toward the belief that the public is much better satisfied and consequently more willing to patronize the cars than would be the case with the flat rate of fare.

Practical Kinks in Truck and Motor Maintenance*

By Henry Cordell
Master Mechanic Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

DON'T forget that the electric roads of today have more and keener competition than ever before and we have got to be up on our toes and doing things every minute if we expect to stay in the game. The traveling public won't stand for irregular service, hard riding cars, discourteous treatment, poorly ventilated cars, and a lot of things which could be pulled on them say ten years ago. I quote the expression, "Them days is gone forever," and we should know it.

Look around and see the progress in the field of manufacturing. New tools, new ways of doing work, higher standard of workmanship, greater production—all with the one idea to sell the public what it wants.

Have we done this in the electric railway field? To a certain extent, yes; largely, no.

What has been the result as to the patronage of your road? You are better qualified to answer this than I am. Now, then, what should be done to build up the traffic? You know, or ought to know, that a road advertised as a road of speed, safety, comfort and punctuality, when these are not backed up by actual performance, soon becomes the laughing stock of the public, and your competitors (be they steam roads or bus lines) get the business.

In order that we may analyze the subject at hand, let us see what kind of car construction will give us maximum service and minimum expense in operation:

1. Frame of such construction that members will carry the load without stressing.

2. Springs designed so that a car will ride equally well under light and full loads.

The live load on an electric car is large compared with the empty weight of the car; therefore the spring problem is one which is difficult to solve. This condition was taken care of on the North Shore Line by the installation of a third set of springs which are in action only under heavy load. The first truck with this arrangement has been in service for about three years with satisfactory results.

3. Brake rigging so designed that chattering is prevented.

Chattering usually results when brake rigging is hung incorrectly. Brake shoes should be located no less than 2 in. below the center line of the wheels. Levers and hangers should be at 90 deg. angle to the center line of the brakeshoes when the brakes are applied, and the angle should not exceed 120 deg. with wornout wheel and shoes.

Hanger supports should be of as rigid construction as possible. All brake pins should be case-hardened and holes in levers bushed. A clearance of .005 in. is recommended. We have found that double-lever brake rigging gives the longest life, keeps the brakeshoes on the wheels and, due to perfect alignment, eliminates twisting which causes breaking of bolts and shearing of cotter keys.

When the job of bushing brake levers is started, care should be taken that levers are properly laid out to give the required braking pressure. I mention this because, with unbushed levers, the holes are likely to be elongated, and if drilled the chances are the drill will follow the worn hole and every lever will be drilled with a different spacing, which, of course, would be detrimental to the proper braking of the car. Filling the worn hole by means of electric and acetylene welding and redrilling to proper size for bushing is entirely satisfactory and better than plugging the hole in the old blacksmith way. I have yet to see a plug properly welded to the walls of the hole.

Truck brake lever pins or bolts should be shoulder bolts or bolts properly machined with threads cut just far enough to allow the nut to pull up to the proper distance, allowing clearance for levers. The cotter pin hole should be drilled close up to the nut.

Several methods of connecting pull roads to the circle bar have been resorted to. On the later type trucks we located the circle bar as near as possible to the transom, where the swing of the truck is least. In this case the connection is causing no trouble in going around sharp curves. However, when the circle bar is located over the end of the truck, trouble is encountered by brakes being pulled up due to the roller sticking in the depression made in the circle bar by wear. There is also likely to exist too small a radius, which tends to set the brakes on curves. The circle iron should be of an exact radius, using the king bolt as a center. We discarded the roller idea and installed a sliding contact, which works well and has none of the objectionable features of the roller.

4. Renewable wearing plates and shims on pedestals, oil boxes, bolster, center plate and motor suspension lugs.

You will find it a great advantage to use case-hardened wearing plates where excess wear exists. Not only is there a saving of expensive parts, but lost motion affects the riding qualities of the truck, causing nosing if play exists at pedestals, journal bearings and in center plates. Lost motion in the truck bolster causes violent surges in stopping and starting a train, which not only wrecks the cars but is decidedly uncomfortable to passengers.

The standard M.C.B. journal brass has been found to permit the axle to roll out of the bearing under heavy braking at high speeds. To overcome this condition we changed the construction, extending the sides of the brass to approximately the center of journal.

I am satisfied that 95 per cent of hot journals are caused by mechanical defects, rather than poor oil, and that most of the remaining 5 per cent are due to improper methods in preparing the packing, which should be a good grade of wool waste. Poor dust guards mean worn journals and bearing trouble. We should insist upon the use of proper style and make, and under no condition permit their omission.

Wheels and axles should be inspected closely and gages furnished the inspectors so that no guesswork enters into the decision as to whether or not a wheel or axle should remain in service. Furthermore, inspectors should be conversant with M.C.B. and A.E.R.A. rules regarding limits of wear, and under no condition be permitted to deviate from those rules.

Looking After the Motors

No equipment is subject to harder service than a railway motor, and perhaps none receives as little care on the average. Why? Because of the inaccessibility. Specific rules must be laid down and followed. Cleaning off string bands, checking up brush tension, inspecting condition of brushes, fields, leads, clearances, end play, etc., must be done at regular intervals, based on mileage operated.

String bands should be carefully inspected and if there is sign of oil or carbon deposits, they should be cleaned with gasoline and treated with a light coat of quick air-drying varnish.

Inspectors should be taught to examine commutators carefully. It is a well-known fact that the commutator is the weakest part of the motor, and on it are seen the effects of any field and winding trouble.

Motor leads are of more or less trouble, depending on their location and installation. The longer the leads are, if protected by wire armor so as to prevent chafing, the better service will they give. Substantial cleats located on the underframe of the car and spaced so that connections are held between them, and protected by means of a rubber-lined canvas hose, meet the condition well.

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*Paper presented at the mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2, 3, 1922.

Dipping and baking of armatures, together with impregnation of the fields, spells continuous and uninterrupted service. Before dipping an armature, care should be taken that it is absolutely dry and that all dust, oil and grease are wiped off. Placing armatures in an oven holding 210 to 225 deg. F. and allowing them to remain until heated through will put them in condition to receive and absorb readily the varnish or insulating paint.

We have changed from a string band to the use of 1¼-in. lino-tape tightly drawn with just a few turns of string up against the commutator to hold tape in place until varnish has dried hard. By giving the tape band several coats of good baking varnish and bake the armature between applications you will obtain a result that will insure your armature from front-end trouble.

Banding of armatures should be done in stages. First, temporary bands should be applied after thorough heating, and the coils drawn down, dipped and baked. When the armature is cool, remove the temporary bands and put on the finish bands, and apply a coat of air drying varnish. Before the motor is placed in the truck, a floor test should be made. We run all motors on the floor and at the maximum speed attained in service for a sufficient length of time to ascertain bearing conditions or any electrical imperfection that might exist. A group of car resistance boxes are used and the switch panel is so arranged that the fields are separately excited, causing the motor to run at a constant speed.

The application of pinions should receive more than casual attention. Pinions should be heated by boiling, and bore and shaft cleaned thoroughly before assembling. Loose pinions are expensive and inexcusable.

With the two-point suspended gear pans, we have found that the lugs on the motor shell heads and axle cap, as well as the lugs on the gear pans, wear a good deal and are very hard to keep tight. To overcome this difficulty, we made two-ply thick pads from canvas left over from armature hoods and soaked them in red lead and inserted them between pan supports and pan lugs. This not only saves the wear but keeps the pan from rattling, and the bolts stay tight.

With the approach of bad weather we arrange to put on all covers removed during the summer months and to apply new felt. During the summer months ventilated covers are used. We find that no excessive heating takes place on either ventilated or non-ventilated motors during the winter season with tight covers, but this precaution prevents snow from getting in.

We can eliminate lots of our trouble by scheming and planning, and no detail should be too small to be overlooked. It is the small defects which lead to costly repairs and renewals.

Pay Attention to Your Neighbor's Public Relations*

By Joe Carmichael
Director Iowa Committee on Public Utility Information, Des Moines, Iowa

NO OTHER business is so strictly regulated by the public as are utilities. If the public is to regulate them wisely it must know something of their business and problems. No one is going to tell them what these problems are unless the utility companies themselves do so. That briefly is the reason for the Iowa Committee on Public Utility Information, which was organized on the first of this year for the purpose of disseminating information about the electric railway, electric light and gas industries of the state.

At a recent meeting of the directors of these committees held at Atlantic City in connection with the sessions of the American Gas Association, and at which were present many of the prominent utility company operators of the country, two things were emphasized as to what the activities of these committees should be:

1. The importance of the work to every individual company in the state.
2. The necessity for putting its work on a businesslike basis.

In connection with the first point, it was claimed that no company can stand by itself. It is vitally interested in the standing and the public relations of every other utility company in its state.

A company is to be commended if its own public relations are good, if it is giving an honest and courteous dollar's worth of service for every dollar received, and if the people whom it serves are boosters for it and not knocking against it. But its managers make a mistake if they take the stand that they have set their own house in order and it is not their business if their neighbor is in bad with his public.

As has been said and generally conceded, the public utilities are more strictly regulated by state law than any other industry. Scarcely a legislature meets but which passes some kind of legislation with respect to the utilities. If this legislation is to be constructive and to tend to build up the industry rather than harass it all the facts must be known not only to the members of the legislators but to the public which tells them what to do.

The company whose public relations are good, whose people are satisfied that they are getting a square deal, will have little trouble in getting consideration from the legislators who represent those people. You can place all the odium you wish on demagogues, but, as a matter of fact, they usually follow the lead of the people. They grasp opportunities. And if a people are incensed against a public service company, their legislators, even though they may be inclined to be fair to the utilities, will have a difficult time doing so. Their cue is rather to lambaste the utilities and make political capital of their opposition to them.

But the company whose relations are pleasant is as dependent on his neighbor's legislators as he is on his own. It is advisable therefore for him to pay some attention to the public relations of his neighbor. He has a perfect right to urge and insist that these public relations be what they should be.

The other point discussed was the matter of putting the work of the committees on public utility information on a sound business basis. It was generally agreed that the best way to do this was to go into the local newspapers with the story of the utilities and to make advertising contracts with them for directly informing the public. It is worth the money just as much as the coal or other supplies you buy is worth it. You have an opportunity daily or weekly to talk to the people, to explain to them what you are doing, to tell them about your service and what you have to sell. How can you expect wisdom on the part of the people who regulate your business if they know nothing about your affairs except the garbled, false and malicious or ignorant statements of those who are your enemies with a purpose?

There are legitimate news stories in every street railway company office and plant. The newspapers will publish these stories if they are news. It is the duty of committees on public utility information to dig up these stories so far as they affect the whole industry. And it would be valuable for every company to have some one high in authority seek out these news stories and see that the newspapers get them.

But it will be difficult to impress newspapers with the high standing of a utility company if that company has no definite policy on publicity.

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*Paper presented at the mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2, 3, 1922.

Why Current-Collecting Devices Should Be Improved*

By C. M. Feist
Master Mechanic Sioux City Service Company, Sioux City, Iowa

IN A trolley current-collecting device it is necessary to provide sufficient area of contact surface, a low-resistance constant lubrication and low pressure per square inch on its bearing in order to overcome or avoid rapid bearing and side wear. Such a construction would tend to distribute localized heat and decrease resistance. Upon close observation it is found that a trolley has to adapt itself to many sudden variations owing to unbalanced load and changes in track elevation, during which time the wheel bearing position is changed. The side contact is frequently broken as a result of too rapid wear on the side contact springs and washers. The worn metal from the washers and springs and the ends of the wheel hubs work into the bearings and help to cut out the bearing surface, which results in a wabbly wheel that loses its contact. A further destructive effect takes place on the entire trolley device and on the overhead.

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*Paper presented at the mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2, 3, 1922.

It has been the practice of many railways to arrange systematically the current feeder system by which a reasonably high voltage can be maintained on the lines. The return circuits have also been given considerable attention to prevent energy losses, yet the collecting devices have been practically at a standstill in design or efficiency, especially where grease or oil is used for their lubrication. Such a practice adds to the resistance and to the general cost of maintenance.

The following is the result of a test of various trolley contact devices as reported by Prof. D. D. Ewing, Purdue University. The electrical losses per car-mile were found to be as follows:

Speed	Wheel Wire Contact	Bushing Contact	Bearing Friction Losses	Total
10 m.p.h.	10 watts	13 watts	20 watts	43
15 m.p.h.	50 watts	17 watts	26 watts	93
20 m.p.h.	80 watts	40 watts	36 watts	156
25 m.p.h.	125 watts	80 watts	50 watts	255

It is understood that these tests were conducted with new collecting devices and in a personal letter to me Mr. Ewing stated that a worn bearing would no doubt show a loss several times greater. It has been considered, and has worked out very well in practice, to eliminate side contacts owing to their frequently varied position and wear. Upon riding a few miles on top of a car and taking notice of the sudden lateral movements of a trolley, it will be found that a straight line from the center of the car body at the usual height of trolley wire would represent about 10-in. sideways to every 2 in. change in elevation, or other unbalanced condition caused by truck springs or unbalanced load. From the above test it is shown that the energy losses are constant, and when totalizing only a fair percentage of the losses with the number of car-miles operated on properties in a year's time, including labor and material in the maintenance of the trolley, the total expense would perhaps be larger than the cost of the maintenance of a car body. The fact that the life of trolleys is comparatively short in spite of frequent renewal of parts and other attention demonstrates conclusively that the device has not been designed to keep up with improvements made in other equipment used in electric railway operation.

Trolleys should be designed so as to eliminate all possible arcing. The bearing should be of ample capacity so that the wheel may roll in straight rotation for a reasonable length of time. A combination of correct design, as outlined above, and properly selected material with good workmanship should insure efficiency of a higher standard and be more satisfactory.

The matter of trolley wheel pressure against the wire has also been discussed. It appears that from 25 to 30 lb. pressure is about the average which most companies have adopted on city lines. It is absolutely essential, however, to make and hold a firm contact between the wire and wheel, as we all know the destructive effect of a partial electrical contact. On city span wire lines, where the wire has some relief in the upward direction, a firm contact can easily be secured.

The Sioux City Service Company shows for the year 1921 the approximate cost of operation on complete trolley heads to be 26 cents per 1,000 car-miles.

One car operating 50,000 car-miles or over per year would show a saving of 50 × 50 cents, or $25; 100 cars, $2,500; 1,000 cars, $25,000, and 3,000 cars, $75,000.

The trolley base plays an important part in the satisfactory operation of railway equipment, as it has to act freely sideways on its center bearing in order to avoid unnecessary friction on the side of trolley wheels, grooves and on the side of the wire.

Make Your Master Mechanic an Optimist[*]

By B. W. Arnold

Manager of Railways Eastern Wisconsin Electric Company
Oshkosh, Wis.

When a general manager takes charge of a property his first duty is to study the personnel of the several departments, and I am certain that he devotes more time to his survey of the mechanical department than to his survey of any other department. He realizes that the responsibility of keeping the cars in motion rests upon the mechanical department. No other department more directly affects public relations.

The master mechanic must be made to sense and take his responsibilities and he must be an optimist. Many master mechanics are diffident. The master mechanic should have confidence in himself and in his organization. He must "know" that things can be done. When the master mechanic has confidence in himself, when he knows that his department can accomplish things, then the general manager can make a much better record on any property, be it large or small. The mechanical department can never succeed when it is headed by a "whining pessimist."

One of the most important factors in the development of good relations between the general manager and the mechanical department is good housekeeping. You can easily imagine how the general manager would feel on being told by the insurance inspector that his insurance premiums were materially reduced because of the efficient housekeeping prevailing in the shops.

Further, the general manager should always be able to obtain from the mechanical department information that he wants and needs. To this end maintenance of proper records by the mechanical department is just as necessary as the replacement of burned out armatures, because without such records the general manager must be entirely at sea as to costs and other essentials. Lack of proper records is often most noticeable in the case of small properties and the responsibility for absence of such records most often rests upon the general manager himself. It is his duty to see to it that necessary facilities are provided for keeping adequate records. Mechanical men as a rule are not partial to clerical work. Such effort is in their opinion entirely outside the legitimate scope of their activity. They often feel that time spent on keeping records is wasted and that it could better be used in repairing cars. This attitude is fundamentally wrong and the "up-to-the-minute" master mechanic of today can give any inquiring official data on every question that has a legitimate bearing upon the work of the mechanical department. Master mechanics that do not realize this fact belong to the days that are gone forever. Of course, it is possible for the record habit to grow and, like any other good thing, the keeping of records may be carried to such extremes as to cost altogether more than they are worth.

I firmly believe that wonderful results can be accomplished by the master mechanic placing responsibility for particular jobs on particular men. Then the responsible men are inclined to be enthusiastic over seeing their particular job done on a 100 per cent basis as if they had responsibility for the success of the entire property.

The continuous demand upon the mechanical department makes it imperative that master mechanics always have in training a likely understudy for every job. The property should never be jeopardized for a single minute by the absence of any man in any department. This applies with peculiar force to the mechanical department.

The day of the "buck passer" is gone. The man who will meet his problems face to face and put them squarely up to his boss is the man who will get what he goes after. Therefore, I believe that weekly meetings of department heads on small or large roads are of real value, and the master mechanic must be made to feel that he is a real factor at these meetings, and his problems should be given fullest consideration. I am convinced that it is the desire of every general manager to have his master mechanic and the men in the mechanical department feel that a close relation exists between them. I believe that the general manager realizes how important a cog in the wheel of operation the mechanical department really is, but I also feel that it is up to the men in the mechanical department to be able and ready to respond to every call of the general manager and to have dependable information available for him whenever he asks for it.

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[*] Paper presented at the mid-year meeting of the Iowa Electric Railway Association, Sioux City, Iowa, Nov. 2-3, 1922.

Design and Construction of Streets for Street Railway Traffic

At This Second Meeting at the Engineers' Club in Philadelphia of the Paving and Railway Engineers Track Foundations Were Considered and the Relative Merits of Different Types Were Discussed

A REPORT was published in the last issue of this paper of the conference on the morning of Monday, Oct. 9, at the Engineers' Club of Philadelphia, on the design and construction of streets for street railway traffic. The conference was continued on the afternoon and evening of Oct. 9. An account of the afternoon session follows:

The chair was occupied by W. H. Connell, and the first speaker was E. M. T. Ryder, way engineer Third Avenue Railway, New York, who told about the plan to test rail joints, for which the American Electric Railway Association had made an appropriation of $10,000, toward the sum of $20,000 which will be required to finance the work. Mr. Ryder said that the committee in charge was anxious to get as many engineers and companies interested in this work as possible and have the benefit of their guidance in laying down a program for the tests.

A contribution was then read from Ellis R. Dutton, assistant engineer, Minneapolis, Minn. He told of experience with paving in streets containing car tracks in Minneapolis and said that the best solution of maintaining paving in such streets consisted in separating the paving in the track area from that in the remainder of the streets. Even with the substantial track construction used in Minneapolis, there is vertical movement of the track, which it seems impossible to prevent.

CONDITIONS IN NEW YORK

The next speaker was C. M. Pinckney, chief engineer of the Bureau of Highways, New York City, who said that most of the street railway areas were paved with modern granite block. Its advantages were its durability and because blocks could readily be removed to permit repair of the railway structure and then restored. In Manhattan it is now standard practice to use two rows of granite block on the outside of the rail adjoining asphalt paving. With the underground conduit system in Manhattan the area between the rails of a track is crowned so that the slot rail will be higher than the tram rail. This is somewhat objectionable to vehicles crossing the track. Drainage water had not affected the foundations of the underground conduit system, as it is a very rigid type of construction, but with the overhead trolley and wooden tie construction, it is important to provide drainage so that the water will be cleared away from the rail and not allowed to seep into the foundation.

Paving is affected by street railway tracks in a number of ways besides the vibration from the operation of the cars. If the original track construction is poor or the maintenance is inadequate, the paving will suffer. Track also influences the use of the street by vehicles. Where there are tracks on narrow streets, the average vehicle runs partly in the railway area and partly outside it and produces a different kind of wear than in streets without tracks. Vehicles do not usually follow the rails unless the paving in the street is poor. Paving is also affected by the type of rail construction, as for instance where tie rods are used. If the track construction was designed especially for the paving, there would be little trouble.

PHILADELPHIA EXPERIENCE

Julius Adler, deputy chief Bureau of Highways, Philadelphia, the next speaker, then presented an address which is published in abstract in another column. He also showed pictures of Philadelphia track, several of which are reproduced herewith. In commenting on these he said: Fig. 1 is an intersection of Germantown and Susquehanna Avenues. This paving is smooth granite block laid in 1915 on a 6-in. concrete base. There is practically no wear on the block away from the crossing. Fig. 2 is also a view on Germantown Avenue where the pavement is wood block and when laid in 1916 was flush with the rail. The pavement was on a 6-in. concrete foundation with ½-in. cement pad, 1 in 4 mixture. The space along the rail through the entire length of the block shows numerous failures, indicating that there had been a movement all along the street of both rail and tie. In this form of construction, the first evidence of defect is on the outside of the rail, generally about the end of the tie. It would seem that this is the point of greatest movement. The same conditions are found in granite block and asphalt pavements. The deterioration then works in toward the rail and proceeds between the rails. Fig. 3 shows a crossing at Twelfth and Filbert Streets of dressed granite block on 6-in. concrete completed in 1919. The outstanding feature is the bad condition of the crossing in an otherwise good piece of pavement; the granite block was laid with an asphalt elastic filler. So far as we know, all of these crossings were laid on the natural soil. Fig. 4 gives view at Tenth and Walnut Streets, paved with smooth dressed granite block on a 6-in. concrete and completed in 1921. The paving elsewhere consists of wood block on a 6-in. concrete base, bituminous paint being put in the concrete and bituminous filler between the blocks with smooth dressed granite block on the rails, and redressed granite block between the rails. This pavement is now about seventeen months old. The shoulders are intact. The general condition of the pavement along the straight rail is satisfactory. The blocks in places have dropped down something like 1 in. to 1½ in.

Fig. 5 shows the typical present standard track construction in Philadelphia: 9-in. girder rail 140 lb.; no tie rods; 5-in. x 9-in. ties, 22-in. centers. The view shows the track tamped for final cleaning up of the rubbish from the shoulder ready to place the concrete around the ties to the bottom of the ties and then out on the shoulder in a continuous operation. After the tamping work has been completed, the concrete is placed around the ties, in probably not more than three or four hours or half a day, so that presumably there is little or no opportunity for water to get in and disturb the solidity of the subgrade, as it will in the tamping. When a street is paved, and most of the streets are one-track streets, the paving is laid in the track area and on one side. Then when that is complete the other side is paved.

DISCUSSION

In the discussion H. H. George said he knew of track constructed in various ways, some in concrete and some with ballast, where the paving was much worse than shown in the pictures, although the track had been down for less time. He also knew of track laid on stone ballast with nothing but concrete between the ties and with wood block paving which had been in since 1912 and practically in the same condition in which it was laid, although the traffic was heavy. He thought soil had much to do with the matter.

Mr. Adler said that he knew of some locations in Philadelphia where there was a good gravelly soil and the pavement had done very well along the tracks.

Mr. McIlraith, Philadelphia Rapid Transit Company, said the company is building better tracks this year than before, and not in the way shown in the pictures. For the last year and a half it has been the practice at the street crossings to put in at least 8 in. of first class ballast underneath all street intersections. In 1916 the pinch for men and materials and money was felt, and much of the pavement laid in that year was put in without any track repairing being done. Unless the track is put in good condition at the same time the paving is done, it is manifestly impossible to keep the paving up.

Most of the Philadelphia railway streets are laid with granite block and with sand filler, and of course such paving lets water enter rather rapidly. At one time the speaker said that he was an advocate of solid concrete slab construction on clay soil. Now he believes natural soil is a better track foundation, though if the soil was largely clay, it would be desirable to have under the tie a fine grade of granite grit or something else that would be durable, will pack readily with tamping and will let the water permeate through it and spread over the structure. A depth of 6 in. of grit under the ties on a soft clay soil or any other type of undesirable soil is in his opinion a better construction than concrete. The material inserted will absorb more water than the natural soil would do. It is also better than crushed rock ballast because it gives a greater area of bearing on the soil.

Mr. Ryder of New York, referring to a statement made by Mr. Pinckney

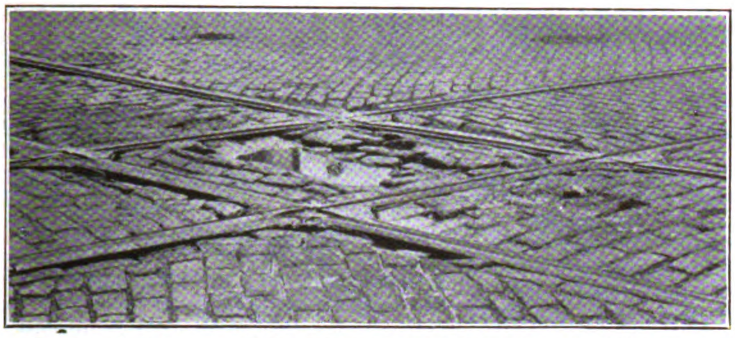

FIG. 1—CROSSING AT GERMANTOWN AND SUSQUEHANNA AVENUES, LAID IN 1915

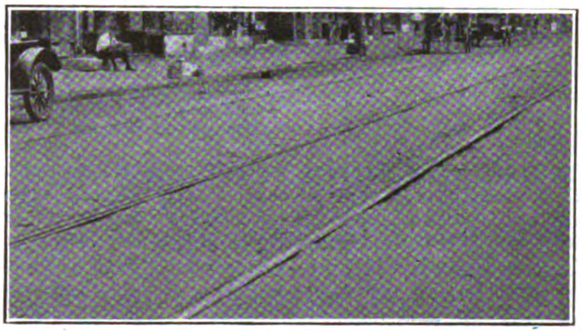

FIG. 2—CROSSING ON GERMANTOWN AVENUE WITH WOOD BLOCK PAVEMENT, LAID IN 1916

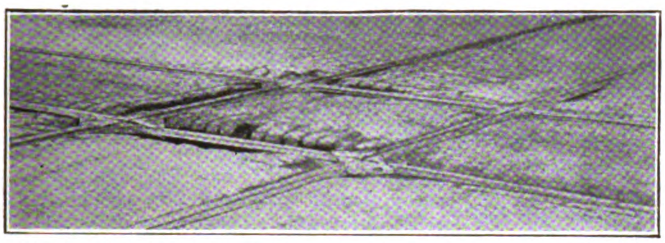

FIG. 3—SHOWS A CROSSING LAID WITH GRANITE BLOCK IN 1919

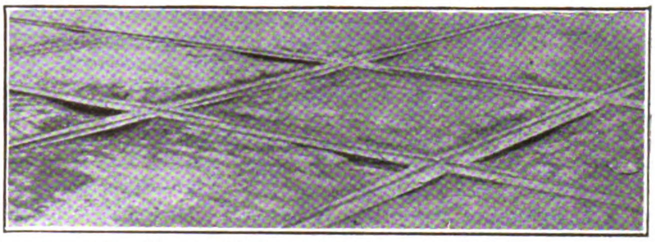

FIG. 4—CROSSING COMPLETED IN 1921

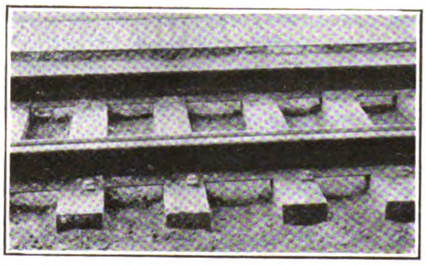

FIG. 5—THIS IS THE PRESENT STANDARD TRACK CONSTRUCTION IN PHILADELPHIA

on the use of granite block in Manhattan, said that it is always used there with asphalt filler, which he considered preferable for the purpose to cement grouted granite.

A representative from Cleveland said that where water got below the crown between the track rails it would tend to heave the paving. Hence in Cleveland the area is dished, so that if water gets under it the tendency is to form the paving in a straight line and not to crack it.

Mr. Ryder pointed out that it is the practice on steam roads not to carry the stone ballast much beyond the end of the ties, so that the ballast can drain out sideways. He said it is inadvisable to use stone ballast where water can stand in it, and he agreed with Mr. McIlraith that instead of stone ballast a material should be used that has the least possible number of voids in it. Track should be drained, and where the sewer is in the center of the street, if the material under the ties is sandy and gravelly or is mixed with a close-filled stone, water will work down into the sewer and take care of itself except where there is a very unusual amount of it. As for water in the groove of the rail, the remedy is to use a T-rail.

Mr. Wysor said that in Baltimore both concrete foundation and crushed stone foundation were used and as good results were obtained from one as the other.

Mr. Adler, in answer to a question, said he thought the winter conditions in the latitude of Philadelphia were such as to introduce special problems in track construction. There are no extended periods of cold, but alternate freezing and thawing. This probably made it harder to maintain streets and roads than in localities farther south or farther north.

Mr. Cram of Brooklyn referred to the report on track foundations of the American Electric Railway Engineering Association and gave statistics of the amount of water which would be retained by different kinds of soil. This means that the type of foundation has to be varied with the kind of soil on which it rests. The American Railway Engineering Association and the American Society of Civil Engineers, aided by funds first donated by Mr. Carnegie, have spent $50,000 studying the stress on steam railway tracks and have reported among other things that a track is an elastic structure and is subject to Hooke's law that when a body is subjected to an external force a stress and an accompanying deformation result. The same law applies to electric railway tracks, and the main point is to control the movement of the track. A recent investigation of the electric railways in the United States showed that while 60 per cent used some form of ballast construction, 10 to 15 per cent laid their track on natural soil and about 25 per cent laid their track on concrete. Most street railway track laid on any form of concrete has been a failure.

In Brooklyn, the soil is mostly a sandy loam with some clay, and the construction, which was authorized by the city highway department after an extended investigation, is practically the same as that followed in Philadelphia. The subgrade is excavated for the tie or slightly above, and the tie is incased in concrete, then the street is paved, generally with granite block. Latterly, sheet asphalt on concrete has been laid in direct contact with the rail. Last summer the company was obliged to take up a steel tie concrete constructed track which consisted of about 6 or 8 in. of concrete where the track had settled in some places about 2 in. and in other places 3 in. In its place wooden tie construction with the grooved girder rail paved in asphalt was employed, and the speaker believes that it will last twenty or twenty-five years in place of the fourteen years for the other construction, and its maintenance should be about 10 cents per foot per year instead of 89 cents per foot per year.*

In one street along Prospect Park, where the subsoil was bad and drainage from a lake penetrated the soil, broken asphalt was first thrown in the trench. On top of that the company put some cinder and rolled it, and on top of that put an 18-in. concrete mat with Carnegie steel ties spaced about 3-ft. centers. This is a track practically floated in concrete on a quagmire. The speaker said that he hoped it would last during the life of the rail.

C. H. Clark, Cleveland Railway, then presented some pictures of his track construction which he said up to two years ago was solid concrete construction. At present the company is building a great deal of track with wooden ties and some track without any foundation under it. One reason for this, however, is that track improvements have to be charged to capital and the stock of the company has to be sold at par, and as the stock has been below par it has been impossible to raise capital for extensive improvements. Some track is laid on crushed stone ballast, which has been rolled with a roller before the wooden ties are placed on the ballast. The ballast is rolled to about 1½ or 2 in. below the bottom of the tie. The ties are then tamped with slag screenings.

The meeting then adjourned. The evening session will be reported next week.

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*For further particulars see article by Mr. Cram in the issue of this paper for last week.

To What Extent Is Paving Affected by Street Railway Tracks?*

BY JULIUS ADLER
Deputy Chief Bureau of Highways, Philadelphia

UNDER conditions such as exist in Philadelphia, the presence of street railway tracks almost invariably shortens the life, increases the annual maintenance cost and greatly magnifies the difficulty of keeping street pavements in safe and usable condition.

The influence of the tracks in promoting pavement deterioration is first direct, as evidenced immediately along the rails, and second indirect, with the deterioration occurring both near and at a distance from the rails.

Under the heading of direct wear a considerable portion of the trouble originates with the railway engineer's insistence upon the flexible or non-rigid type of track construction, for the matter of harmonizing flexibility in track construction with reasonable permanency in the abutting pavement construction is apparently an unsolved problem. What is the definition of this term flexibility? How much must a rail be permitted to deflect in order to give reasonable length of service? How much can a pavement be expected to deflect and still maintain its integrity? Unfortunately, there seems to be no exact answer to these questions. Even the most rigid types of pavement do deflect, under heavy loads, an amount capable of measurement with suitable apparatus and without apparent detriment. The less rigid types, such as those on macadam foundations, or bituminous bound foundations, together with sheet asphalt, granite block with bituminous mastic filler and brick with asphalt filler, deflect to a still greater extent under loading in the ordinary course of events.

In the highway field, as in the railway field, there is an active controversy concerning the relative merits of the flexible and non-flexible types; but as applied to pavements, there is one fairly safe rule, namely, when the deflection of the pavement under the ordinary maximum load is clearly visible to the eye, there is trouble ahead. On the same basis, when the vertical movement of railway tracks becomes apparent, there is little hope for the adjoining pavement, be it ever so flexible. Stone block, or other types of pavement laid adjacent to a rail, may be bound together with a flexible asphalt cement, but when the rail begins to work, the frequently repeated movement and the access of water to the foundation will invariably cause the breaking down of the pavement.

At the city paving meeting held here a year ago, E. J. McIlraith of the Philadelphia Rapid Transit Company ably presented the arguments in favor of non-rigid track construction as practiced by his company. Using a 9-in. 141-lb. girder rail laid on 5 in. x 9 in. x 8 ft. ties, spaced 22 in. on centers, laid on the natural soil, his calculations showed a maximum pressure transmitted by the tracks to the supporting soil of approximately 0.4 ton per square foot, as against safe working pressures of 4 to 6 tons per square foot as used in building foundation construction. Mr. McIlraith concludes: "Is it not then clear that a very safe margin of loading exists, and that any more expensive structure to install, to maintain, or to remove, that would still further blanket the load over a wider area of soil, would represent a waste of money?"

From the paving engineer's standpoint, the method of reasoning and conclusion arrived at are incorrect in several respects.

In the first place the calculations are based on static loads, but the effects of impact, the most difficult of all conditions to deal with in engineering structures, are entirely disregarded. It may be said that when the track structure is properly installed there is no occasion for impact occurring on straight track, free from special work, but this assumes a degree of perfection which, experience shows, is never attained. No ordinary methods of working can produce a subgrade under the track which is of uniform bearing power and free from soft spots, with the result that the track structure described does move perceptibly in places almost immediately after the final tamping. It is further evident that, in service, the head of the rail does eventually develop inequalities which cause impact from the moving wheels.

In the second place, the reasoning employed in Mr. McIlraith's discussion gives scant consideration to the fact that the movement of track structures and the accompanying deterioration of pavement, form a progressive action. A persistent slight movement of the rails will break the bond of the adjoining pavement at least sufficiently to allow moisture to enter slowly. The later movement of the rail, in the presence of moisture, sets up the pumping action so often referred to in track structure, and if the material supporting the track structure is of a character which can readily be pumped (and natural soil certainly is) the support of both the track and the pavement steadily decreases in this locality, the amount of movement in the track increases at a progressive rate, and the breaking down of the pavement follows with increasing rapidity.

The conclusion seems to be that in order to keep paving intact around railway tracks, the amount of possible movement in the tracks must be definitely limited from the very start. This cannot be accomplished by laying the track structure directly on the ordinary clay soil and there must be a slab of concrete of proper thickness and strength placed below the bottom of the ties. We do not claim, however, that the railway engineer's contention for flexible track structure is incorrect, providing the degree of flexibility is limited. For example, if an intermediate layer of porous material is placed between the concrete slab and the bottom of the ties, flexibility can be accomplished by this means and no harm done to the pavement provided the material so placed is of a character that is not readily pumped (when moist) by a very slight deflection of the track.

The remaining part of our discussion has to do with the indirect influence of railway tracks on the wear and tear of pavements. This is a condition which varies with the width of the streets, number of tracks in the street, amount and weight of car traffic, and amount and weight of vehicular traffic. In Philadelphia unfortunately a very large proportion of the most important streets are too narrow to accommodate properly car traffic and vehicular traffic as they now exist. The headway between cars is so close that during the busy hours of the day vehicles have but little opportunity to use the central portion of the street and are forced to move in a narrow path, usually on one shoulder.

At the city paving meeting a year ago, the opportunity was taken to point out this fact as one of the most serious problems to be contended with in the maintenance of asphalt pavements on railway track streets in Philadelphia. These pavements laid on a 26-ft. cartway free from railway tracks give very satisfactory service, but laid on a street of the same width with a track in the center the concentration of traffic on a narrow shoulder often causes excessive disturbance of the pavement surface. This fact, however, is not limited to asphalt pavements alone, for there is no known type of city pavement in general use whose life is not very much longer under well distributed traffic than under heavy traffic following a narrow path. There are examples in Philadelphia of granite block, wood block and vitrified brick on streets occupied by railway tracks, all showing well defined ruts as a result of the traffic being forced to follow a narrow path.

This general condition, which in a city of narrow streets causes a heavy increase in pavement maintenance costs, is one which must fairly be attributed to the influence of the railway tracks, but unlike the matter of disintegration along the rails, it is a responsibility which must be faced by the city alone. At the present time, at least, it must be admitted that surface railway cars are existing and operating on a big scale in all large cities and are an absolute essential in the development of those cities and in their daily routine of commercial and other activities. The cars are on the streets because they are a necessity, and if the remaining portion of the street suffers from the concentration of vehicular traffic, then the city must assume the responsibility for so improving its design and construction of this portion that the traffic can be carried without undue wear and tear.

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*Abstract of address presented at meeting of track engineers at Engineers' Club, Philadelphia, Oct. 9, 1922.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Status in Buffalo

International Files Damage Suits—Conferences on Restoration of Five-Cent Fare Started

Papers in a suit for $4,960,000 damages against the county of Erie have been served upon the County Treasurer by the International Railway, Buffalo, N. Y. The company claims it has suffered to that extent because of rioting in the county since the start of the car strike on July 1. A similar action has been brought against the city of Buffalo for damage done within the city.

Detail Figures of Losses

The total is made up of these individual items: Damage to cars, tracks, carhouses and equipment through violence, $10,000; earnings lost through strike, $2,000,000; damage to good will and franchises, $2,500,000; suits against the company for injuries, cost of feeding and housing employees and hiring guards, $450,000.

Herbert G. Tulley, president of the International, refused to appear before the municipal authorities when the later asked for a preliminary examination of Mr. Tulley in reference to the claim of $3,800,000 against the city for alleged strike damages.

Less than 30 per cent of the platform employees of the International now are being housed in the three camps established by the company during the early days of the strike. About 70 per cent of the new employees are living in private homes, boarding houses and many have moved their families to Buffalo from cities in the South where many of them formerly were employed. Company officials say they do not know just how long the employees' camps will be continued.

R. H. Horton, Philadelphia, represented Thomas E. Mitten, chairman of the board of the International, at the first of a series of conferences between committees representing the company and the municipal authorities in reference to the restoration of a 5-cent fare or the adoption of a service-at-cost plan of operation in Buffalo. President Tulley and Vice-President Dickson were the other representatives of the International.

Nothing Accomplished

Nothing was accomplished at the session nor was any concrete plan for service-at-cost mapped out, as the City Council had just been advised by the city law department that an investigation into service-at-cost disclosed the fact that "a good agreement is not impossible, but only the most skillful negotiations can produce a contract which will be flexible enough to provide for all emergencies without being so elastic as to be worthless."

The report of Corporation Counsel William S. Rann, who made an extended investigation into the question, denounces the service-at-cost system and says that in almost every city in which it has been placed in operation, except Cleveland, the plan has been disappointing to the public, and in some instances to the operating companies and employees.

Ernest K. Jaggard, president of the Buffalo Jitney Owners' Association, is under arrest on a charge of conspiracy upon complaint of President Tulley of the International. When arraigned in court, Jaggard pleaded not guilty and demanded a jury trial. His trial was set for Nov. 27 and he was released on $5,000 bail. Jaggard's arrest resulted from John Doe proceedings brought to determine if the transportation corporation law is being violated in Buffalo through the running of jitneys by the Manhattan Transit Company of New York. Joseph H. Hoadley, president, and Henry D. Chapin, officers of the Manhattan company, will be tried on conspiracy charges Nov. 24.

The Manhattan Transit Company operated several hundred jitneys in Buffalo after injunctions had been issued retraining the operation of such vehicles in Buffalo. The company claimed it had authority to operate 10-cent buses because of a blanket franchise granted years ago.

Agreement Sought Without Arbitration

In a formal notice on Nov. 1 the Springfield (Mass.) Street Railway and the Worcester Consolidated Street Railway asked their employees to accept a reduction of 8 cents an hour for blue uniform men and a corresponding reduction for miscellaneous employees under the contract to become effective on Dec. 31, on the expiration of the existing contract. This would establish a maximum of 50 cents an hour for the blue uniform men. At the same time the Springfield and Worcester divisions of the Amalgamated Association asked that wages be increased to the rates in force up to March 1, 1922, which would mean a maximum of 68 cents an hour for blue uniform workers. Request was also made by the men for various changes in the working conditions, concerning which there has been considerable complaint since the last adjustment, especially as relates to the outside spread and guarantee of spare men. Efforts are being made to come to an agreement without resort to arbitration.

Council Decides Not to Go Over Sir Adam's Head

After a debate lasting six hours, the Council of Toronto, Ont., on Oct 26 defeated, by a majority of sixteen to six. Alderman Whetter's suggestion that the city send a deputation to Ottawa to try to buy the city portions of the Toronto Suburban Railway.

The debate was featured by a long explanation from Sir Adam Beck of the whole negotiations. Information not before made public was given to the Council by Sir Adam and Mayor Maguire, both of whom stated emphatically that the city lines could not be purchased separately — legal opinion had proved that; that the agreement to take over the whole system was practically ready for signature, and that the city would soon be able to give West Toronto people relief from their present transportation injustices.

Sir Adam gave the history of the agreement which a certain Toronto evening paper said had been made between the Toronto Transportation Commission and the National Railways regarding the purchase of the city lines. The Hydro-Electric Commission knew nothing of this.

This agreement, it was explained, provided for the operation by the National Lines of the portions in the city on which the franchise had expired, so that the National Railways would not pull up the tracks and leave the district without any service at all. It had nothing to do with the purchase of these lines. It provided for the operation until such time as the Toronto Transportation Commission could get hold of the lines, and provided that any deficits would be paid by the city or the Toronto Transportation Commission. But this agreement was never even executed, said Sir Adam.

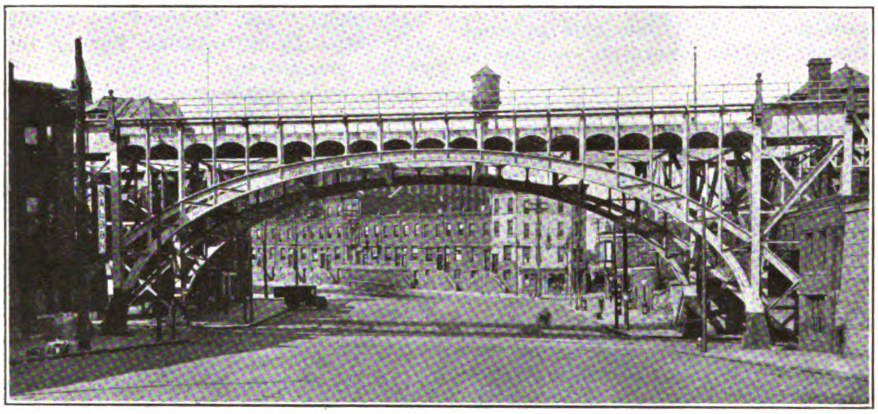
In answer to question as to how long it would be after the city passed the by-law approving the agreement before the city lines would be turned over to the Toronto Transportation Commission, Sir Adam said that depended on the speed shown by the new directors of the National Railways and the lawyers engaged.

Ald. Singer wanted to know if Sir Adam would still recommend the purchase of the whole system if the people were given a chance to vote and turned down the waterfront entrance project. Sir Adam's answer to this and other questions was the same. The whole matter would be signed, sealed and delivered before Jan. 1 and these matters would not interfere with the purchase. He had a mandate from Toronto to buy the whole system and would buy it unless the City Council intervened and voted to stop him.

Frankford "L" Opened

Philadelphia Rapid Transit Takes Over Operation of Important Addition to City's Transit Lines

All Frankford, a section of Philadelphia, is celebrating. It started celebrating on Saturday, Nov. 4, with the official opening of the Frankford elevated line, and it planned to continue celebrating until Nov. 11. Frankford waited seven years for its elevated extension, and it decided that after waiting seven years it should celebrate for seven days. At first there were all the delays, the war, change of administrations, etc., incident to the actual building of the structure by the city, and after the line had been erected the city and the Philadelphia Rapid Transit Company got into a jam over the terms of operation. And so the Frankford elevated stood in mute silence for several years, mocking the passengers taking the long ride by surface line from Frankford into Philadelphia.



Artistic Street Crossing on New Elevated Line

Nov. 4 was, indeed, a great day for Frankford, and incidentally for Bustleton, a suburban section of Philadelphia. More about Bustleton later. President Mitten of the Philadelphia Rapid Transit Company and Mayor Moore, together with members of the Council, other officers of the Philadelphia Rapid Transit Company and invited guests from Philadelphia and nearby cities, all participated in the official ceremonies incident to the opening.

The first train left the Bridge Street terminal late in the afternoon, following the speeches at the dedication ceremony. Whistles screeched a greeting to the train which carried the Mayor, Mr. Mitten, officials of the city and the transit company and invited guests.

The only drawback to the celebration was the absence from it of W. S. Twining. An acute attack of indigestion forced the director of the department of city transit to remain at home. The director personally supervised the construction of the city-built elevated and also of the Bustleton surface line.

As indicated before, Frankford was not the only section of the city that held open house and festivities on Nov. 4 because of the beginning of new eras, due to better transportation facilities. Bustleton, too, has a new line and, while it is not a $15,000,000 "L," it is a very adequate surface line. Council made an appropriation of $1,200,000 and authorized the construction and improvement of a double-track surface passenger railway, beginning at or near Frankford Avenue and extending along Oxford Avenue and other streets to the Byberry and Bensalem pike. Later studies of the work showed that the sum appropriated by Council would be inadequate to cover cost of building and equipping 10 miles of double-track road.

During the negotiations leading to the present agreement for the operation of Frankford elevated, it was estimated by city and Philadelphia Rapid Transit engineers that during the first year of operation 9,000,000 passengers would be carried on the Frankford elevated if operated by the city and terminating at Front and Arch Streets; and 33,000,000 passengers would be carried on the Frankford elevated if operated by the P. R. T., with free transfers to surface lines and with Market Street subway delivery.

The company says that 24,000,000 additional passengers will use the Frankford elevated because the P. R. T., as operator, supplies the Market Street subway terminal and free transfer with connecting crosstown surface lines.

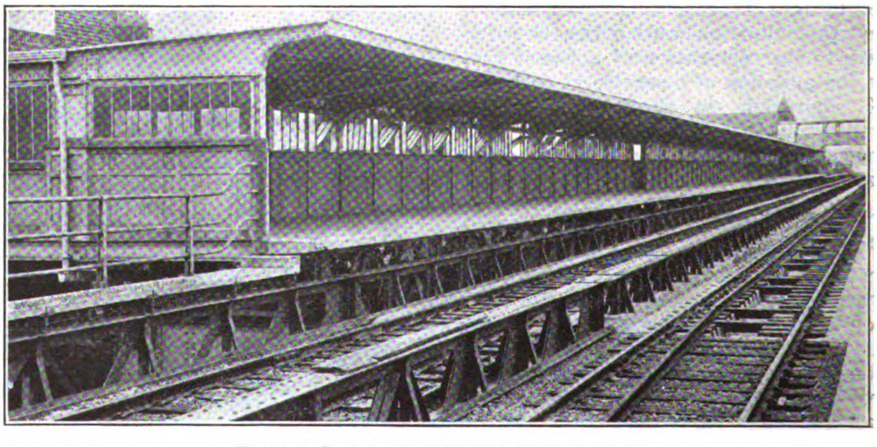
There will be a readjustment of service and routes in the Frankford general district by combining the service on closely paralleling routes where it can be reasonably done, and by withdrawing such service as will be largely unused after the Frankford elevated is in operation.

The fare for the ride over the Frankford-Market Street elevated, between the Bridge Street terminal, Frankford, and the Sixty-ninth Street terminal, West Philadelphia, will be 7 cents cash, four tickets for 25 cents. The payment of a cash or strip ticket fare entitles the passenger to one free transfer between the Frankford elevated and any connecting crosstown surface line north of Arch Street, or in West Philadelphia between the Market Street elevated and connecting crosstown surface lines, as designated on the transfer tickets. To obtain a transfer, it is necessary for the passenger to make the request at the time the cash or strip ticket fare is paid, and with the opening of the Frankford elevated, the practice of handing out transfer tickets at the exit gates, previously in vogue at certain of the West Philadelphia stations, was discontinued.

The transfer of passengers between the elevated-subway trains and the surface-subway cars at Juniper Street is continued, as is also the exchange tickets now receivable at westbound stations of the Market Street subway.

Four motor buses were used by the Philadelphia Rapid Transit to carry its own and city officials to the dedication ceremonies. They represented practically all the types required for city service. They included two Mitten-Traylor single deck vehicles, one of twenty-nine and one of twenty-five passenger capacity; one model L double-decker of the type developed by the Fifth Avenue Coach Company, and one covered double decker, with prepayment rear end, of the Detroit type described in *Bus Transportation* for September, page 479.

While no official announcement has been made by the Philadelphia Rapid Transit, the use of these buses undoubtedly indicates their operation in the near future in conjunction with the existing rail lines. In fact, President Mitten of the Philadelphia Rapid Transit Company has been credited with the intention of making a thorough study of the costs and possible routes where buses might be used.



Typical Station on New Elevated Line

More Trackless Trolleys

Nine-Mile Line Added to System on Staten Island—200 Miles More in Prospect

Staten Island on Nov. 4 had 9 more miles of trackless trolley added to the 6.1 mile system already in operation there. The new line was opened with ceremonies in which Mayor Hylan of New York, Commissioner Whalen and other city officials participated.

The new line operates from the end of the St. George-Richmond trolley line to Tottenville via Fresh-kills Road, over a 20-ft. concrete highway with few grades but many curves. The line is approximately 9 miles in length and for a ride over it a 5-cent fare is charged, with no transfers to the trolley cars at Richmond. Normally, service is given every twenty minutes, but during the morning and evening rush hours more frequent headways are run.

The overhead trolley consists of double construction with a loop at each end of the line, the loop being formed around a block. At the Richmond end of the line the new system connects with the municipal trolley line so that it is possible for a passenger to ride from St. George to Tottenville for 10 cents.

Eight new vehicles were purchased for the route, a 300-kw. generating station installed at Sea View Hospital, an automatic substation put up at Green Ridge, and a carhouse with a capacity of twelve buses built at the same place. For this operation the city appropriated $177,700.

In general the vehicle in appearance follows the automotive design rather than that of the street car. It was designed by the Trackless Transportation Company, New York. The motors are mounted amidships, while under the hood are placed the resistance grids, the storage battery for emergency lighting and the battery charging generator.

The body, which was built by Osgood-Bradley Company, Worcester, Mass., has steel posts and carlines and outside panels of 20-gage steel. Inside the wainscoating under the windows is of $\frac{3}{16}$ in. Agasote. The roof is tongue and grooved hardwood sheathing, covered with No. 12 canvas, on top of which is a trolley board 18 in. wide that runs the full length of the body. Three footholds on the right-hand rear corner and a roof ladder provide access to the U. S. 50-A trolley base and sliding current collector.

The line has its own power supply. At Sea View Hospital, a city institution, a 2,300-volt 300-kw. alternator direct connected to an Erie-Ball engine has been installed. The voltage is then stepped up to 6,600 for transmission to Green Ridge, where a Westinghouse 300-kw. automatic railway substation has been put in to furnish the necessary power at 600 volts d.c. to operate the trolley buses.

NEW TRACKLESS TROLLEYS DRAWN UP TRAIN FASHION

Commissioner Whalen is on record as saying that the Richmond-Tottenville trackless trolley is only one of the thirty odd lines planned for the borough. According to Mr. Whalen, the plans of Mayor Hylan call for 204 miles of trackless trolley in Richmond.

A year ago Mayor Hylan put into operation two trackless trolley routes in Richmond, one making Linoleumville accessible, the other providing transportation for the city's great Sea View institutions. Both lines have served the public well and have resulted in the building of numerous homes in the sections served.

Advantages of One-Man Car Operation Cited

Accidents have been minimized, schedules better maintained and the service generally improved by the use of one-man trolley cars on the Altoona & Logan Valley Electric Railway lines in Altoona and Blair Counties, according to a statement filed by General Manager S. S. Crane of the traction company with Mayor Charles E. Rhodes and the City Commissioners. The statement was made in rebuttal to objections raised by citizens at a hearing before the commissioners. Citizens protested the use of one-man cars.

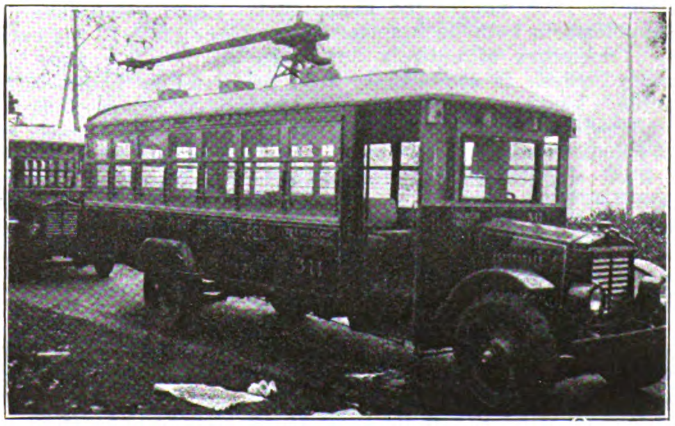
The Altoona & Logan Valley company operates specially designed one-man, single truck cars on certain lines, and one-man double-truck "owl" cars on other divisions. Passengers enter and leave by the front door.

General Manager Crane in his statement cites eleven reasons for the one-man car, several of them answering citizens' protests. As to a safety measure in dropping sand, he states that the front end operator can drop sand from either end of the car at the same time. As to "on time," the manager states that one-man cars, by accurate records, show a better schedule than two-man cars, with an even better record possible where passengers have the exact fare.

In conclusion Mr. Crane stated that one-man cars were operated on the Tyrone lines ten years ago and that actual experience has demonstrated the wisdom of their use.

"Better service to the greater number has been the watchword in Altoona," said Mr. Crane, "and when conditions warranted extensions were made voluntarily for the convenience and accommodation of the public. Decreasing revenues, however, must be met by decreasing costs and the one-man car maintains the proper ratio without service impairment."

CONCRETE CARHOUSE AT GREEN RIDGE


CLOSE-UP OF A NEW TROLLEY

Utility Questions in the Elections

Candidates Talked Regulation, Home Rule and Water Power—The Arrogant Rebuked and the Compromiser Defeated—California Rejects $500,000,000 Appropriation

CAUSTIC comments are everywhere in evidence in the daily newspapers on the outcome of the election. These relate to the results in their national significance and to the purely local aspects of some of the upsets. Thus in the plurality given in New York City to Alfred Smith, who has been returned to the office of Governor, the *Wall Street Journal*, than which there is no more outspoken paper in the country, said that it was by no means the first time that New York City had returned like a dog to its vomit. As the *Wall Street Journal* sees it New York State prefers a good mixer to a good business man.

WATER POWER AND HOME RULE

In New York State the water power and the home rule issues received a great deal of attention from the Gubernatorial candidates. Somewhat similar issues were involved in New Jersey, while elsewhere throughout the country questions affecting the utilities were involved in the elections, notably in California, in Detroit, Saginaw and other places.

In Chicago there was no direct issue affecting the utilities, but the defeat of candidates having the backing of William Hale Thompson has raised the question whether Chicago's present Mayor can be returned to office.

In New York Mayor Hylan, ever quick on the verbal trigger, read into the election result the end of the traction triplets, the endearing term which he uses to describe the members of the present transit commission, created at the behest of Governor Miller. In this case the wish appears to be father to the thought, for it is most uncertain just how far the new Governor can go in undoing the work of the commission. If Mayor Hylan had his way, his own whole transit program, if such it may be called, would be made possible of completion at once, even including his $25,000,000 bus program, but Mayor Hylan's way may not be the Smith way. Sight must not be lost of the fact that the ingratiating Smith during his previous administration as Governor in 1919 induced the Legislature, Republican in both its branches, to appoint members of entirely new regulatory bodies. In consequence there resulted a one-headed regulatory transit commission and a one-headed regulatory construction commission.

What Mr. Miller, the defeated candidate for Governor in New York, said during the campaign does not matter now. It is no longer news. It has passed into history. What Mr. Smith said, however, does matter, but it must be read in the light of his appeal for votes. He referred constantly to the so-called Carson-Martin bill, which, he charged, provided that the Public Service Commission can fix the rate of fare without regard to existing franchise. He also repeated many times the interrogation: "By what reasoning does he (Governor Miller) arrive at the conclusion that the State of New York should have anything to do with railroads that are partly the property of the city of New York?" He said the big question was: "What business is it of the State of New York to be regulating this transit question which lies entirely within the city of New York?" Still the records show that outside of the city of New York the electric railways of the State did secure relief from burdensome fare provisions during Mr. Smith's former administration, although the concessions were in a measure wrung from the administrative bodies.

In New Jersey George S. Silzer has been elected Governor. He is a pronounced 5-cent fare advocate. He will be faced by a hostile law-making body, however. As a spokesman for Mr. Silzer a former member of the State Utility Commission, John J. Treacy, stumped the State. Mr. Silzer is a democrat. Opposed to him was William N. Runyon, who flatly put himself on record against the 5-cent fare, saying it was impossible of accomplishment. In this connection it is interesting to note that Mr. Treacy lays claim to being the author of the Bacharach bill, the national measure which would make appeal to the federal courts impossible for utilities seeking relief from commission decisions fixing rates. In one of his speeches Mr. Treacy said: "With a contempt characteristic of that corporation (the Public Service Corporation of New Jersey) it saw fit to flout the State courts and the State Commission. If this practice were to be permitted State regulation of public utilities would soon be at an end, and all that we had gained through the long fight for a public utility law would be lost."

$500,000,000 APPROPRIATION DEFEATED

In California the people declared themselves in no uncertain terms on the proposed constitutional amendment known as the water and power act, which would have pledged the credit of the state to the extent of half a billion dollars to engage in the business of developing hydro-electric power. Incomplete returns indicate that the measure has lost by nearly two to one. Briefly, the act provided for the control of the water powers of the state by a board of five, to be appointed by the Governor, which would have at its disposal $500,000,000 to be raised by the sale of bonds and backed by the credit of the state. This money could be used at the discretion of the board to develop and distribute water and electrical energy and, if deemed expedient, for the acquisition of the power plants and distribution systems of privately owned utilities.

Two other measures of interest to the utility industry of California have apparently lost by majorities too large to be overturned when the complete returns are counted. One was an act to bring municipally owned utilities under the jurisdiction of the California Railroad Commission and to give the commission the power of regulation in all matters except the issuance of securities. The other was an act requiring municipally owned utilities to pay the same tax that is required of privately owned utilities.

In San Francisco the plan of the city to purchase the Market Street Railway has apparently been ratified by voters, for an amendment to the city charter has been passed which would exempt from the city debt limit an issue of bonds such as would be required to be issued for the city to purchase the railroad. The railway company has set a value of $48,000,000 upon its properties, but the city engineer is understood to have set the figure at $40,000,000. Under recent reorganization plans, the Market Street Railway's bonded indebtedness has been reduced to $15,000,000. On the basis of the $40,000,000 purchase price figure, these bonds, together with $11,700,000 prior preferred, the $5,000,000 preferred and $4,700,000 second preferred, could be retired, and there would still remain the equivalent of $35 a share or more for common stockholders.

In Detroit the citizens by a more than two to one vote, rejected the proposal of Mayor James Couzens and the Council to oust the Detroit United Railway interurbans from the city. Two other measures also sponsored by the city administration, the proposed $5,000,000 bond issue for municipal street railway extensions, and the proposed charter amendment relieving the Detroit Municipal Railway of the cost of paving between its tracks, also lost by wide margins.

Unofficial figures from Saginaw, Mich., indicate that the franchise calling for the restoration of service by the Saginaw-Bay City Railway was lost by a small margin. A recount will be asked by those friendly to the franchise. It was the largest vote ever recorded on a municipal question in Saginaw.

North American Completed Purchases of St. Louis Properties

As noted in the issue of October 28, the North American Company's offer to purchase the stock of the East St. Louis & Suburban Railway had been accepted by practically all of the share holders. Since that time the North American Company has purchased the stock and has actually taken control of the management of both the East St. Louis & Suburban Railway and the East St. Louis Railway.

W. H. Sawyer, who has been president of both companies under the E. W. Clark management, will continue in that position under the new management. Mr. Sawyer has severed his connection with the Clark interests.

Financial and Corporate

Third Avenue's Previous Year's Deficit Absorbed by Improvement

An increase of more than $1,000,000 is noted in the net income of the Third Avenue Railway, New York, N. Y., for the year ended June 30, 1922, over the year ended June 30, 1921. After taxes, interest charges, and a 5 per cent interest on adjustment mortgage income bonds the net income amounted to $207,474. Last year the company reported a deficit of $876,611. The improvement in the income account is noted in the following table:

	1922	1921	1920	1919
Operating revenue	$14,141,412	$13,499,226	$11,752,069	$10,363,447
Operating expenses	10,555,026	11,037,607	9,284,722	7,741,083
Taxes	964,970	879,319	816,939	818,060
Operating income	$2,621,416	$1,582,300	$1,650,408	$1,804,304
Other income	261,537	213,486	191,909	156,882
Gross income	$2,882,953	$1,795,786	$1,842,317	$1,961,186
*Interest charges, etc.	2,675,479	2,672,397	2,687,713	2,681,242
Net income	$207,474	†$876,611	†$845,396	†$720,56
P. & L. def.	$2,280,591	$2,488,066	$1,252,510	$20,991

* Includes full interest on adjustment mortgage 5% income bonds. † Deficit.

Commenting on the report of his company President Huff said that this betterment in the operation was due not only to an increase in receipts of nearly $700,000 but also to a decrease in operating expenses of approximately $400,000.

In his remarks to the stockholders Mr. Huff said that the physical condition of the property was steadily improving and that the engineers of the Transit Commission had reported that the property was being well maintained. Referring to the adjustment bonds he said that the directors felt that the situation was not sufficiently stabilized at the end of the first six months of the year to justify a payment of more than 1¼ per cent upon these bonds. But at the end of the second six months a payment of 3¾ per cent had been justified. There remains as interest still unpaid upon these bonds 21¼ per cent.

Property Sale Confirmed

Sale of the properties of the Springfield Terminal Railways operating the Springfield, Troy & Piqua traction line, from Springfield, to Troy, to the Joseph Schonthal Company of Columbus, for $87,000, was confirmed by Federal Judge John E. Sater in Cincinnati on Nov. 7. The company is expected to junk the line which has been in the hands of a receiver for about two years on application of the Central Trust Company of Illinois. Efforts to sell the line to proposed operators, met with failure after several deals had been arranged. The receivers were ordered by the court to convey deed to the property upon payment of the full purchase price, and all questions relating to priority of liens upon the funds arising from the sale and the distribution of the funds are reserved for future determination by the court.

Declares Dividend—Suspends Extra Fare

The directors of the Brooklyn (N. Y.) City Railroad at a meeting on Nov. 8 declared a dividend of 20 cents per share on the outstanding capital stock, payable Dec. 15, to stockholders of record on Nov. 8, 1922, the payments being made out of the surplus earnings.

The directors voted to suspend the collection of a second fare on the Flatbush Avenue Line, and elected General Manager Clinton E. Morgan second vice-president of the company.

The property of The Brooklyn City Railroad was returned to its owners on Oct. 19, 1919, following a default by the lessee, The Brooklyn Heights Railroad, in the payment of the installment of rent due Oct. 1, 1919, in accordance with the terms of the lease, which called for annual payments totaling 10 per cent on the stock of The Brooklyn City Railroad Company.

The earnings of the company since July 1, 1922, the date of the last annual report, having continued to be satisfactory, the directors, it was stated, felt that they could conservatively declare a dividend.

In explanation of the suspension of the collection of a second fare on the Flatbush Avenue Line it was stated that the company, in order that the public might be adequately served, was compelled in 1919 to increase its income by exercising its right to collect a second fare on the Flatbush Avenue Line.

The company having overcome initial difficulties and having put its property in good operating condition, it was said, is gratified to be able to suspend the collection of a second fare on the Flatbush Avenue Line and thus to relieve the traveling public of this additional burden. The second fare has been collected since Jan. 17, 1921, the company's right to do so having been established by the courts.

Manhattan Stockholders Approve Readjustment

The stockholders of the Manhattan Railway, New York, N. Y., on Nov. 8, approved the readjustment plan of the Interborough Rapid Transit Company and the Manhattan Company at the annual meeting of the shareholders of the company. The ratification of the plan, which had previously been approved by the board of directors, was accomplished only after Clarence H. Venner, a minority stockholder, sought to obtain an adjournment on the ground that no quorum was present.

Approval of the Interborough-Manhattan plan would be illegal, Mr. Venner stated, because the lease of the Manhattan lines contained a clause to the effect that the modification of the terms could be accomplished only on the unanimous consent of the stockholders. As long as 1 per cent of the shareholders objected, said Mr. Venner, the plan could not be put into effect, and he added that he, representing more than 1 per cent, did object.

Three new directors were elected, Finley J. Shepard being chosen to succeed George J. Gould; Thomas I. Parkinson to succeed William A. Day, and W. S. Pierce to succeed J. J. Slocum.

27,500 Shares of Common Stock Purchased by Bankers

Purchase of 27,500 shares of common stock of the Washington Railway & Electric Company, Washington, D. C., during the week ended Nov. 4, by Crane, Parris & Company, Washington investment bankers, acting in behalf of undisclosed principals, has created lively comment in financial circles and revived gossip of plans for consolidation of this street railway corporation with the Capital Traction Company and the Potomac Electric Power Company.

While it was stated on behalf of Crane, Parris & Company that there was no connection between the stock transfer and merger plans and that the deal was for investment purposes, the stock of all three of the corporations connected with consolidation gossip reacted upward sharply on the exchange following announcement of the deal.

There are 65,000 shares of Washington Railway common. The 27,500 involved in this deal were acquired by the Washington Utilities Company in 1912 and 1913 with a view toward merger, which was blocked at the time by legislation. The shares were deposited as collateral for an issue of $1,500,000 short-term notes which were sold to Washington, Baltimore and New York banks. When the Washington Railway suspended dividends in 1919, these notes were defaulted and the stock was taken over by the banks and managed by a noteholders' protective committee. The price paid by Crane, Parris & Company was not made public, but was said to be sufficient to pay noteholders both principal and accrued interest on their investment.

Traffic and Transportation

Compromise Effected

Houston Agrees to Limit Number of Jitneys—Company Will Continue Seven-Cent Fare Operation

The fare controversy between the Houston (Texas) Electric Company and the city of Houston has been settled by compromise. The company some time ago presented a petition asking for authority to increase fares from 7 cents to 9 cents and to discontinue the selling of metal tokens at the rate of four for 25 cents. The request for increased fares was based on the claim that the company had found it impossible to operate profitably in the face of the competition of the jitneys, and that the company's petition to the city to eliminate or greatly reduce the number of jitneys operating had not been granted, but had been referred to the qualified voters for settlement in a referendum election to be held Nov. 7.

FIGHT DATES BACK TO JANUARY

After several proposals and counter proposals, a basis of settlement was finally reached under which the company will continue operation under a 7-cent fare, will continue to sell metal tokens at the rate of four for 25 cents and will resume work on the improvement projects which were stopped when the company filed its request for increased fares.

The city of Houston agrees to reduce the number of jitneys operating in Houston to 150 or less by Jan. 1 and to permit no more than this number to operate thereafter. There are now 187 licensed jitneys in operation in Houston. Eleven jitneys will be eliminated on Nov. 15 when their licenses are canceled by the city. All are operated by negroes and run to the "Black Belt" section of the city.

NINE-CENT FARE APPEARED LIKELY

The fight between the company and the city dates back to last January. The company at that time obtained a fifteen-year extension of its franchise from the city, with the provision that it would sell car tickets four for 25 cents and would within two years spend $1,200,000 on extensions and improvements under the direction of the City Council. The company so reduced fares and spent, it later reported, some $600,000 on the improvement program, building several miles of new track and buying many new cars. Then it came before the Council and demanded that jitney competition be abolished, except on two lines originating outside the city and on one line, the Austin, which does not run within two blocks of any car line. The Council refused to do this. The company then presented statements tq show that it had not made 1 per cent on its investment in the six months ending Sept. 1.

The company countered by threatening to raise cash fares to 9 cents and abolish tickets if jitneys were not abolished at once. It had meanwhile stopped all improvement work, explaining that its credit was not good to borrow any more money while making only 1 per cent on its capital. The city then proposed that the weekly pass be tried.

Fort Worth Fare Briefs Submitted

Briefs have been prepared by attorneys for the Northern Texas Traction Company and by Corporation Counsel R. E. Rouer in the litigation involving the reduction of fares in the city of Fort Worth, Tex., and these are now in the hands of N. A. Dodge, special master in chancery, who heard evidence on the questions at issue under appointment of the Federal court for the Northern District of Texas. Attorneys have been at work on the briefs for about a month.

When Special Master Dodge heard the evidence in the case, which was concluded about a month ago, he gave attorneys on both sides a month in which to prepare and submit their briefs. He will now consider these briefs in connection with the evidence adduced and will make his report of his findings to the Federal District Court.

The Northern Texas Traction Company is now charging a 7-cent fare in Fort Worth, the company having put this fare in effect early in 1920. The city seeks to force a reduction in fares, such reduction to be measured by the amount which the earnings of the company may be reduced and still yield a fair and adequate return.

The charter provisions of the city of Fort Worth are much the same as in Galveston. The company can announce that a certain fare will be charged, that it is necessary to yield a fair and adequate return, and the charging of that fare can then be prevented only by court action.

Considerable statistical data bearing on gross and net revenues, operating costs, depreciation, replacement value, taxes, etc., were placed before the special master during the hearing.

City Applies for Rehearing

The city of Syracuse, N. Y., through its assistant corporation counsel has filed an application with the Public Service Commission for a rehearing of the New York State Railways one-man car and fare issues. If the application is denied the city will have ninety days in which to carry an appeal to the Appellate Division of the Supreme Court. The recent decisions of the commission with respect to the one-man car and the rate of fare in Syracuse have been reviewed previously in the *Electric Railway Journal.*

Interurban Road Protests Bus Operation

The Chicago, Elgin & Aurora Railroad has appealed to the Supreme Court of Illinois from the action of the Illinois Commerce Commission in granting the Smith Motor Bus Company a certificate of convenience and necessity on Nov. 1 to operate motor buses connecting Batavia, Elgin, Aurora, Big Rock, Fulton and Chicago. A similar order was issued Sept. 8, 1921, but, due to an error in the wording, it was reissued with the correction made.

The electric railway, in its appeal to the Supreme Court, contends that the complainant is already established; that it is amply able to take care of the transportation needs of the territory; that there is no necessity for the operation of a bus line, and that the commission has the power to compel the railroad to give adequate service if it is not now doing so. The various arguments were advanced before the commission when the public hearing was called, but the utility board apparently believed that there was a need of the supplementary service that would be supplied by the buses.

Mark Smith, the head of the bus company, started in the business in 1920 with a line between Aurora and Batavia. Complaint was filed by the electric railway soon thereafter and the bus line was compelled to cease operations and ask for a certificate of convenience and necessity. Now that this has been granted, Mr. Smith plans to resume business. He will go ahead with his plans unless halted by a court injunction.

Dismissal of Complaints Brings $325,000 Into Railway Treasure

Complaints made to the Public Service Commission in 1919 over certain passenger fares charged by the International Railway, Buffalo, N. Y., between Buffalo and Lockport, Tonawanda, North Tonawanda and LaSalle, but never prosecuted, have been dismissed by the commission. The commission at the time allowed the increased rates to become operative providing the company issued rebate slips. This continued for a period of months, when the International put a new tariff into effect.

About $325,000 was set aside by the International to meet the face value of the rebate slips pending a determination of the case by the Public Service Commission. Municipal officers in the cities which made the original complaint were cited to show cause before Commissioner William R. Pooley why the complaint should not be progressed or abandoned and closed on the commission's record. With the dismissal of the case, the $325,000 goes into the treasury of the International.

There is now pending before the commission a general action seeking lower fares to and between points on the interurban lines of the International. Hearings will be held later.

Six Cents in Galveston

No Other Alternative to Increase in Rates in Famous Case in Which United States Supreme Court Laid Down Rules Governing Fair Return

THE Galveston (Tex.) Electric Company was granted a 6-cent fare by the City Commission, effective on Oct. 28. The 6-cent fare was authorized in an ordinance adopted at a special meeting of the City Commission and carried an emergency clause which made it effective at once. The fare up to that time had been 5 cents.

Adoption of the 6-cent fare ordinance automatically disposes of the fare litigation pending in Federal court, under which the Galveston Electric Company sought to enjoin the city officials from enforcing the 5-cent fare ordinance. An agreement was reached whereby the case will be dismissed and the company will pay all court costs.

The 6-cent fare ordinance was passed on recommendation of City Attorney Frank S. Anderson after he had caused an audit of the company's books to be made and had carefully investigated the questions of earnings and operating costs of the company. The audit as made disclosed the fact that the net earnings of the company for the nine months ended Sept. 30, 1922, were $12,340, or a deficit on fair return of $87,259. Mr. Anderson based his calculation on 8 per cent as a fair return. It was this rate of return that was declared fair by the Federal court in earlier litigation. At 8 per cent the fair return for the nine months would amount to $96,600. It was estimated that a 6-cent fare would produce this return.

The removal of the street car tracks from Market Street in the business district, which has been proposed as a means of lessening traffic accidents, is not involved in the agreement reached in connection with the fare increase, and the City Commission will take up the track removal question on petition of property owners, Mr. Anderson said.

The company's case seeking to enjoin the city had been set for hearing in Federal court on Oct. 30. Prior to his making a recommendation for a 6-cent fare, Mr. Anderson conferred with Federal Judge J. C. Hutcheson and Clarence Wharton, attorney for the Galveston Electric Company in the litigation. The City Charter of Galveston provides that the Board of City Commissioners, upon publication of the company or on petition of citizens of the city, may determine, fix and regulate the fares to be charged by the company, and it was under this Section 98 of the charter that the 6-cent fare ordinance was passed.

HISTORY OF CASE REVIEWED

In reviewing the litigation between the company and the city, the city attorney said:

On June 5, 1919, the board of commissioners passed and adopted an ordinance fixing the fares of the Galveston Electric Company at 5 cents for each adult and 2½ cents for each person for half fare.

In May, 1920, the Galveston Electric Company filed a suit against the city in the District Court of the United States for the Southern District of Texas, praying for an injunction restraining the enforcement of the ordinance above referred to. The issues joined in this suit were referred to a special master, who heard the evidence and made his report thereon to the court.

The period for testing the constitutionality of the ordinance in the hearings before the master was taken by both sides to be the twelve months ending June 30, 1920.

The matters in dispute between the company and the city were, briefly, as follows:

(a) The present fair value of the property.
(b) Depreciation allowance.
(c) Maintenance.
(d) Allowance of federal income taxes.
(e) Allowance of brokerage fees.

GOING CONCERN VALUE

Involved in the question of fair value was an item of $520,000 added to the base value of the property as "going concern value."

The master fixed the present fair value of the property at $2,167,805, which included the item of $520,000 going concern value, and an item of $67,078, brokerage fees.

The case came before Judge Hutcheson upon application for confirmation of the report of the special master, and the court declined to allow the items of $520,000 going concern value, and $67,078, brokerage fees, and fixed the fair value of the property at $1,626,061 as the figure upon which the company was entitled to earn a fair return. Eight per cent at that time was assumed to be a fair return.

For the purpose of rate making the court fixed $70,000 as the annual allowance for maintenance.

The company contended that the actual maintenance expended during the test period, which was largely in excess of that amount, should be allowed.

The court refused to allow federal income taxes as a part of the operating expenses.

The court fixed the annual depreciation allowance at 4 per cent per annum to be applied to the present fair value, for rate making purposes of the company's depreciable property, to wit: $1,062,892.

SUPREME COURT CONFIRMS

Upon appeal to the Supreme Court of the United States that court in all things confirmed the findings of the trial court, so that the basis upon which the company is entitled to earn a fair return has been fixed.

Neither the district court nor Supreme Court fixed the rate of fare to be charged by the company. The question determined was: Did the 5-cent fare produce a gross income which, after deducting operating expenses, maintenance at $70,000 per annum, taxes (less federal income taxes) and depreciation leave a net income equal to 8 per cent upon a fair value of the property?

The court held that under conditions existing during the six months ending Dec. 31, 1920, the 5-cent fare did yield a fair return and denied the application for an injunction without prejudice to review it, if changing conditions warranted.

It will thus be seen that the city has no control over the gross earnings of the company, which are governed entirely by the number of passengers carried.

ASKED INCREASE THIS YEAR

On March 23, 1922, the company made application to the board of commissioners for an increase in fare.

An audit of the books of the company for the year 1921 and three months of 1922 was made by the firm of Ernst & Ernst, public accountants, and from such audit it was determined by the board of commissioners that the company had earned a fair return during the calendar year 1921.

The operations of the company for January, February and March, 1922, showed that the company was not earning a fair return, but the board of commissioners refused an increase in fare based upon the operations for those months, holding that three months was not a fair test period. The courts hold that a longer time should be allowed.

On or about June 1, 1922, the Galveston Electric Company filed suit in the United States District Court for an injunction restraining the enforcement of the 5-cent fare ordinance, contending that it was not earning a fair return and that the ordinance was confiscatory.

An audit of the company's books has been brought down to Sept. 10, 1922, and discloses the following comparative statement of the railway company's income and expenses for the nine months ended Sept. 30, 1922, and 1921:

	1922	1921
Gross income	$384,562	$468,058
*Total maintenance and operating expenses ...	330,332	361,017
Net earnings	$54,230	$107,041

*This includes maintenance for 1922, $67,052, and for 1921, $91,171.

From net earnings is to be deducted the depreciation allowance and taxes for the year 1922.

The following shows the set-up upon which the court based his finding that the company would earn a fair return for the year 1921, to wit:

Gross revenue		$618,000
Operating expenses	$329,411	
Maintenance	70,000	
Depreciation	45,245	
Taxes (exclusive income).	27,475	472,131
Available for return..........		$145,868

This equals a return on the court's valuation of $1,626,061 of 8.9 per cent.

Set up of operations for nine months ended Sept. 30, 1922, upon the basis of the court's decision, to wit:

Gross income	$384,562
Operating expenses (less maintenance)	263,279
	$121,282
Maintenance (nine months at $70,000 per year)	52,497
	$68,785
Taxes (nine months, less federal income taxes)	22,515
	$46,270
Depreciation, nine months........	$33,930
Net income	$12,340
Deficit fair return for nine months.	87,259
Net earnings required to produce fair return at 8 per cent	$99,600

Under the provisions of section 98 of the charter, the board of commissioners has the power, upon application of the company, and may of its own motion, determine, fix and regulate the fares to be charged by the Galveston Electric Company, and I call attention to the following extract from the opinion of Judge Hutcheson in the former suit, viz:

"To the litigants and their counsel in this and similar cases before me I commend these expressions, not because of the wisdom of the author, but because they bear the sanction of the authority of the Supreme Court of the United States, adding to them the declaration that if at any time it should appear to me that any order made by me in this or any similar cases now or hereafter pending before me is being used by the parties to it for any other purpose and to any other extent than its terms express; in short, if it should appear to me that a City Council, resting upon a court order, has abandoned its legislative function and is refusing to consider from that standpoint such proper adjustment of the rates as the actual experience of the utility shall show it entitled to; or if a utility, where the order is in its favor, is using such order as propaganda in an effort to unduly increase its rates, this court will, of its own motion, or upon application of the other party, amend or vacate the order so as to deprive the guilty party of its benefits, and to that end the decree in this and similar cases will be drawn."

The Supreme Court of the United States has approved the language of Judge Hutcheson. As to what has brought about the present condition in the earnings of the company, it is not for me to conjecture, but undoubtedly the increase in the number of privately owned automobiles and lack of work along the docks for the past year have contributed largely to the present situation.

Commission Favors Improvements

General Andrews Explains Why Certain Changes in Operating Methods Are of Benefit to Public

A complaint was recently made to the New York Transit Commission in regard to the new "Guardless" Brooklyn Rapid Transit cars by one of the civic leagues in that city. The complaint was directed generally against the practice of operating doors of subway trains by one man for more than one car, "as prejudicial to life and limb of the traveling public and also a cause of great discomfort." The complainant made the five following points:

"1. In case of sickness, no one in authority.

2. In case of disturbance, no one in authority.

3. In case the device for opening the doors fails to work, no one in authority.

4. No one in authority to direct strangers.

5. No one to announce the stations, the present system of megaphones being in about 75 per cent of the cars inaudible."

The method of operation referred to is one in which multiple-door control provides that one trainman stationed in the center of a unit of three cars opens and closes the side doors for all three of the cars of his unit. The reply was sent by Gen. Lincoln C. Andrews, chief executive officer of the commission, and is reproduced in part below:

> The commission is glad to receive the opinions of the patrons of the road in this matter. Multiple-door control is being experimented with under the commission's supervision as one of the advances in rapid transit operation which has been developed by railroad operators under the stress of the necessity for reducing the costs of operation and increasing efficiency.
>
> As you probably know, the commission plans for the unification of all transit facilities and their ultimate operation as a single system with universal transfers and a 5-cent fare. This can only be accomplished under the most efficient administration and operation of the lines as it must include the operation of new lines intended to develop outlying sections and relieve present congested areas. The commission therefore is interested in developing modern efficiency methods. For example, the use of the prepayment turnstile, one-man car operation on surface lines and multiple-door control in rapid transit.
>
> In reality, this multiple-door control is based upon methods of operation which the commission believes insure greater safety to the passengers than the old method of having the guards open and close the doors by hand. The control of the train is now so hooked up that it is impossible for the train to start until all doors are actually closed. This prevents the possibility of any passenger being dragged by being held in a partially closed door when the train starts.
>
> As to the five specific points made in your letter, the B. R. T. is now installing in each of the cars where no guard is present an electrical device plainly marked by which, in case of any emergency calling for the presence of the guard, a passenger may instantly call the guard from the middle car where he is stationed. As to the last two points, directing strangers and announcing stations, it is true that strangers must depend upon information from fellow travelers for information before they embark on the train. We have had no serious difficulties in this connection. The station announcers should be, of course, in good working order. They are constantly inspected with a view to keeping them in good working order and we have had very little complaint from the traveling public along this line.
>
> The commission is watching these developments closely and will continue to do so with a view to determining their safety and propriety from the point of view of convenience to the public as well as efficiency and operation. It must be kept in mind, however, that in order to preserve the 5-cent fare in the presence of the uniformly high costs of everything that goes into railroad operation economy must be observed by the operators. If the railroads were in a position to be able to make financial profits the public would be justified in demanding more refinements of service. Their financial position is of course no matter of conjecture. The commission has monthly reports in detail of all their financial operations and keeps constantly in touch with them both as to income and expenditure. As you know, the B. R. T. is still in the hands of a receiver, who is of course required to administer the road's affairs with the closest attention to economy and efficiency, with a view to re-establishing its financial stability. The commission, representing the public which is absolutely dependent upon these rapid transit facilities, is interested primarily in seeing that they render efficient service, but must also regard their financial stability in order that they may continue to give service that secures the safety of their riders as well as their convenience.

Hears Arguments on Abolishing Limited Service

The Massachusetts State Public Utilities Commission gave a hearing recently on a petition of the town government of West Springfield for the abolition of the limited car service on the Springfield and Holyoke systems between Springfield and Holyoke and the establishing of a maximum speed of 20 m.p.h. for all cars on that line. It was urged that operation of the limited cars, which make only a few stops on the route, is dangerous to the public and a discrimination against the townspeople, who desire more local service. H. M. Flanders, general manager, submitted statistics showing that the number of accidents on the through cars was relatively lower than on the local cars. The commission reserved decision.

Transportation News Notes

Weekly Pass in Effect.—The Washington & Virginia Railway, Washington, D. C., has installed the weekly pass on its line between Washington & Alexandria. The pass is selling for $1.60 a week.

Reduced Fares for School Children.—The United Electric Railways, Providence, R. I., put into effect beginning Oct. 12 reduced school tickets to pupils eighteen years of age and under. Tickets are being sold in strips of ten, entitling a pupil to ten rides at the rate of 40 cents per strip.

Extends One-Man Car Service.—The Springfield (Mass.) Street Railway has further extended its one-man car service by changing the Hartford West Side and the King Street routes from the two-men to the one-man basis. Cars for these lines will be chosen from those converted from the two-men type.

Action on One-Man Car Put Off.—The City Council of Danville, Va., has deferred action on one-man car operation, permission for which is being sought by the Danville Traction & Power Company. The finance committee had recommended the use of the one-man type of car except during rush hours and for a trial period of one year.

Lines Reopened.—Service has been restored on the Marcy Avenue and Park Avenue lines of the Brooklyn (N. Y.) Rapid Transit Company in Brooklyn, closed since the 1920 strike. Federal Judge Julius M. Mayer, the Transit Commission and Lindley M. Garrison, receiver for the company, were all instrumental in having the two lines reopened.

Request All Night Service.—Officials of the Bethlehem Steel Company at Steelton have petitioned the Harrisburg (Pa.) Railways for an all-night service between the east end section of the borough and Harrisburg. The request was made at the instance of the steel mill employees, some of whom finish work at irregular hours and are unable to get transportation home.

Fares Advanced.—Increased railway fares on the lines of the Hydro-Electric Railways (Essex District), Windsor, became effective on Nov. 1. If $1 worth of tickets are purchased patrons may still ride for 5 cents. Transient passengers can either pay a straight 6-cent fare or buy six tickets for 35 cents.

New Traffic Rules to Have a Trial.—Some new traffic rules will be tried out in Louisville, Ky., which will include elimination of the left hand turn on several of the business corners, while traffic policemen in the future will blow whistles before turning semaphores, thus giving pedestrians a chance to clear the crossing before the change in traffic is made. At Fourth and Walnut Streets the curbings are to be cut back and fenced off, so that pedestrians will have to cross a little behind the intersection, thus allowing vehicles to get clear of the procession stream before having to halt for pedestrians in making the right hand turn. White lines will be painted on the streets to designate the crossing spots. What is needed more than anything else in Louisville is to force pedestrians to obey traffic officers.

Lines Rerouted.—In compliance with the rerouting ordinance passed by City Council several weeks ago, the Cincinnati (Ohio) Traction Company, on Sept. 10, rerouted all of its lines in the heart of the city which will not necessitate the laying of new tracks or switches. Plans for the installation of tracks and switches to accommodate rerouting of all cars, as provided by the city ordinance, have been drawn and the necessary material will be ordered at once, A. Benham, general manager of the traction company, announced. Rerouting proposals were submitted early this year by W. Jerome Kuertz, Street Railroad Commissioner, after a lengthy study of Cincinnati's traffic problem. The new routes do away with left-hand turns in the downtown area of the city except at the beginning or end of the loop in which the cars are turned.

New Publications

The Welding Encyclopedia

A Practical Reference Book on Autogenous Welding. Compiled and Edited by L. B. Mackenzie and H. S. Card of the *Welding Engineer*, Chicago. Published by the Welding Engineering Publishing Company, Chicago, Ill.

This is the second edition of the Welding Encyclopedia, and it has been revised to bring it up to date. The alphabetical arrangement of titles facilitates reference to the shorter articles and definitions, and the placing of longer articles at the end is convenient for those who wish to make an extended study of such topics. Long articles on thermit welding, the welding of rail joints, oxyacetylene welding, and other topics of interest to the electric railway engineer are included.

Protective Relays, Their Theory, Design and Practical Operation

By Victor H. Todd, Designing and Manufacturing Electrical Engineer, Westinghouse Electric & Manufacturing Company. McGraw-Hill Book Company, New York, N. Y. 274 pp. Illustrated.

The relay performs one or another extremely vital function in the modern power plant or substation. It has, for example, made the automatic electric railway substation possible. Simple in principle, but involving great care in manufacture and ingenuity in application, it controls the operation of large power units and is largely responsible for their safety. For these reasons a convenient text and reference book on the subject of protective relays should be welcomed to the library of the power engineer. This one, in the preparation of which a number of experts have assisted seems well adapted to its purpose, that of being of assistance not only to the operator and tester, but also to designers. The text is well illustrated and appears to be fair in its references to the work of manufacturers in the field other than the one with which the author is connected.

Digest of Business Statistics

Based on the census of 1920 and other data. Compiled and published by Joseph E. Austrian, New York. 103 pages, fifty-five tables, nine maps and five diagrams.

This book was prepared especially for sales and advertising executives, although it is expected that it will prove valuable also to business executives generally. It gives the latest authoritative information relative to populations, particularly the United States, every state being analyzed separately.

Forms, Records and Reports in Personnel Administration

Edited by C. N. Hitchcock, University of Chicago Press, Chicago, Ill. 128 pages.

This book contains reproductions of forms and records of many kinds in connection with employees, accompanied by explanatory notes. The forms are selected from those used by a variety of companies.

The "Union d'Electricité" and the Gennevilliers Station

By Ernest Mercier. Translated by C. M. Popp. Published by *Revue Industrielle*, Paris.

This is a handsomely illustrated booklet of about fifty pages, giving details of the great power plant now nearing completion in the suburbs of Paris. The plant was described briefly in the issue of the *Electric Railway Journal* for Aug. 12, 1922, page 231.

Electric Transients

By C. E. Magnusson, A. Kalin and J. R. Tolmie. McGraw-Hill Book Company, Inc., New York, N. Y. 1922. 196 pages, illustrated.

Electrical engineers are, as a rule, more familiar with the phenomena of direct and alternating current than they are with what is known as "transient phenomena" in an electric circuit. In electric railway power practice, such transient phenomena are involved in lightning discharges, and in surges produced in lines by the sudden opening of switches, by short circuits or by other momentary disturbances. The theory of the subject is, of course, inherently rather involved, but all power engineers ought to be familiar with the fundamental principles of the subject. They can thus select, install and maintain lightning arresters, reactance coils, coils, etc., more intelligently than otherwise would be possible. They have in the past depended largely upon Dr. Steinmetz's well-known book on this subject for their information, but have now, in this smaller and less mathematical text-book, a second source of information. The book is of excellent quality from the standpoint of the classroom instructor, for whose purposes it was intended. For the practical man it would be greatly improved if there could be added something about the ways in which transient phenomena are brought about in commercial, everyday circuits.

Belt Conveyors and Belt Elevators

Belt Conveyors and Belt Elevators. By F. V. Hetzel. John Wiley & Sons, New York, N. Y. 333 pages. Illustrated.

By confining attention to one part of the field of conveying machinery the author of this book has been able to go into great detail on this subject. His idea has been to present the results of many years of practical experience in this field; at the drafting board, in the shop and in the field supervising the erection and operation of the machinery. For thirteen years he was chief engineer of one of the largest manufacturing companies in the business.

So much attention is being paid at present to the use of machinery in handling materials that a compendium of information like this cannot but be of service to all fields where materials have to be handled in quantity. In the electric railway field this applies to fuel, ashes, track and roadway materials, etc. A perusal of this book will show where belt conveyors and elevators can be applied and, where applicable, how they should be used.

The Forest Products Laboratory

The Forest Products Laboratory. A Decennial Record, 1910-1920. Published by the Decennial Committee, Howard F. Weiss, Chairman, Madison, Wis.

On July 22, 1920, there was celebrated at Madison, Wis., the tenth anniversary of the founding of the Forest Products Laboratory. Later the laboratory published an attractive volume containing the proceedings of the decennial meeting and much information concerning the laboratory. The book is illustrated from photographs showing the many activities which are carried on by the laboratory.

The record states that the technical work of the laboratory is divided among seven sections, each unit devoting its attention to certain well-defined fields. In addition to these research sections there are four service units, looking after such matters as finance, engineering, maintenance, etc. The war greatly stimulated the development of the laboratory as is indicated by the fact that the staff was expanded from eighty-four persons, which it contained in the spring of 1917, to 458, the number in employment on the day the armistice was signed.

Of the many subdivisions of the laboratory work those of particular electric railway interest are wood preservatives, wood preservation, grading rules for structural timber, wood technology and kiln drying.

Manchuria: Land of Opportunities.

Published by the South Manchuria Railway, Dairen, Manchuria. American representative: Yozo Tamura, New York. 113 pages, with map, diagrams and other illustrations.

This section of China only a few years ago was known as "The Forbidden Provinces." Now industries have been developed, largely with American apparatus. There are mines, extensive agricultural developments and electric central stations, with electric railways in Dairen and Fushun.

List of Selected and Professional Business Books

For the convenience of persons interested in business literature, Scovell, Wellington & Company, accountants and engineers, Boston, Mass., have compiled a list covering general accounting, auditing, banking, municipalities, general business, advertising and selling, and handbooks. The name of the publisher, the number of pages, and the date of publication are given in each case.

Personal Mention

Mr. Hecht Chairman

New Orleans Banker Heads Successor Company to New Orleans Railway & Light Under Reorganization

Rudolph S. Hecht has been made chairman of the board of directors and acting president of the New Orleans Public Service, Inc., created recently to control the New Orleans Railway & Light Company under the recent reorganization. Mr. Hecht is a commanding figure in the financial and banking activities of New Orleans. His elevation to the highest position in this service by the directorate is conspicuous proof of recognition of his fidelity to the task of bringing about the reorganization of the New Orleans Railway & Light Company. As chairman of the committee representing the holders of the 4½ per cent bonds, he exercised rare tact and diplomacy in reconciling conflicting interests when hope to do so had practically been abandoned. For four years he applied himself with tireless energy to attain the end sought.

R. S. HECHT

His versatility in other lines of effort is further attested by the fact that he is at present president of the Hibernia Bank & Trust Company, New Orleans, one of the leading financial institutions of the South; president of the Hibernia Securities Company, New Orleans, New York, Atlanta and Dallas, an institution of which he was the founder, and president of the Board of Commissioners of the Port of New Orleans, a State institution devised for the purpose of placing New Orleans in the front rank as a port of entry and export. This latter organization now owns and manages $55,000,000 of property on the river-front, represented by docks, warehouses and elevators. It has also built and will soon open for commerce an inner harbor or navigation canal, at an expense up to the present time of nearly $20,000,000.

Mr. Hecht is also vice-president of the Union Indemnity Company, New Orleans; vice-president of the Clearing House Association; director of the New Orleans branch of the Federal Reserve Bank of Atlanta, the Mississippi Shipping Company and the Federal International Banking Company, New Orleans, formed under the Edge act, in which organization he took a leading part.

Rudolph S. Hecht was born in Ansbach, Germany, on June 3, 1885, and after his graduation from a local college emigrated to the United States, settling in Chicago in 1903, where he entered the service of the National Bank of the Republic as a clerk at a salary of $30 a month. From that position he was appointed, two years later, assistant foreign exchange manager of the Commercial National Bank, Chicago. In 1906 Mr. Hecht came to the Hibernia National Bank, New Orleans, where he rose from a minor official position to vice-president and finally to president, to which position he was elected in 1918. He was then thirty-three years of age.

Mr. Hecht is a man of unvarying good humor, of exceptional affability and courtesy, easy to approach, and an attentive listener.

His duties as chairman of the board of the New Orleans company will place in Mr. Hecht's hands the financial management of the affairs of the company, for which his varied experience as a banker well equips him. He will also have general supervision of the other policies of the corporation.

W. A. Webb of Colorado has been selected as chief railway commissioner of South Australia at a salary of £5,000 a year. Mr. Webb was recently on the staff of the United States Railway Administration at Washington.

F. H. Harrington is now claim agent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. The position was formerly held by E. E. Smith.

W. H. Sawyer, president of the East St. Louis & Suburban Railway and of the East St. Louis Railway Company, East St. Louis, Ill., which were recently bought by the North American Company, has resigned from his position as vice-president of the E. W. Clark Management Corporation and from his other connections with the E. W. Clark Company.

Guy R. Radley, of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has accepted the chairmanship of the electric railway section of the National Safety Council for the coming year. He is a man of experience, well known in the Middle West for his ability to organize. Mr. Radley has asked the hearty co-operation of every member of the railway section in increasing the membership. Mr. Radley is safety engineer of the Milwaukee Company.

G. F. Butler is general freight and passenger agent of the Norfolk & Western Railway, Bluefield, W. Va. B. W. Herman held this position previously.

A. L. Castle is now president of the Honolulu (H. I.) Rapid Transit Company, Ltd., of which L. T. Peck was formerly president. Mr. Castle has been with the company for a long period and before his election to the presidency served as a vice-president. Mr. Peck's retirement was noted in the *Electric Railway Journal* for May 20, 1922.

Obituary

John C. Welty, counsel for the Northern Ohio Traction & Light Company, Akron, Ohio, died recently.

F. M. Hawkins, who has been associated with the Crouse-Hinds Company for more than twenty-five years, died recently.

J. Houston Miller, Waxahachie, Tex., a member of the board of directors of the Texas Electric Railway, is dead at his home in Waxahachie. Mr. Miller was seventy-one years old. He had been prominently connected with the Texas Electric Railway since it was first projected by the late J. F. Strickland.

James F. Hogan, superintendent of construction of the New York State Railways, is dead. He had been in ill health for some time and six weeks ago went to visit his brothers in Binghamton, thinking the change would benefit him. He suffered a complete nervous breakdown, however, and went to the hospital. Mr. Hogan was born in Chenango Forks. He lived there through his school days and later moved to Cortland, where he worked on the Delaware, Lackawanna & Western Railroad. He moved to Syracuse about twenty years ago and became roadmaster of the D., L. & W. lines there.

Frank S. Gannon, from 1903 to 1906 vice-president Metropolitan Street Railway, New York, died in New York Nov. 8. Most of Mr. Gannon's active life was spent as a steam railroad operator. Just prior to his connection with the Metropolitan Street Railway he had been third vice-president and general manager of the Southern Railway, and previously he had been successively superintendent of transportation of the Long Island Railroad, general superintendent New York City & Northern, general manager Staten Island Rapid Transit Railroad and general superintendent of the New York division of the Baltimore & Ohio Railroad. Mr. Gannon left the Metropolitan Street Railway in 1906 to become president of the Norfolk & Southern Railway.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Average Supply Thirty Days

Census Report on Coal Situation So Reports, With 28,000,000 Tons on Hand Oct. 1

Official figures are available on the coal supply situation. They were issued under date of Nov. 7 by the Bureau of Census under the authority of the Federal Fuel Distributor. Between Sept. 1 and Oct. 1 stocks increased 6,000,000 tons. Since Oct. 1 they have increased as much again, if not more. What is still more important the trend of production is constantly upward and coal is being added to storage.

If it were possible to compile the figures as of the present moment the situation would undoubtedly show that conditions are greatly improved over those of Oct. 1, the latest date for which official data are available. As of that date, reports from 306 electric light plants collected in part through the American Electric Railway Association and the National Electric Light Association indicate that the electric utilities at that time carried an average supply of thirty days. Into this average, however, went many plants with stocks much in excess of thirty days and others whose reserves were dangerously low. With few exceptions, the electric plants have less coal on hand than they had a year ago.

This in itself might not appear to be very reassuring, but sight must not be lost of the constantly increasing production. To the managers of plants still suffering from the acute shortage of coal, there is, perhaps, small comfort in knowing that things have been worse. But that is the fact. The comparative figures show it. Thus on Oct. 1. 1916, the estimated total commercial stock of bituminous coal was 27,000,000 tons. On Oct. 1, 1917, it was 28,100,000 tons. On Oct. 1, 1918, it was 59,000,000 tons. For the corresponding period in 1919 and 1920 the figures do not appear to be available, although the tendency throughout these years was downward at other periods. On Nov. 1, 1921, the next nearest comparable date to Oct. 1 the supply was 48,500,000 tons. Last April the amount available was 63,000,000 tons, but on Sept. 1 it was only 22,000,000 tons, climbing from that figure to 28,000,000 tons on Oct. 1, 1922.

Measured in tons, the stocks on Oct. 1 were about the same as the corresponding day of the years 1916 and 1917. Measured in terms of days supply, the present stocks are larger, because the present rate of consumption is still below normal. Measured in either tons or days supply, the present stocks are larger than those of June, 1920. If evenly divided among all consumers the stock on Oct. 1 would last twenty-two days. The record stock of last April, just before the strike, was sufficient to last fifty-two days if evenly divided. The low stock of June, 1920, was sufficient for only fifteen days. But then stocks are never evenly divided. In every community there are consumers who store virtually no coal and others who carry stocks far above the average.

Statistics of Car Factories and Repair Shops

The Census Bureau has just made public some statistics for 1919 about factories for the manufacture of cars and railroad repair shops and the number of cars manufactured in them. They show that in 1919 there were seven manufacturing establishments building electric cars and 624 electric railway repair shops. The former employed 3,286 and the latter 33,120 persons. The value of the material turned out by the manufacturers was $18,441,976 and by the repair shops $75,210,701. The electric cars built and these various establishments are listed in Table I.

Table II shows the cars built in 1919 and previous census years in manufacturers' shops. These figures do not include the cars built in railway shops.

TABLE I—ELECTRIC CARS BUILT IN 1919

Class	Number Total	All Wood	Steel Under Frame	Steel Body With Wood Interior	All Steel	Value
Electric-railroad cars....	2,049	73	938	899	139	$14,264,946
Passenger...........	1,814	41	840	898	35	12,131,561
Freight and all other..	235	32	98	1	104	2,133,385

TABLE II—STATISTICS OF CARS TURNED OUT BY MANUFACTURERS' SHOPS IN VARIOUS YEARS

	1919	1914	1909	1904
Electric-railroad cars:				
Number..................................	1,898	2,542	2,525	4.384
Value..................................	$13,502,653	$8,789,546	$6,626,357	$9,297,166
Passenger—				
Number..................................	1,726	2,335	2,345	4,008
Value..................................	$11,495,791	$8,075,710	$6,249,415	$8,809,261
Other varieties—				
Number..................................	172	207	180	376
Value..................................	$2,006,862	$713,836	$376,942	$487,905

Personnel Changes in Westinghouse Offices Announced

A number of changes in the personnel of the district offices of the Westinghouse Electric & Manufacturing Company have been announced by W. S. Rugg, general sales manager.

In the Pittsburgh office, the power division has been changed to the central station division with Barton Stevenson as manager. Mr. Stevenson will also be in charge of the sale of supply apparatus throughout the entire Pittsburgh district. The railway division has been changed to the transportation division, with F. G. Hickling as manager. A merchandising division has also been organized of which F. C. Albrecht has been appointed manager. A transportation division has been organized in the Philadelphia office and Thomas Cooper has been appointed manager. A central station division has also been organized with H. L. Moody as manager. Mr. Moody will also be in charge of the sale of supply apparatus in the Philadelphia district, assisted by H. F. Brinckerhoff, who has been appointed assistant manager of the central station division. W. P. Cochran will temporarily have charge of the merchandising division, which has been newly formed. Similar changes have also been made in the Detroit office. A central station division has been established with L. Whiting as manager. Mr. Whiting will also have charge of the sale of supply apparatus. F. D. Koelbel has been made acting manager of a newly created merchandising division. A transportation division has been established with R. L. Hermann as manager.

Railway Sales Double

That the railway industry is making substantial recovery in its purchasing this year is well indicated by the fact that the General Electric Company has made gross sales of railway equipment and supplies during the first ten months of 1922, which indicate that the total business for the year will be about double that for 1921.

Metal, Coal and Material Prices

Metals—New York	Nov. 7, 1922
Copper, electrolytic, cents per lb........	13.80
Copper wire base, cents per lb..........	15 625
Lead, cents per lb......................	7 00
Zinc, cents per lb......................	7 40
Tin, Straits, cents per lb................	37.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons................	$6.875
Somerset mine run, Boston, net tons.....	3.625
Pittsburgh mine run, Pittsburgh, net tons	3 37
Franklin, Ill., screenings, Chicago, net tons	2 625
Central, Ill., screenings, Chicago, net tons	1 87
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft..............................	6.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2 00
Linseed oil (5-bbl. lots), N.Y., cents per gal.	92 00
White lead, (100-lb. keg), N.Y., cents per lb.	12 125
Turpentine, (bbl. lots), N.Y., per gal.....	$1.64

Track and Roadway

Toledo & Indiana Railroad, Toledo, Ohio, is laying new rails in East High Street, Bryan.

Chattanooga (Tenn.) Traction Company has begun extending its line from Signal Mountain in the direction of Crossville.

Potomac Public Service Company, Hagerstown, Md., is considering the extension of its tracks into the West End. R. Paul Smith, an official of the company, has made a trip of inspection through the territory.

London (Ont.) Street Railway in a report to the City Council recommends the construction of a new north and south line on Colborne Street; also the extension of Adelaide Street tracks north from Oxford and the construction of a new line up Quebec Street.

Toronto, Ont.—The City Council has passed a resolution recommending that the Toronto Transportation Commission be requested to go ahead with the rehabilitation of tracks between Avenue Road and Spadina Avenue and between Yonge and Church Streets. The estimated cost is $86,000.

Pacific Electric Railway, Los Angeles, Calif.—This company has filed an application with the Board of Public Utilities of the city of Los Angeles for a franchise for the construction of a second track on Front Street, Los Angeles Harbor, between Fifth and Sixth Streets, and on Sixth Street between Front Street and Pacific Avenue. The total length of the proposed second track is approximately 3,100 lin.ft., and the estimated cost of the proposed improvements is $120,000.

New York, N. Y.—Nine bids were received by the New York Transit Commission for the construction of the subway portion of the Flushing extension of the Corona line of the Queensborough subway, together with the ramp approach leading into the subway from the drawbridge which will span the Flushing Creek. The highest bidder was T. A. Gillespie & Company, $2,740,000, and the lowest bidder was the Oakdale Construction Company, Inc., $1,635,990.

Northern Ohio Traction & Light Company, Akron, Ohio, is putting down approximately one-half mile of double track in Bedford, Ohio. Track extends from Columbus Street to Solom Road. The construction is 95-lb. rail. The work cost $65,000. The company has just completed the construction of a double-track line extending from the southern limits of Canton to a point midway between Canton and Massillon. The work is of open construction with 80-lb. rail on wood ties. The center pole plan is used. The work cost about $125,000.

Cincinnati (Ohio) Traction Company on Nov. 1 completed one of the most difficult track relaying projects encountered by its engineers in recent years. The work was done on upper Vine Street and involved the relaying of 2 miles of single-track rails. Fourteen curves were included in the 2-mile stretch. The work was completed in less than three months. Cars were operated over the thoroughfare while the work progressed as there was absolutely no way of rerouting them. Automobile and other vehicle traffic also had to be contended with. According to Walter Draper, vice-president of the company, the work was completed in record-breaking time, considering the conditions under which it was done.

City Railway, Wheeling, W. Va., will take up the car tracks on the East Wheeling loop and on the Market Street line from Eleventh Street to below Sixteenth Street, in accordance with the city demands. The Wheeling Traction Company has agreed to build a new track on Market Street from below Sixteenth Street to Eleventh Street, which will be placed in the center of the street. The company will also co-operate with the city in the paving of this section of Market Street and will be responsible for the paving of the section occupied by the car tracks.

Power Houses, Shops and Buildings

Northern Ohio Traction & Light Company, Akron, Ohio, has begun the construction of a brick freight house in Barberton, Ohio. The new building is to be 25 ft x 70 ft. About 300 ft. of track, from Cornell Street over Houston Street to the building, is also being constructed. Cars will "Y" into the house. The building will house the Electric Package Agency as well as the company's freight department. The building and location represent a $30,000 investment.

Indiana Service Corporation, Fort Wayne, Ind., has started construction work on the first two units of the shop and carhouse lay-out at Spy Run Avenue and Kamm Street in Fort Wayne. The first unit will be a fireproof two-story building which will contain three car tracks on the ground floor. Pits will be provided for the inspection and making of repairs to city cars. The second floor of this building will contain the offices of the superintendent of the car shops, the city superintendent and the cashier. Rooms will also be provided for the operators of city cars. The building will be 60 ft. by 250 ft. The second unit will be a wash room, 30 by 220 ft. It will be but one story and will be used as a place where city cars will be washed and cleaned. Other units in the general layout will be added next spring, provisions being made for trackage for 200 city cars. A rapid completion of the work on the new carhouses is necessary, according to S. W. Greenland, general manager of the company, because of the inability to care at the old carhouses for the increasing number of city cars owned by the company.

Trade Notes

Johns-Pratt Company, Hartford, Conn., announces the appointment of L. F. Carleton as district sales manager, electrical division, with office in Boatmen's Bank Building, St. Louis.

Dwight P. Robinson & Company, New York, N. Y., has started work on the design and construction of an extension to the plant of the American Rolling Mill Company at Ashland, Ky. The extension will include a jobbing sheet mill, and a galvanizing plant. This is one of several undertakings recently awarded to Dwight P. Robinson & Company.

Major Frederick Pope, first vice-president New York Steam Corporation, and E. B. Powell, consulting engineer Stone & Webster, Inc., sailed for Europe on Oct. 28 on the *Majestic* to make a study of recent developments in European power-plant practice. They expect to visit England, France and Germany, returning to the United States early in December.

Westinghouse Electric & Manufacturing Company has transferred its Krantz works to Mansfield, Ohio, from Brooklyn, N. Y. The Brooklyn works was not large enough to furnish adequate facilities to meet the impending demand for production. The Mansfield plant gives the works a location in the central part of the country with easy access to a large number of railroads and to both the Middle West and Eastern offices of the Westinghouse company.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has issued Bulletin 47,002. It groups switchboard panels under two general classifications, the vertical type and the bench type. Slate and marble are the two materials mentioned as being universally used for switchboard panels. The title of the Bulletin is "Switchboard Panels and Supportive Framework."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued two attractive publications containing suggestive ideas on the solution of two important problems confronting the electric railway operator, maintenance of equipment and proper application of transportation methods. The first book, "Electric Railway Equipment— Helpful Hints on Its Maintenance," S. P. 1656, contains 112 pages and is the first edition of what will evidently be an encyclopedia of operation and maintenance of equipment. The second book, S. P. 1655, is a twenty-page publication entitled "Electric Railway Transportation." The light-weight double-truck car, the safety car and the trolley bus are the three leading topics discussed, with pictures portraying the actual operation and installation of each type in the United States and Canada accompanying each discussion.

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Europeans Thinking of Radical Revision of Car Design

ON PAGE 825 is reported the belief of E. S. Raynor, a British tramway manager and engineer, that radical revision of electric railway car design should be considered. His thinking is in the direction of greatly reducing the unsprung weight and the total car weight and eliminating the solid axle. He also criticised as crude and inefficient the present braking mechanism. The conviction of some European engineers along this line seems to be strong, for recently the operating company in Paris has placed in operation a single-truck car with a body-mounted motor connected by drive shaft to each axle, the latter being split and provided with differential and the brakes being of the transmission band type. Discussion of such car design has come out now and then in conversation in this country, but it has been considered so radical that the authors have felt compelled to keep their thoughts out of public print. To date, all discussion of the subject is purely speculative, but there is certainly food for thought. The advantages of placing the heavy electric motors in position to have their weight entirely sprung are very important in their relation to track and car maintenance and car-riding qualities. But so radical a departure from well-established designs has very serious drawbacks and would therefore have to have very positive merits in order to receive serious consideration.

Improve the Morale of Your Shop

IN A RECENT discussion between two mechanical men, the rolling stock of an electric railway was referred to as being kept in almost perfect condition. "How does the master mechanic do it with the poor shop facilities which he has?" was asked. A visit to the shops disclosed two essentials which were incorporated in the organization that are most vital to the success of any undertaking. They are: Co-operation, and pride in the work accomplished. A thoughtful master mechanic recognizes that proper credit for the work completed must be given to all, as the conscientious and skillful working out of each detail is necessary for producing a high-class completed unit. A mechanic will take pride in producing good work if allowed to do so. Sufficient time is also required for honest work. No first-class job is completed in a hurry except by accident. A satisfied mechanic will measure aright the time necessary for doing a good job. It is true that without adequate tools and proper routing methods shop output is limited greatly, but without men proud of their work and earnestly striving for results the possibilities of economy will never be realized.

Proper recognition of satisfactory work is one of the essentials of increased effort. Advancement in position with increased remuneration is an important step toward increasing shop morale. A man's pride and interest in his work will decrease when they fail to secure advancement over another who goes about his duties with a "don't care" attitude. Hope puts us in a working mood, and a 5-cent increase in a shop man's rate of pay shows that his efforts are appreciated.

The Square Deal in Regard to Track Paving

ON ACCOUNT of the wealth of information which was brought out in the papers and discussions at the Philadelphia Engineers' Club conference on track paving, this paper has in three successive issues devoted liberal space to a report of the conference. Way engineers throughout the country, and managers as well, will find much to think about in the discussions which took place. The conference, of course, did not settle the mooted questions which are involved in this complicated subject, but the joint consideration of the paving problem by railway and municipal engineers marks a step in the right direction. The discussion brought out in sharp relief the radical differences in points of view, the differences in part being due to different assumptions of fact and in part to the respective affiliations of the engineers. What is needed first would seem to be a formulation of those fundamentals upon which all can agree. Questions of fact ought to be demonstrable, and a sufficient volume of agreed-upon data ought to be possible of assembling. Once the facts are agreed upon, an equitable allocation of maintenance charges is possible.

City engineers may ultimately develop data to show that streets with tracks cost more to maintain than those without tracks. Just how much the difference in maintenance cost is, if any, and how it varies with the different types of track and pavement construction await determination. But whatever the result, it must be remembered that some streets must contain tracks, for without them adequate transportation for a city of any size cannot be furnished. If there were no tracks, the present cars or their transportation equivalent would be obliged to run on the paving, causing greater wear as well as frightful traffic congestion—wear that, under present laws, would be paid for almost entirely by the city. The track structure transfers the railway load to a separate, independent foundation, thus relieving the paved surface of a large transportation load. Obviously this is good economics. It does bring in the complication of paving around the track, but that complication can be simplified with good engineering.

The fair solution to the whole problem seems to involve the paving and maintenance of the paving of the entire street by the municipality, with types of paving selected with due regard to the presence of the track. The railway should build track of such types as will deteriorate the paving as little as possible. Relieved of the present paving obligation the railway might equitably be required to pay for actual damage done to the paving, as was suggested by Mr. Davison at the Philadelphia conference, where damage is done by movement of track and vibration at joints and special trackwork.

Efficient Lubrication Requires Clean Oil

ONE of the most trying problems in electric railway maintenance is that of keeping dirt and water out of bearings. Electric railway car equipment operates under extremely trying conditions, and the oil used for lubrication soon becomes filled with impurities that greatly reduce its efficiency as a lubricant. In order to prevent serious damage to the bearings, the waste and oil must be replaced at regular intervals. The master mechanic is then confronted with another problem, that of salvaging as much of the oil and waste as possible. If the impurities are removed, the oil can be returned to service, and if waste is carefully cleaned and sorted much of it can be saved for future use. Every electric railway, therefore, has need for simple and effective oil and waste purifying equipment.

Many railway officials look upon an oil purifying device as being primarily a means of conserving oil. While operation of the oil reclaiming plant of the Milwaukee company described in this issue returns the old oil for reuse in 98 per cent original condition at a cost per gallon just one-quarter that of new oil, the more important economy effected by such apparatus is the protection it affords against damage to the operating equipment. An armature wrecked because of faulty lubrication will require more money to put it back into service than can be saved by much oil economy. Lubrication affects the service and reliability of the equipment and ultimately public sentiment. In addition, it is a fundamental element in maintenance costs, but not through the quantity of oil saved. When compared with other items of operating expense, the item of lubrication appears infinitesimal.

The big point then when oil and waste reclamation is considered is to be sure that when reused and returned to service, the oil and waste are free from all of the contaminating elements that will damage the bearings.

Real Shop Improvements Are the Order of the Day for 1923

THIS is the time of year when the wide-awake electric railway master mechanics and the superintendents of equipment, are planning how they can reduce maintenance costs for the coming year. Most of them are well aware that parts of their shop layout are not what they ought to be, but shortage of funds, or perhaps lack of sufficient determination, or both, have interfered with the carrying out of choice projects. The shops suffered possibly more than other parts of electric railway properties, due to war and post-war conditions. Managers knew that the equipment department would "worry through" somehow, and regretfully but firmly tied another knot in the purse string. It is high time now, however, that the shops be brought back to first-class condition, for good maintenance work can be done only with good maintenance facilities. Investment in such facilities is a perpetually paying one, because the results continue indefinitely.

In looking toward 1923, equipment men will naturally have in mind the work which has been done on their behalf by Engineering Association committees. Years of hard work have been put in by these committees with a view to improvement in shop layout and procedure. During the past two years the efforts have crystallized in definite recommendations. While the suggestions as to shop layout may seem primarily applicable to new shops, they have an important function to perform with respect to existing shops. They furnish a gage by which the merits of a particular layout can be estimated. The recommendations might well be studied with local conditions in mind. Such study would naturally lead to the laying out of a general program of desired improvements. If all of these improvements cannot be made at once, the alternative is to pick out for the present those things which promise the greatest immediate and prospective saving. Reinforced with the results of this analysis, the equipment superintendent might well go to the manager with some tangible recommendations, backed up by figures as to the saving to be effected by a given investment. Thus reinforced, he ought to be able to get a reasonable appropriation for improvements for his department in the 1923 budget.

Too Slow Speed and Too Safe Operation Are Imposed Upon in Traffic

ON THE surface cars of a certain metropolis the habitual rider becomes impressed if not exasperated with the extremely slow speed of operation. The car is almost the slowest vehicle on the street. The excuse is the heavy traffic, but close observation in various cities where traffic congestion is comparable does not convince one that the excuse is controlling. In this particular case the reason lies in two causes: First, because the cars are equipped with but two old motors with low gear ratio and have very slow acceleration. Second, because of their slow movements, the cars are constantly imposed upon by the truck and taxi drivers, teamsters and most all the "professional" drivers, thus pyramiding the factors causing slowness.

One almost feels that the cars are operated too safely, for the drivers seem to depend confidently on the motorman giving way to them—and he does, invariably. In cities where the street cars operate at high rates of speed, the truck and taxi drivers and teamsters have a wholesome respect for the right of way of the rail-bound unit. They do not impose on it because of the danger of collision. But there is no such danger, virtually, in the city in question because of the sluggish movement and the ultra-cautious operation. So the vehicle of the multitude is continually held back while the competitive taxi of the individual cuts in or swings around in front of the car if this offers advantage in making speed.

The taxi drivers know the sales value of speed, but this railway management does not, for the speed of the cars is barely faster than walking.

This local situation could be changed materially with the installation of some modern equipment—and aggressive motormen. And one wonders if a few bumps wouldn't be well worth while in overcoming the blasé ignoring of cars by the drivers of vehicles, thus making for speed and giving better service to the greatest number.

The street car does not need to be the pokey, antiquated vehicle of days gone by. There are available modern street cars capable of even more "get up and go" in their movements than can be mustered by the newer form of mass transportation—the bus. The street car is not an antiquated vehicle, as a type, but there are antiquated street cars and antiquated operation in existence here and there, to the discredit of the industry and also to the financial ill-being of the particular company.

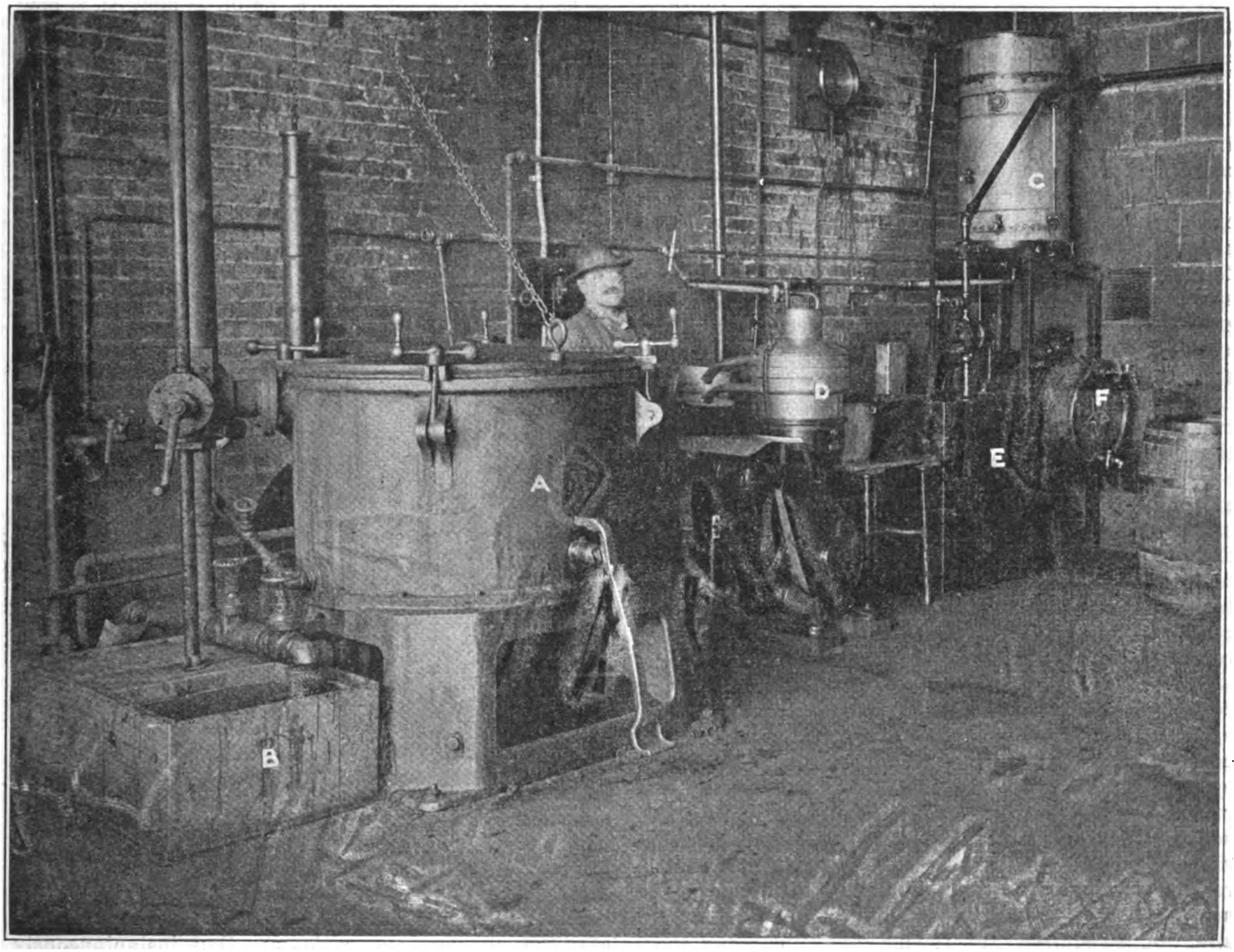
Oil and Waste Reclaimed with Profit in Milwaukee

A Large Reduction in Lubrication Costs Has Been Brought About Through the Use of a Very Comprehensive System of Oil and Waste Reclamation—Apparatus Installed to Do This Work and the Process Are Described in Detail

THE waste and oil used in the motor, axle and journal housings of electric railway cars soon become contaminated with dirt, water and other impurities which impair the efficiency. By removing these impurities, the oil and waste can be restored to nearly their original condition and thus an increased service can be obtained. The Milwaukee Electric Railway & Light Company in its Cold Spring shops undoubtedly has the most complete oil and waste reclamation plant of any electric railway, and a study of its methods and equipment will be of value to other electric railways.

After the car body has been raised, the trucks run out and the motors lifted off in the truck overhauling shop, the waste and oil are removed from the various bearing housings. A galvanized-iron pail is used to receive the waste, and as soon as the pail is full it is emptied into rectangular containers approximately 3 ft. x 3 ft. x 4 ft. high, three of which are provided in a convenient location. Two of these are used for the oil-soaked waste removed from axles and journal bearings, and one is used for armature bearing waste. The waste removed from the armature bearings is thus kept separate, but no attempt is made to keep the axle and journal bearing waste separate. The waste accumulated in the truck overhauling shop containers is sent in to the reclaiming room. Galvanized iron cans 2 ft. in diameter by 3 ft. 6 in. high are used for transporting the waste from outside shops. In the Cold Spring truck overhauling shop, which is adjacent to the oil reclaiming room, the waste is handled and taken to the oil and waste reclaiming room in a wheelbarrow with a special galvanized iron basket.

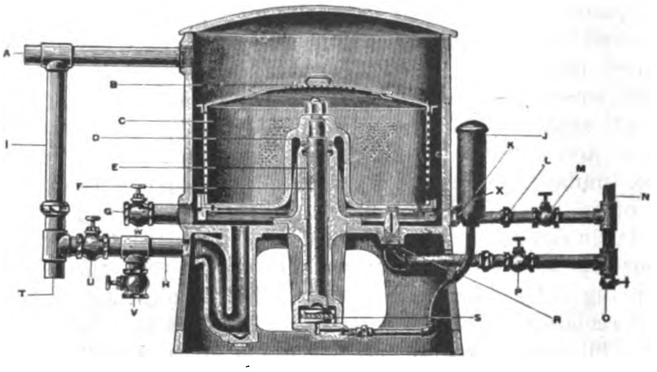
The waste received in the reclaiming shop is first sorted and any which is badly discolored or which has an excessive amount of foreign substance in it is thrown



INTERIOR OF OIL HOUSE, SHOWING ARRANGEMENT OF EQUIPMENT USED IN OIL EXTRACTION AND IN WASTE RECLAMATION

A. Extractor of oil from waste. *B*. Liquid receiving tank. *C*. Gravity tank. *D*. Oil purifier. *E*. Storage tank. *F*. Barrel for oil supplied on requisitions.

out and scrapped. The remainder goes into a centrifugal oil extractor made by the Oil & Waste Saving Machine Company, Philadelphia, Pa. The size used by the Milwaukee company has a capacity of about 200 lb. of waste, and under average conditions this amount of waste yields about 20 gal. of liquid. An accompanying illustration shows the construction of this separator.



SECTION OF MACHINE FOR EXTRACTING OIL FROM WASTE

A. Steam exhaust. *B*. Removable cover to basket. *C*. Basket. *D*. Felt washer. *E*. Bushing. *F*. Shaft. *G*. Water Inlet. *H*. Fat discharge. *I*. Overflow. *J*. Oil reservoir for oiling machine. *K*. Turbine nozzle for revolving machine. *L*. Union. *M*. Steam supply valve for turbine. *N*. Steam supply pipe. *O*. Blow-off valve. *P*. Steam supply valve for boiling or washing nozzle. *R*. Boiling nozzle or washing nozzle. *S*. Step bearing. *T*. Drain to sewer. *U*. Valve for drawing off wash water. *V*. Valve for reclaimed oil extracted by machine. *W*. Valve for controlling wash water inlet. *X*. Turbine blades.

The waste is placed in the basket of the extractor, care being taken to have it evenly distributed and only loosely packed. No material is allowed to remain above the rim of the basket. The cover of the machine is then closed, this being provided with a gasket so as to make it steam-tight. A steam turbine is used to rotate the basket, and after the lid of the machine has been closed the valve to the turbine nozzle is opened. The steam exhausted from the turbine passes up through the waste in the basket and thus heats it. An average steam pressure of 130 lb. is used in the Milwaukee installation. After the steam has been turned on it takes about ten minutes to bring the machine up to speed, and an additional fifteen minutes to complete the extraction. The basket is revolved at a speed of between 700 and 800 r.p.m. The centrifugal action throws the waste to the outside wall of the basket and the pressure exerted removes the oil. The action of the steam heats the waste and oil to about 200 deg. F., and at this temperature the oil becomes quite fluid and flows out at the bottom of the basket. The walls of the basket have holes, and inside the basket is a screen to keep the waste from clogging these openings. The heated oil flows freely from the extractor to an adjacent receiving tank. Some very fine fibers and ends of the waste follow in with the oil, and in order to prevent clogging the oil first passes through a screen at the opening to the receiving tank. This receiving tank is of rectangular shape and has a capacity of approximately 45 gal. As soon as the oil has been removed, the machine is stopped by closing the steam supply valve and by applying the brake. In the Milwaukee installation an average of 3,500 lb. (dry weight) of waste is reclaimed per month. The time required to charge the machine with waste and empty it is 0.25 man-hour. No attention is required after the machine is placed in operation. The extractor is entirely a self-contained unit and the installation and piping are fully illustrated in the accompanying photograph. In the Milwaukee installation the cover of the extractor is handled by a chain which runs over a sheave mounted on the wall. A counterweight is fastened to the lower end of this chain, which balances the weight of the cover.

The waste is removed from the basket of the extractor by means of a pitchfork and is placed on a sorting table, and the liquid removed from the waste is held in readiness for the purifying process. The liquid from the receiving tank is pumped by a centrifugal pump through a pipe which leads upward and across the top of the room to a gravity tank in the corner of the room. This tank has a capacity of about 70 gal. and is provided with a float with a gage to indicate amount of oil in tank.

From the gravity tank the oil is led through a 1-in. diameter pipe to the purifier. This pipe has a steam connection for the purpose of heating the oil as it is being conducted to the purifying machine. The distance from the settling tank to the steam connection is about two-thirds the total length of the pipe. The proper location for this connection was found by trial. If the steam enters the pipe too near the settling tank it retards the flow of oil, and instead of mixing with it as it flows toward the purifier the steam passes back through the oil and escapes through the settling tank. The valve which governs the flow of oil through the pipe is located just underneath the tank and has a long handle so that it can be operated from a position adjacent to the purifier. The steam connection is opened so as to heat the pipe before the oil is allowed to flow. The temperature of the oil as it enters the purifier is usually about 195 deg. F. The water used in the purifier is also heated to about 210 deg. F. in a similar manner.

TABLES FOR SORTING WASTE AND CLEANING OIL PURIFIER

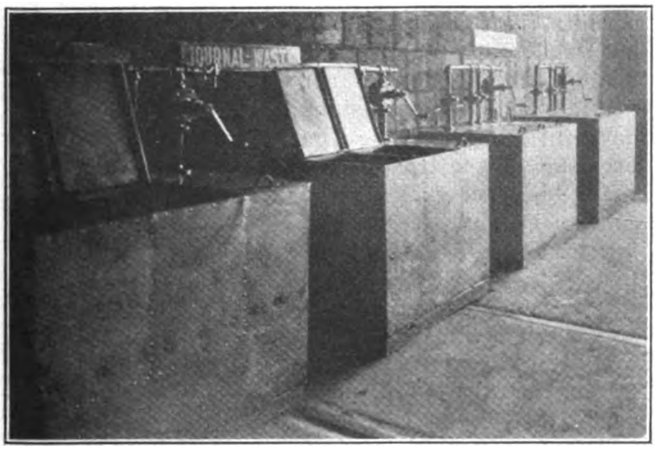
The oil purifier is a most important part of the reclaiming equipment. The machine used was made by the De Laval Separator Company, New York, N. Y., and in outward appearance is very similar to the large centrifugal separators employed in creameries throughout the country. It is motor driven through a belt, and in starting the machine the motor is started first and the machine is then brought up to speed by tightening the belt on the driving pulley. The starting of the machine takes approximately five minutes. The purification of the oil is accomplished by means of centrifugal force. Liquids of different specific gravities are thus instantaneously separated and any solid impurities are removed. As the pressure exerted by centrifugal force is several thousand times greater than that of gravity, the process is much more rapid and the purification much more positive and complete than by the gravity method. In the De Laval bowl the effect of this centrifugal pressure is multiplied by a series of disks, which are placed so as to divide the liquid into thin sheets or layers. This is of particular advantage as it brings about a finer purification with less centrifugal force than if the entire contents were treated in a mass.

The principal part of the purifier and one with which the user should become very familiar is the revolving member known as the bowl in which purification takes place. An accompanying illustration shows a cross-section of the bowl of the No. 600 purifier used in Milwaukee. The bowl is revolved at a speed of approximately 6,000 r.p.m., and while revolving the liquid to be separated enters the bowl at the top opening marked "Used Oil" in the accompanying diagram. It then passes down through the center tubular shaft to the bottom of the inner chamber where the heavier and more easily removed substances are thrown out and held in the sediment pocket. After passing down through the tubular shaft and out through the slots in the bottom of the inside shell, the liquid is carried up between the disks where it becomes separated and is distributed in thin layers between the disks. Here, due to the centrifugal action, separation takes place. The water and sludge, being heavier than the oil, are thrown outward to the periphery of the bowl and pass upward along the outer edge of the disks to the discharge outlet.

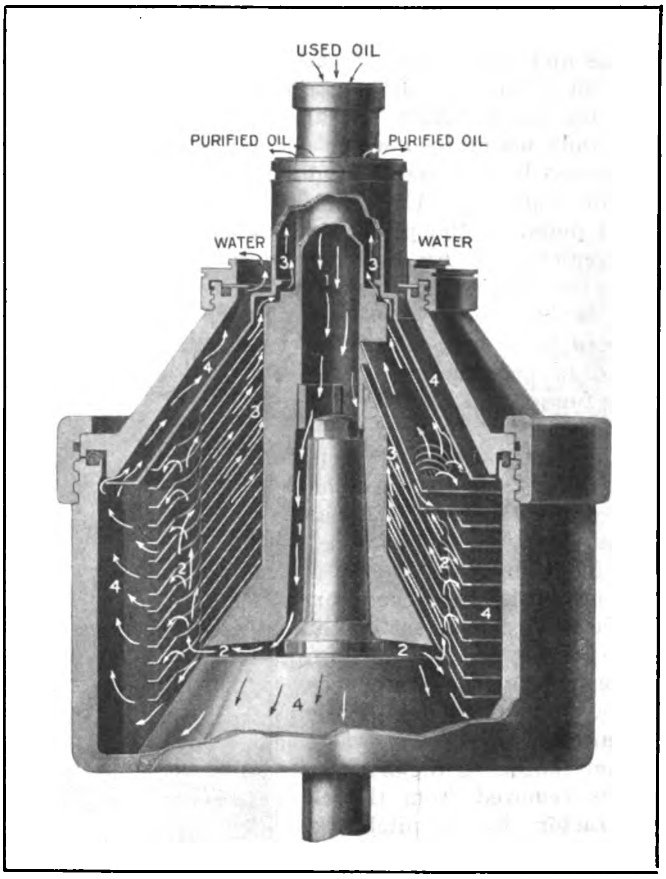
The oil, being lighter, passes inward between the disks, where the thin layers are subjected to tremendous centrifugal force, which throws out the remaining traces of impurities and water. These impurities are forced along the lower surface of each disk toward the center shaft, thence upward to the oil discharge outlet.

The bowl of the purifier is surmounted by three covers, each provided with a spout. The top one serves as an overflow outlet. The purified oil is collected in the second cover and discharged through the attached spout, where it runs by gravity to a storage tank.

The sludge comes out at the bottom spout of the machine with the water and is run directly into the sewer. The extremely heavy sediment which cannot be carried out by the sludge remains inside the bowl to be cleaned out after such a quantity has accumulated as will clog the passages. This method permits of from 40 to 90 gal. of oil to be handled before sludging occurs at the purifier. A bench and small tank are provided to facilitate the cleaning of the disks and bowl of the purifier. One and a quarter man-hours are ordinarily required to purify 50 gal. of oil and to clean and assemble the machine. An average of 1,200 gal. of oil is purified per month. A conception of the amount of oil reclaimed by the Milwaukee property may be gained from the fact that approximately 15,000 gal. of pure oil is produced per year. The base of the oil purifier covers a floor space of 17 in. x 21½ in., and it is bolted down by four bolts.



Waste Saturating Tanks with Pumping Equipment and Controls to the Various Compartments of Each Tank



Cross-Section of Oil Purifier Bowl

In passing from the purifier to the storage tank the oil runs through an open trough. Pure oil is almost transparent and the use of the open trough enables the operator to observe the oil as it comes from the machine. Whenever observation shows that the oil is becoming slightly discolored, the extreme end of the trough is lifted up so that no more oil can pass through it and the machine is then closed down and cleaned.

The pure oil storage tank is rectangular in section and is located just to the right of the oil purifier. This tank is equipped with a hand pump for use in delivering the oil to the saturating tank or to barrels as desired. For convenience in keeping a record of the amount of oil supplied on requisitions for use in the overhauling shops, a barrel has been installed just to the right of the purified oil tank. This barrel is filled and then any oil requisitioned is taken from the barrel. A record is thus readily obtained of the number of barrels of oil which have been furnished.

A row of saturating tanks is installed along the wall opposite to that which contains the oil purifying equipment These waste saturating tanks were manufactured by the Milwaukee Oil Pump & Tank Company, Milwaukee, Wis. Four tanks are used for waste saturation, and each of the tanks is provided with three compartments. This separating of the tanks into compartments is convenient, as waste can be saturated in one compartment while waste in the second compartment is draining, and the third compartment can be used for supplying waste at the same time. Vertically the tanks are separated into three sections; the top is for the reception of the waste, the middle section is a drainage space and the bottom of each tank is used for receiving oil from the waste in the process of draining in the top compartment. Steam coils located underneath the tank maintain a waste and oil temperature of approximately 120 deg. F. during the saturating and draining process. Each tank is provided with a centrifugal pump in the piping, which enables the operator conveniently to use any accumulation of oil in the bottom for saturation. Signs installed on the wall above the tanks indicate the use to which the waste is intended to be put. There are two containers for waste used in armature bearings, one for journal bearings and one for axle bearings.

GLASS TEST OF OIL
At left—Glass dipped in oil just taken from dirty waste. At right—Glass dipped in oil which had been run through the purifier.

The waste removed from the oil extractor is placed on a sorting table. This has a pipe framework and galvanized iron top. The top is about 40 in. from the floor, which is a convenient height for sorting the waste. Two sides of the top have guards about 4 in. high. These guards prevent the waste from falling to the floor as it is removed from the oil extractor by a pitchfork. The under part of the sorting table is used for storage of various materials. In sorting, the waste is graded and is then placed on a drying-rack. In the process of oil extraction the waste has accumulated some moisture, so that it is necessary to dry it before it is again used. The drying rack has a pipe framework and a large mesh wire top. When thoroughly dry, the waste is placed in the saturation tanks, where it is immersed for twelve hours in the heated oil and is then drained for an additional twelve hours. Experience has shown that proper treatment of the waste enables it to absorb about 2 lb. of oil per pound of dry waste. Reclaimed waste is used for repacking axle and journal bearings only, while new waste is used for armature bearings. Whenever new oil is put in the saturating tanks, this is accomplished by raising a barrel above the tank by an air hoist and letting the oil flow by gravity as desired.

The electric car oil used on this property is furnished by the Texas Company and is a straight mineral oil of two grades, viz., summer and winter electric car oil. While the viscosity of the summer grade is considerably higher than that of the winter grade, the effect as regards reclaiming and purifying is identical with that of the winter grade.

The reclaimed oil is tested frequently by means of a glass test, a method now used on a large number of electric roads. In this test two pieces of thick glass 3½ in. wide by 12 in. long are used. The oil is placed on the glass and its color is observed. This can be compared with new oil or with oil before reclaiming as desired. Accompanying illustrations show a comparison of two samples of oil, one of the oils before it has been subjected to the reclaiming treatment and another of the same oil after treatment. The difference is quite apparent. The lubricating value of reclaimed oil is equal to that of unused oil and is used for same purposes.

Increasing the Weld Section in the Seam-Weld Joint

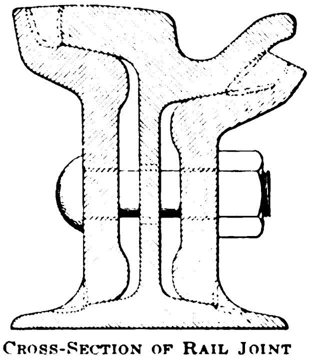
A Development in Rail Joints Designed Primarily to Give Large Area of Weld Section Under the Outside of the Head

THE Third Avenue Railway System, in New York City, is trying out a modified form of seam-weld joint which was devised by E. M. T. Ryder, way engineer of that system. The fundamental purpose in the new design is to give a cross-section of weld much greater than that in the usual form of seam-weld joint.

The extra section of weld is provided by means of extensions of the joint plates. As applied by the Third Avenue System, the extension on the outside plate projects upward to the rail-head surface and at such a distance from the side of the rail head as to provide a trough which is filled with the welding metal. A similar extension may be made if desired on the inside plate projecting under the surface of the tram of the rail in such away as also to provide a trough. The welds between the bottom of the plates and the base of the rail are made in the usual fashion.

This design aims to give the maximum cross-section of welding material at the head seam, which is the point where it is most needed as most fractures of the seam start under the head on the receiving side and failure occurs progressively. Theoretically the most desirable place for the seam weld is under the rail head as the point of heaviest load would ordinarily be at about the inside edge of the fish plate, which place is of course impracticable to reach.

In the new design the welding material is at the outside of the rail head, but it is not felt that this will make a serious difference in the result, especially as it permits the fish plates to have full bearing across the fishing area, which is not possible with the designs now in general use. The provision of the troughs for the welding metal is a great convenience in welding and insures the best possible job in applying the welding metal whether by metallic or carbon electrode method.



CROSS-SECTION OF RAIL JOINT DESIGNED TO PROVIDE LARGE CROSS-SECTION OF WELDING METAL

One objection to the extension of the joint plate outside of the rail head is interference with paving. In practice, however, this proves not to be serious. Again, when the joint plate is brought up level with the rail surface, as shown in the illustration, there will be a small ridge of metal left as the rail head wears down. This can easily be ground off or, as has been suggested, the upper surface of the joint plate can be chamfered off so as to lower its edge a half inch or so without reducing the area of weld in contact with the rail head. Mr. Ryder has been granted a patent on this invention.

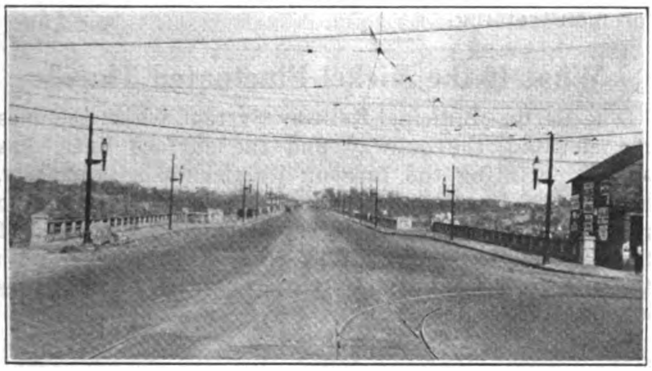
New Akron Viaduct Eliminates Bad Hills and Saves Railway $14,500 Annually

WITHIN the next sixty days interurban and city cars and electric freight trains of the Northern Ohio Traction & Light Company, Akron, Ohio, will be crossing the Cuyahoga Valley on the new $2,000,000 viaduct recently completed at Akron, establishing new time records and eliminating one ½-mile hill having an average grade of 10.5 per cent and another of almost equal length having an 8 per cent grade. The viaduct extends northward from Main and Furnace Streets, close to the main business center across the valley to North Hill, a distance of 3,000 ft. It is a concrete structure with thirty-four major piers measuring from 27 to 36 ft. in width at the base and sunk to an average depth of 38 ft. The percentage of grade is 1.48. The structure is built to allow for 5 ft. 8 in. of contraction and expansion.

Work began on the viaduct June 1, 1919. Approximately 280 men worked on the job steadily. The height at the lowest point in the valley is 135 ft. and the longest arch span is 191 ft. There are twenty-nine arches. The roadway width is 52 ft. with a 10-ft. walk on each side.

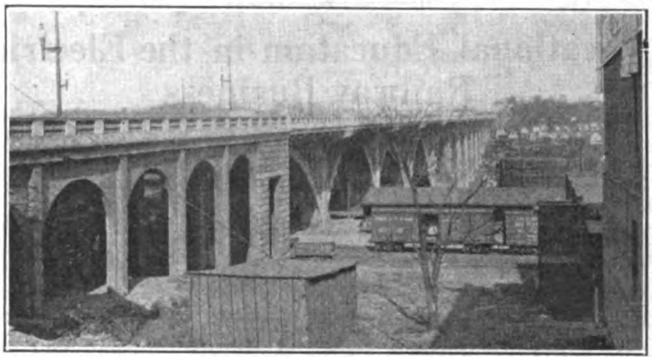
In the track construction the company used 100 lb. Carnegie rail in 60-ft. lengths, with special trackwork at the south approach to provide for turning freight and express cars down Furnace Street to the company's big warehouse a few blocks away, thereby keeping these cars off the city streets as much as possible. The company's terminal building for passenger traffic, built two years ago, was located with this viaduct project in mind and it is less than two blocks from the south approach.

With the operation of cars across the viaduct, the Northern Ohio Traction & Light Company begins payment to Summit County of an annual rental of $15,000. This rental is in lieu of the company's estimated share in the cost of construction—6 per cent on $250,000. Its use means a reduction of six to ten minutes in the running time of trains to Cleveland, Kent, Ravenna and city cars to Cuyahoga Falls and the North Hill section of Akron. A total of 140 interurban and suburban trains will go over the structure daily in addition to the Cuyahoga Falls and North Hill city cars.



NEW VIADUCT WHICH HAS BEEN BUILT OVER THE CUYAHOGA VALLEY, AKRON, OHIO

In addition to the saving in time, there will be a big saving in power, equipment and maintenance to the company. Accurate figures as to this saving are not available at this time, but some idea of the saving may be obtained from the following: The weight of the company's standard interurban cars is 72,000 lb. The 3,000-ft. grade eliminated is 9.5 per cent. Without the viaduct, the average time required to climb the 2,200-ft. north hill alone is ninety seconds, and the energy consumption on the hill is at the rate of 13.09 kw.-hr. per car-mile as against a probable 2 kw.-hr. per car-mile on the viaduct. The actual energy now used in going up the north hill by the standard interurban is 5 kw.-hr. The maximum current demand for the hill is 1,010 amp. There is also the improvement in safety to be considered. The hill on the north is one of the most dangerous in the country, while the south hill is almost equally bad, although much shorter. These hills have been the cause of numerous accidents and many special operating rules which will practically be eliminated by the use of the viaduct.



CONCRETE STRUCTURE ELIMINATES TWO BAD HILLS

The cost of the track on the viaduct and the connections was $224,381. The daily saving in operating expenses resulting from this investment and the $15,000 annual rental is as follows:

Saving in equipment released	$3.60 per day
Saving in brake shoes, wheel wear and armature repairs	5.00 per day
Saving in energy	61.40 per day
Saving in platform time	20.50 per day
	$90.50 per day
Annual operating saving	$33,032.50
Six per cent interest on investment and rental	18,462.80
Net saving	$14,569.70

Burning Anthracite Mine Waste in Pulverized Form

ACCORDING to a report recently received from the Quigley Fuel Systems, Inc., an important series of tests on burning mine wastes was recently completed by La Société des Mines de Houille de Blanzy, at Montceau-les-Mines, France.

The fuel that was used averaged the following analysis after drying: Ash, 29.2 per cent; volatile matter, 11.2 per cent; fixed carbon, 59.1 per cent, and moisture, 0.5 per cent. The coal ran about 10,728 B.t.u. per pound and the fusing temperature of the ash was from 2,120 deg. F. to 2,228 deg. F.

The test consisted of an uninterrupted thirty-day run of 704 hours, employing a B. & W. boiler having 2,368 sq.ft. of heating surface and having neither a superheater nor economizer. During this period the hourly evaporation for each 10 sq.ft. of heating surface was 30.19 lb. of water per hour, the guarantee being 29 lb. Evaporation of from 36 to 45 lb. was easily attained for periods of several hours at a time.

The average evaporation per pound of coal was 6¾ lb. of water, the guarantee being 5.5 lb. During periods of more than forty-eight hours, the evaporation per pound of fuel was maintained between 7.61 lb. and 7.65 lb., equivalent to an efficiency of 85 per cent.

The smoke leaving the stack was light and of a clear color and caused no deposit of dust in the neighborhood.

Coal preparing and burning equipment consisted of one five-roller pulverizer, one dryer, two powdered-coal feed controllers and two low-pressure burners at the combustion chamber, with the necessary blowers for supplying air for carrying the coal from the powdered-coal feeders into the burners. The equipment for the powdered coal installation was manufactured in France by the French-Quigley Company, with the assistance of the American company mentioned earlier.

Vocational Education in the Electric Railway Business

Northern Texas Traction Company Conducted Successful Class in Foreman Training in Co-operation With State Board

By H. M. Robinson

Mechanical Engineer, Northern Texas Traction Company, Fort Worth, Tex.

In 1917, to encourage vocational education, the federal government passed what is known as the Smith-Hughes act, the provisions of which are not as widely known as they should be. Under this act the government appropriated during 1921-1922 more than $4,000,000 for vocational education. The money is apportioned among the states, which add equal or larger sums from state funds. Thus last year $10,000,000 was spent by the states in addition to the above-mentioned appropriation, making a total of $15,000,000.

The vocational work comprises three divisions: trades and industries, agriculture, and home economics and teacher training. Each division is directed in each state by a director or supervisor who works under the direction of a state board for vocational education. The state board in turn functions through local school boards and school superintendents.

Teachers for the vocational work are recruited from the trades, and by aid of a course in trade analysis and methods of teaching, and a few lessons in practical teaching, they are able to teach their particular trades in a practical manner.

An example of the application of this vocational training in co-operation with the state board is the foremanship class conducted by the writer for the Northern Texas Traction Company. This was the first foremanship class to be held in Texas and, as far as I know, the first class of its kind to be held in the street railway industry. The company provided the classroom and light, and cigars for the men at each meeting. As the class was held outside of working hours there were no wages involved, attendance being voluntary. The class cost the company but a small sum.

Twenty-two men were enrolled in the class, the foremen representing all departments except transportation. The transportation men will be cared for in a class for inspectors which is planned to be held beginning this fall.

The foremen's class ran from Oct. 4, 1921, to April 25, 1922, classes being held Tuesday and Thursday evenings from 7 to 9. There were fifty-five meetings of two hours duration each, a total of 110 hours.

The course was divided into three main parts, covering respectively materials, equipment, processes and operation, and the "man factor." Each topic was subdivided so that supervision, cost elements and managerial problems of each of the three main parts could be taken up separately.

No Formal Text Used in the Course

Before each class I prepared a schedule of topics to be covered during the lesson, but it was my policy to do as little talking as possible. During the meeting I would suggest a topic for discussion and ask the men to express their ideas freely. Frequently arguments would develop and these were of great benefit to the class because eventually some definite idea would come out of the argument. Frequently I would supplement the men's ideas with remarks of my own and also quote from any source from which I could draw information pertaining to the subject at hand. The members of the class expressed their ideas freely, and if others disagreed with them the correct solution was brought out sooner or later to the satisfaction of all.

During each meeting I kept notes on the subjects discussed and the agreements reached, supplemented by any other information I could get, and had these mimeographed and distributed at the next meeting. They served as a review of the previous meeting.

The benefits derived from the class were noticeable, both in the way the foremen handled the men under them and in the way they went about their work. During the course the class analyzed the foreman's job, and at its completion all members expressed surprise at the vast amount of detail that a foreman should take care of if he is onto his job.

Officials of the company attended several of the meetings and joined in the discussions, and their ideas were well taken or criticised by the members of the class. When the course was complete the company gave a dinner at a local hotel to all members of the class. This served to end the course fittingly and let the men know that the company appreciated their efforts at self-improvement. At the dinner all members of the class who had attended 60 per cent or more of the meetings were presented with state certificates recording the fact that the recipients had completed a course of 110 hours in foreman training.

What If the Nickel Fluctuated Thus?

The Berlin Municipal Railway System, which includes the elevated, the subway and the surface lines, has stopped printing the fare on its tickets, as formerly, because the exchange value of the mark changes so rapidly and the fare has to be changed. At the end of September the single fare rate was 10 marks, with transfer for 5 marks more, but an increase in both rates was expected shortly.

Pulverized Fuel for St. Louis Utility

Pulverized coal will be used in the new Cahokia station of the Union Electric Light & Power Company, St. Louis, Mo. The Lopulco system of the Combustion Engineering Corporation has been adopted for the preparation and burning of the fuel, and the Quigley transport system of the Quigley Fuel System, Inc., for the transporting of the fuel in its pulverized form. This system provides an interesting plan for weighing the fuel. Below the floor level of the pulverizing room will be placed a series of five blowing tanks, which serve an equal number of twin pulverizing units.

These blowing tanks will rest on platform scales, the dial of which will indicate to the operator in the pulverizing room the amount of fuel in the tank.

The fuel will feed into these tanks by gravity from fuel bins in the pulverizing room. Each charge will be weighed and then elevated by compressed air to a height of about 75 ft. through 4-in. pipes. By means of a simple system of switching valves and parallel distributing mains, cross-connected, any blowing unit can discharge into any of the eight inclosed storage hoppers in the boiler house. These hoppers serve the four pairs of boilers of 1,800 hp. each, comprising the first group of boiler units to be installed.

The fuel requirements for the first section of the plant, 60,000 kw., which is now under construction, is estimated as 1,000 tons per day, which will be prepared and transported in sixteen hours. The ultimate capacity of the plant will be about 240,000 kw.

The firms of McClellan & Junkersfeld, New York City, are engineers and constructors for this plant.

Mexican Railway to Be Electrified

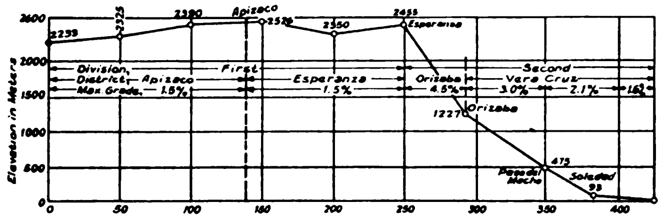
Thirty Miles of Single Track Between Orizaba and Esperanza to Be Equipped for Electric Operation at Once —Beginning of Main-Line Electrification

THE International General Electric Company has received an order from the Mexican Railway Company, Ltd., Mexico City, for the electrification of 30 miles of single track between Orizaba and Esperanza, which is on the main line between Mexico City and Vera Cruz. The approximate cost of the electrification project will be between $2,000,000 and $2,500,000.

This is the first main-line steam road electrification to be undertaken in Mexico. It will be carried out on the oldest and largest railway in the country. Electrification was decided upon on account of the heavy grades and increasing traffic. Indefinite postponement of the necessity for double tracking the road and a saving which will pay for the entire cost of electrification in five or six years are indicated. The system will be operated at 3,000 volts, direct current, power to be supplied by the Pueblo Tramway, Light & Power Company from its hydro-electric plant 5 miles from Orizaba.

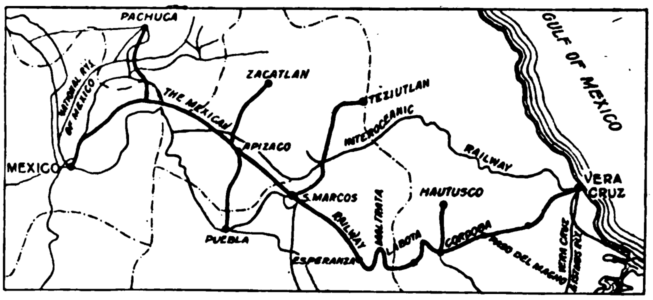
The contract calls for ten 150-ton locomotives interchangeable for freight and passenger service, equipment for an automatic substation, the trolley overhead and feeder lines and fittings complete, as well as the supervision of the complete installation.

The electrification of this portion of the Mexican Railway is the beginning of the main-line conversion, and extensions will follow as it becomes necessary to increase the capacity of the single track or the number of electric locomotives. The total route mileage of the system is 403 miles. It rises from sea level at Vera Cruz to a maximum altitude of between 2,500 and 2,800 meters. Grades as steep as 5¼ per cent are encountered, while the ruling grade on the electrified portion will be about 4.7 per cent.



SOME STEEP GRADES ARE SHOWN ON THIS PROFILE OF THE RAILROAD CONNECTING MEXICO CITY AND VERA CRUZ

The locomotive will be similar in general to the standard articulated truck design furnished for the Detroit tunnel, the Baltimore & Ohio, the Butte, Anaconda & Pacific, the Chicago, Milwaukee & St. Paul, and other railroads. In order to provide the necessary tractive effort without exceeding 50,000 lb. weight per axle, each unit will consist of three articulated trucks instead of two as in former designs. These will, however, be placed under a single cab.



LINES OF THE MEXICAN RAILWAY WHICH WILL BE PARTLY ELECTRIFIED AT THIS TIME

All six axles will be driving axles, each twin-geared to a 1,500-3,000-volt motor. The contract provides for three running speeds with an additional arrangement for shunting the fields on light grades or with light trains. Full regenerative control will be provided and the equipment will be suitable for either independent or multiple-unit operation. The maximum rigid wheelbase will be about 9 ft. 2 in.; and the length over all, about 52 ft.

Mammoth Steam Turbine for Brooklyn

THERE is now under construction at the works of the Westinghouse Electric & Manufacturing Company the largest turbine generator ever constructed in a single unit. It is for the new Hudson Avenue power plant of the Brooklyn Edison Company and will have a rating of 62,500 kva., three-phase, 60 cycles, 13,800 volts at 80 per cent power factor. The turbine will operate at 265 lb. steam pressure, 200 deg. F. superheat, and 29 in. of vacuum.

For use in connection with this unit two 70,000-sq.ft. surface condensers are also under construction.

French Water-Power Development and Railroad Electrification

VICE-CONSUL FULLERTON, Lyons, France, in a report to the United States Department of Commerce, gives data regarding the rapid development of French water powers. The electrification of the railroads is playing an important part in this development. In 1913 only 930,000 hp. was generated by water, while in 1921 the total was 2,100,000 hp. Of this total 650,000 hp. is used for lighting, heating and minor motor power; 1,300,000 hp. for industrial purposes; 50,000 hp. for traction, and 100,000 hp. for agriculture and other miscellaneous uses. Important individual projects mentioned by Mr. Fullerton include the Rhone development, which has the navigation and irrigation phases as well as its power features; and the project for harnessing the hydro-electric portions of the river Dordogne, involving seven generating plants and the world's largest dam at Chambon. A considerable part of the Dordogne power will be required for railroad electrification.

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

New Line Car Built in Trenton Shops

An Emergency Repair and Wire Stringing Car with Closed Section Provided with Bins and Racks Carries Materials for Repairs and Replacements

ACCOMPANYING illustrations show a new double-truck line car recently constructed in the shops of the Trenton & Mercer County Traction Corporation. The car was designed by Herbert Krouse, master mechanic of the company, to meet a long-felt need for a car which would combine the features of an emergency repair car and a wire stringing car. The underframe was constructed from an old abandoned passenger car, but all other material used was new. The car as constructed has an over-all length of 32 ft., and is provided with an inclosed body 23 ft. long and 8 ft. 2 in. wide. The roof is arched to provide sufficient drainage. The interior of the closed portion is provided with bins and racks to give ample storage space for carrying a full supply of line materials for repairs and replacements. A tower has been fitted to the roof of the closed portion. This has a revolving platform and can be rapidly raised or lowered by a very simple, manually operated device. When raised to its extreme height the platform reaches a point 16 ft. above the rail, and when placed at right angles to the center line of the car has sufficient projection over the side of the car to meet all requirements for line work.

The open end of the platform is arranged for mounting the wire reel, and due to the large space provided the necessity for hauling a trailer car is done away with. A sheave is mounted at the edge of the roof and acts as a guide for the wire as it leaves the reel. This is also an aid in aligning the overhead wire as it is strung. The car is wired for double-end operation, the control equipment being mounted inside the closed portion. The open section of the car is not of sufficient length to make operation from this end hazardous.

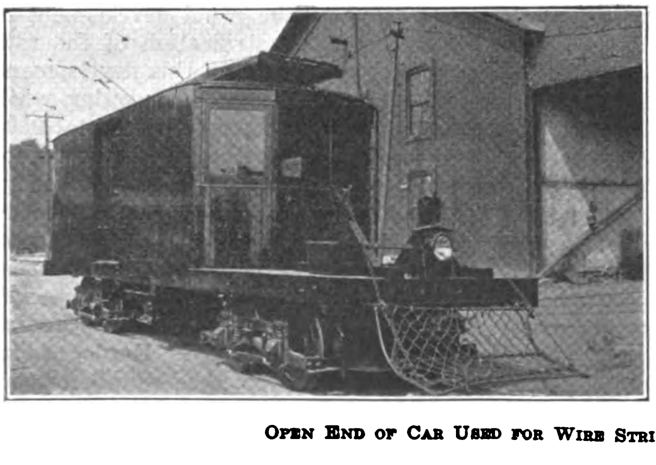
Other items of equipment include straight air brakes, electric heaters, high-powered Golden Glow headlights with dimming attachments, and mechanical sanders provided with 2-in. iron pipes instead of sand hose ordinarily used.

Automatic Control of Fire in Car Shops

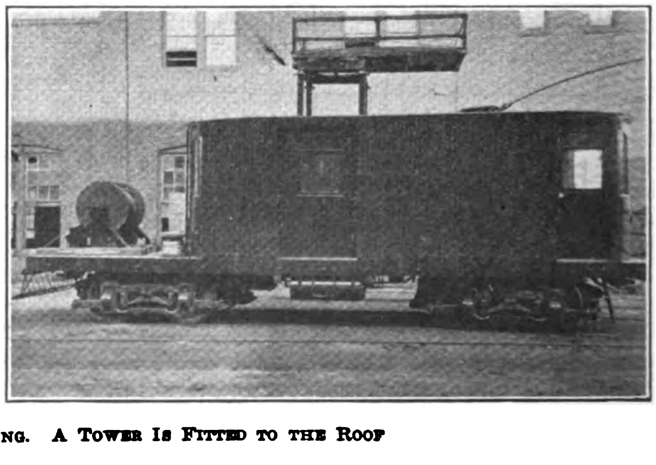
A RECENT instance of the control of fire by automatic sprinklers in the freight car erecting shop at the Turcot Works of the Canadian Car & Foundry Company, Ltd., near Montreal, Que., Canada, is of particular interest to engineers having to do with the construction and maintenance of railway shops.

This erecting shop is a large one-story building, 80 x 800 ft., all one area. The walls are of brick and glass in metal sash; the roof, light planks supported by unprotected steel beams and trusses. The distance from floor to roof is 39 ft. Five tracks run the length of the building. At the time of the fire they were filled with box cars, seventy-five in all. The shop is equipped throughout with a dry-pipe automatic sprinkler system controlled by six automatic air valves. Five metal fire curtains under the roof divide the system into six sections.

The fire broke out early in the morning of Oct. 17, in a box car spotted in the center of the building. It was discovered by the watchman who gave the alarm. A line of hose was stretched by the night shift at the plant, and before this was brought into play the sprinklers overhead began to open. The fire burst through one end and the doors of the car and ignited the corners of near-by cars. The water from the sprinklers blanketed the blazing car and extinguished the fire in the near-by cars, thus confining the fire to the locality of origin. As the fire was directly beneath one of the divisional fire curtains the sprinklers in two sections opened, ten in one and eleven in the other, twenty-one in all. The principal fire damage was to the burned box car, but no practical loss resulted as the car was to be rebuilt. The entire damage to the building amounted to only $50.



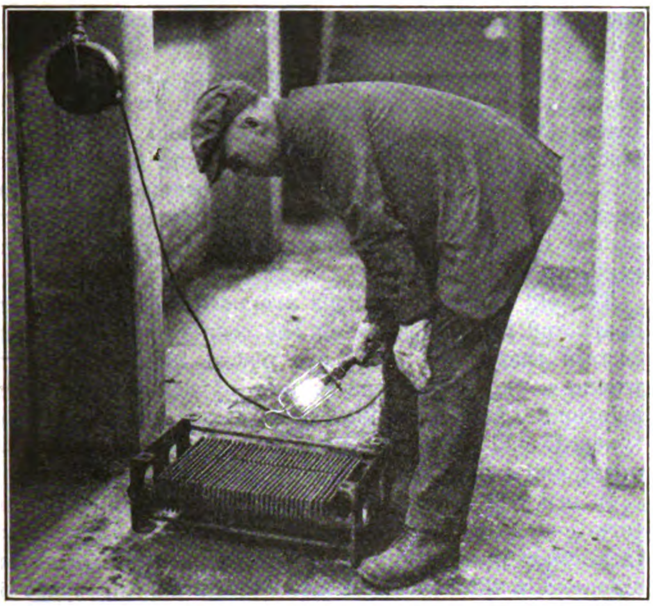
OPEN END OF CAR USED FOR WIRE STRINGING.



A TOWER IS FITTED TO THE ROOF

Extension Lights with Reel Attachment

AMONG the conveniences installed in the inspection pits of the new carhouse for the Department of Street Railways, city of Detroit, Mich., are extension lights with a reel attachment. This provides a very neat arrangement and increases the life of the cord, as it is never left lying on the floor where it is subject to the deteriorating effects of oil, grease and other abuse through being stepped on or mistreated. The trade name of the equipment is "Reelite" and is manufactured by the Appleton Electric Company, Chicago, Ill. An accompanying illustration shows the installation of one of these reels in the shop pits and the convenient use that can be made of it.

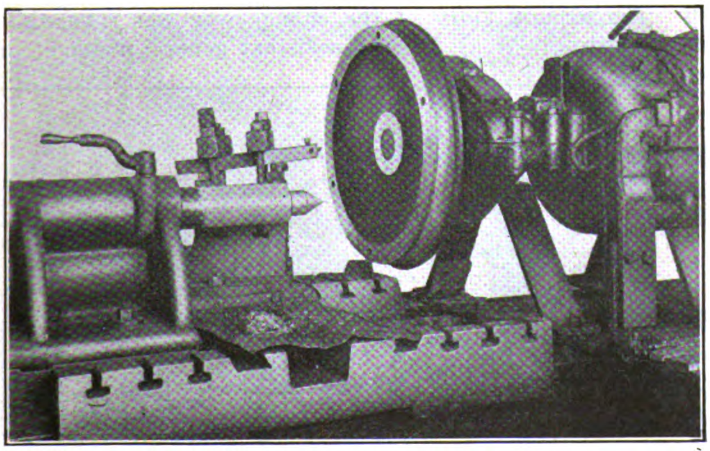


INSPECTING RESISTANCE GRIDS WITH PORTABLE LIGHT WITH CORD EXTENSION FROM REEL

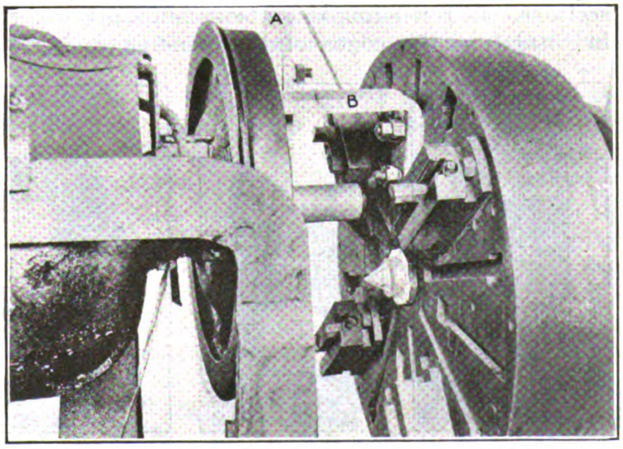
An Unusual Job of Lathe Work

ACCOMPANYING illustrations show an unusual job that was done at the West Springfield shops of the Indiana, Columbus & Eastern Traction Company recently. It was found necessary to overhaul an outfit used to drive a large air compressor. The outfit consisted of an old-type railway motor mounted in the usual manner on a car axle carrying both car wheels, one journal being cut off close to the hub of the wheel, and the wheel faced off to fit into a recess in the flywheel of the compressor, to which it was bolted with six bolts. In overhauling this outfit, it was found that the faced-off portion of the car wheel was out of true, so that it was necessary to reface it. It was also desirable to face the wheel with the axle running in its own bearings.

To accomplish this the complete motor was set in place and lined up in a lathe. The wheels were rotated by means of the motor using the slide rest of the lathe to hold the cutting tool. As first mounted, it was found that the speed was too fast to get a satisfactory job, so an arrangement was resorted to by which the wheels were driven from the lathe spindle. As shown in the illustration, the center of the axle was about 5 in. higher than the lathe centers. Therefore a heavy bar of steel shown at *A* in the second illustration with a hole to fit over the journal was clamped to the wheel next to the lathe spindle, and a heavy bracket or arm shown at *B* extending out somewhat past the steel bar was bolted to the lathe chuck. When the lathe was started this arm came in contact with the bar, thus rotating the wheel to which it was attached. The arrangement gave a slightly non-uniform motion on account of the two centers not being in line, but this variation in speed was not found objectionable, and a good job was secured.



OUTFIT FOR DRIVING COMPRESSOR, SHOWING WHEEL WHICH REQUIRED REFACING



ARRANGEMENT ADOPTED FOR DRIVING THE AXLE FROM THE LATHE CHUCK

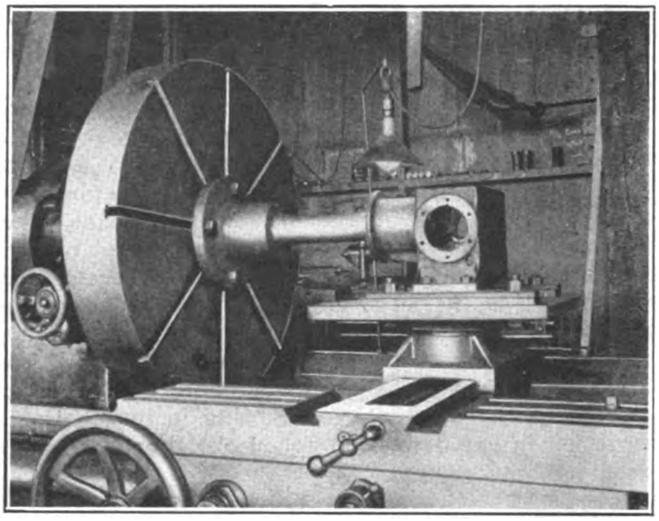
Germans Experts on Fuel Combustion

THE chief mechanical engineer of the United States Bureau of Mines, O. P. Hood, recently returned from a visit to Europe, during which he made an economic survey of the power and fuel situations in several countries. He was particularly impressed by the fact that no smoke issues from the innumerable tall chimneys in the industrial communities of Germany, in spite of the feverish manufacturing activity in these communities. Moreover, the average German plant burns fuel having only a third of the heat value of the commercial coal used in America.

Mr. Hood concludes that the Germans have studied combustion to good purpose, as evidenced by the absence of smoke. He states that briquetting is common practice in Europe, and recommends it for the recovery of fine coal in this country. He was also impressed by the research work being done by Great Britain, along fuel lines, in the great laboratory at Greenwich. As a result, he states, the British are well advanced in work which the United States has not even started.

Special Lathe Attachment Facilitates Reboring of Compressor Cylinders

THE time of setting up compressor frames for the reboring of cylinders has been shortened considerably through the use of some special attachments for a 44-in. lathe in use in the shops of the Wheeling Traction Company, Wheeling, W. Va. A special face plate with holes drilled for fastening the various types of compressor cylinders is used. This is fastened to the base on which the tool post of the lathe is ordinarily located. The face plate is accurately machined, so that the compressor frames can be installed readily without danger of their being out of alignment. The boring is done by a special boring bar which is attached to the face plate of the lathe. This boring bar is made in two pieces. A casting carefully machined is used for bolting to the face plate and in this is pressed a steel boring bar. This is carefully lined up so as to assure accuracy in boring. Through the use of these attachments about half the time ordinarily taken for setting up a compressor frame for reboring is saved.



SPECIAL TOOLS FOR REBORING COMPRESSOR CYLINDERS SAVE CONSIDERABLE TIME

Modernizing Old-Style Field Coils

THE Grand Rapids (Mich.) Railway Company has a number of GE-57 motors in service. As originally furnished this type of motor has field coils wound in a brass shell, the coils being wound with ribbon in two sections. In rewinding these fields, difficulty was found in insulating the edges of the winding and grounds were more frequent on this type than in other fields in service, and when a ground once occurred it was necessary to tear the coil apart and rewind it in order to locate the ground.

With the intention of making a field coil less liable to trouble and which could be more easily repaired, William Goldner, master mechanic of the railway, conceived the idea of making a form-wound coil, which could be fitted into the old shells. In order to use a coil of this type with the old field shell it was necessary, of course, to divide this through the center core, so that the shell could be installed in two parts. In installation the bottom part of the field shell is first placed in position, then the form-wound field coil over this and then the top part can be inserted. A canvas gasket is installed at the top and bottom of the form-wound coil which provides additional insulation and prevents grounding.

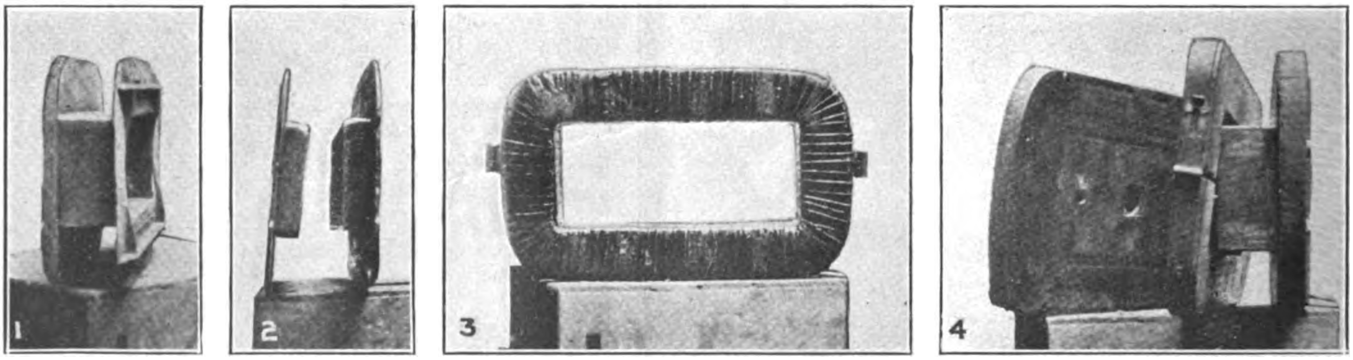
The old metal field shells are used by sawing these apart and then by beveling the corners so as to make certain that when these are placed inside the form-wound coils there is no danger of damaging the insulation. Accompanying illustrations show the old type of field shell, the new type as used by cutting apart, and a form-wound coil as is now used.

In order to wind the new type of field coil a special form consisting of three parts was made up, as shown in another illustration. One end of the form is removable and a filler piece is used to fill up the space of the coil, while the first section of ribbon is wound in place. With the first section completed, the filler piece is removed and the second section can then be added.

Through this rearrangement of the field coils much time is saved in winding, and grounding in the shell has been entirely overcome. The form-wound coil permits better insulation, and should a ground occur the point of the short circuit can be readily located without tearing the coil completely apart.

Effect on Special Trackwork of Reversing Direction of Car Movement in Vancouver

ON JAN. 1, 1922, the British Columbia Electric Railway, Vancouver, B. C., reversed the direction of operation of its cars, changing to the right-hand rule of the road from the previous left-hand operation. This change was accomplished with little difficulty, thanks to adequate preparation, but there were naturally some incidental effects which could not be prevented. The general story of the change-over was covered in articles by W. G. Murrin, assistant general manager, in



NO. 1—METAL FIELD SHELL AS ORIGINALLY USED. NO. 2—FIELD SHELL SAWED IN TWO PIECES AS USED WITH NEW FIELD COIL. NO. 3—FORM-WOUND FIELD COIL READY FOR INSTALLATION. NO. 4—WINDING FORM FOR USE WITH NEW TYPE FIELD COIL

the issues of this paper for Nov. 19, 1921, and May 27, 1922. A. C. Eddy, engineer of way, has recently furnished additional information regarding a few track troubles which developed.

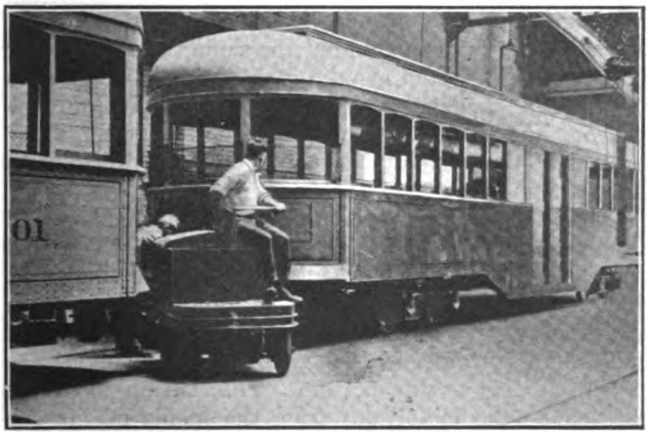
The principal difficulty experienced at the time of the change-over was in the facing switches at junction points, street intersections, etc. The cross-overs were all changed over, and the switches became trailing switches. The facing points at the intersections, although they were all manganese tongues of modern design, had become somewhat worn through service. When the traffic started against these points there was considerable trouble with the switches. splitting—that is, there was a slight movement of the tongue on the floor of the switch after the passage of the first truck.

An attempt was made to build up some of these uneven floors with shims and with the electric welder, but with rather unsatisfactory results. It was impossible to do accurate grinding on the electric weld with portable hand grinders, and the shims rapidly wore out. It was necessary, therefore, to replace several of the facing switches with new switches. In some cases facing switches were transferred from one track to the other, thus keeping them in the original direction.

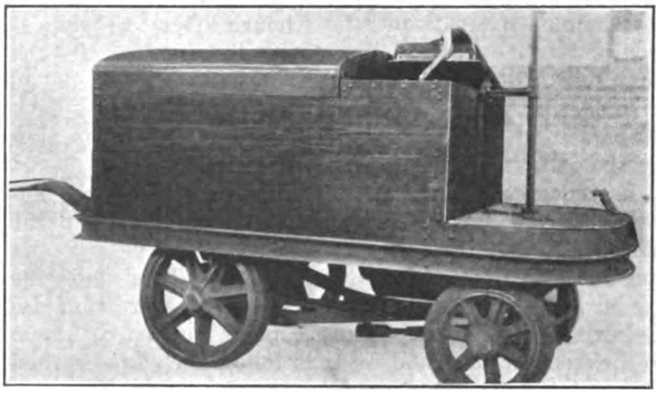
Another trouble that developed was the breaking of rail ends, due to the pounding of the wheel on the high rail. Before the traffic changed over there was a drop from one rail to another at a number of joints, and in several cases the rail had become slightly cupped. although the company endeavors to keep cupped rails built with the electric welder. When the traffic was reversed, there was a jump at these points instead of a drop, and some breakage occurred as mentioned. The broken joints were repaired by putting in sections of slightly worn rail, and the low rail was built up to the level of the high one.

Battery Tractor Switches

A STORAGE-BATTERY tractor is used exclusively by the Cleveland (Ohio) Railway for switching passenger trailers about the Harvard shops. The tractor has demonstrated its flexibility even to the extent of pulling up a trailer to be coupled to a motor car as is shown in an accompanying illustration. Handling trail cars in this manner rather than with electric switchers saves considerable time in moving cars around among the various shops by eliminating trips out to the transfer table in order to reach a car on another track.



Switching Cars in the Shops of the Cleveland Railway. There Is Even Room for the Tractor to Maneuver Between the Two Cars Being Coupled



The Compact Storage Battery Unit Which Has a Tractive Effort of 1,000 Lb.

This tractor, which has been in use since 1918, is a four-wheeled machine equipped with forty Edison cells. The unit, which weighs 2,580 lb., has a drawbar pull of 1,000 lb. and a maximum speed unloaded of 7 m.p.h. Roughly, its over-all dimensions are 77 in. x 40 in. The maximum turning radius is 71 in. The controller is designed with three speeds forward and two reverse and in such a manner as to eliminate the use of resistances.

The trailer was made by the Mercury Manufacturing Company, Chicago.

Painting Methods of Texas Electric Railway

Efficient Results Have Been Obtained Through the Use of Oil Enamel for Painting Rolling Stock—Varnish Is Not Used Over the Enamel

By W. W. Bunnell
Foreman Painter Texas Electric Railway, Dallas, Tex.

THE painting of cars has always been a problem that is open to betterment, but results obtained on our property indicate that the problems in regard to painting have been largely solved through the introduction of oil enamel. We have obtained approximately three times as great service from our equipment painted with oil enamel as was obtained by the use of the old varnish system. We are now bringing cars into the shop after more than four years of service which are still in excellent condition, and are turning them out again from the paint shop in from five to seven days.

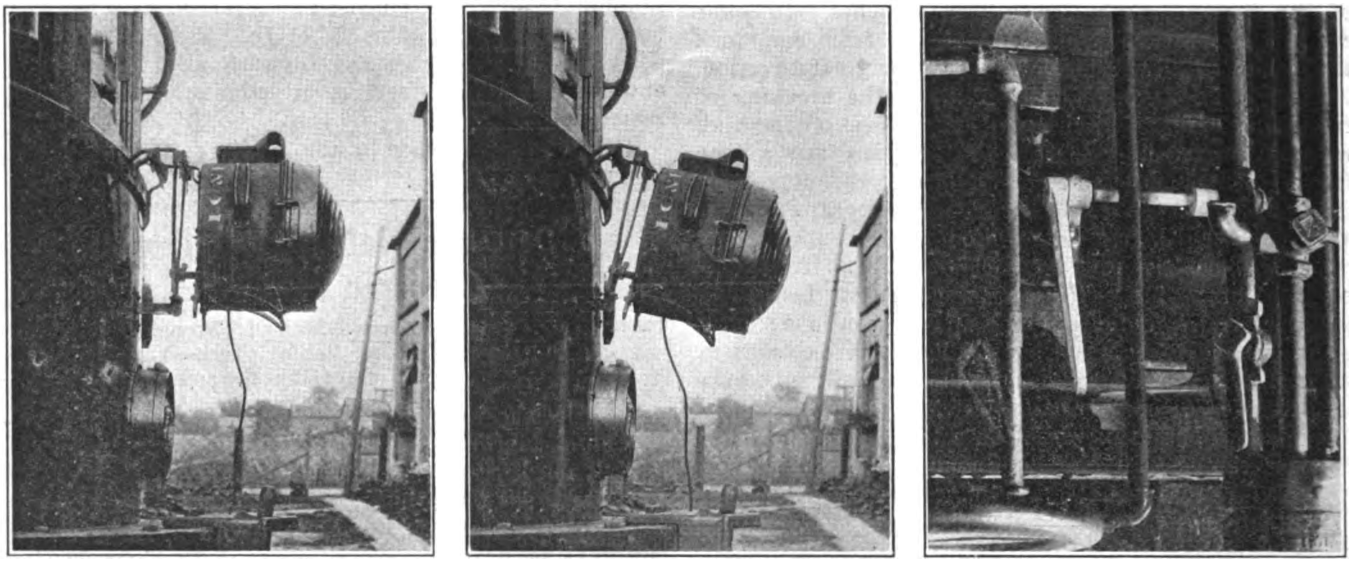
We find that the doors and sash are the first to break down and to need repainting. Our method of repainting doors and sash that are in bad condition and weather beaten consists of scraping off all loose paint and then sandpapering the surface. A straight coat of lead and raw linseed oil is then applied or a good wood primer of a color suitable to the standard body color which we are using. All nail and screw holes are puttied with hard putty and then a second lead coat is applied, which is followed with a knifing coat. Finally two coats of oil enamel are applied. We use an imitation mahogany color for city cars and imitation oak for interurban cars.

In painting a new all-steel car we are very careful to remove all mill scale and rust. Great care is used to see that the iron is particularly bright, clean and free from rust. We then apply a coat of red lead and fill all the largest holes and file marks with hard-drying putty. A knifing coat is then applied which is well sanded, and then one coat of a good sealer is applied. This is followed by two coats of oil enamel, the second coat being applied twenty-four hours after the application of the first coat. We letter and stripe the cars the next day after the application of the last coat of oil enamel.

METHOD USED IN REFINISHING CARS

In repainting cars which have been previously finished with oil enamel, we first clean and touch up the bare spots and then apply one coat of oil enamel and the necessary lettering and striping. This puts the car in good condition for service again. Cars that are in very bad condition have the paint burned off down to the wood or steel and we then follow the same method of repainting as for a new car.

We also use oil enamel for finishing the inside of cars and find that it works equally well on wood, steel or agasote, and the extreme hot weather which we have here in the South does not seem to affect it when used on roofs. Our headlinings are finished in white, as we have found that this color greatly increases the illumination over headlinings that are finished in darker shades.



MECHANISM FOR TILTING ARC HEADLIGHTS ON INTERURBAN CARS, AND, AT RIGHT, LEVER AND CONNECTING MECHANISM FOR TILTING HEADLIGHTS

Results of tests indicate that white and light buff colors reflect approximately 80 per cent of the artificial light. Pale gray reflects 60 per cent, pea green 50 per cent, and the dark greens and browns 15 per cent. White oil enamel seems to have a luster that reflects and throws off light to a very marked degree so as to increase the efficiency of the lighting system and thus give the same intensity of illumination with less lamps and consequently with an appreciable reduction in power consumption.

For painting baggage cars, express cars, work car tool boxes and the like, we simply give them a coat of a good primer and then apply one coat of oil enamel. The lettering and numbering are done with an imitation gold ground in the same vehicle. For painting roofs we are using a paste paint thinned with raw linseed oil and fish oil used in equal parts, with about 2 lb. of melted paraffin wax to 5 gal. of oil. This is a government specification for a canvas preservative, and we are getting very good results from its use. We have come to grief in attempting to use varnish over the enamel, as we found that it is certain to check and alligator.

Tilting Mechanism for Headlights Prevents Glare

A FEW months ago the Indiana, Columbus & Eastern Traction Company was involved in an accident which resulted apparently from a driver mistaking the interurban car in the dark for some other conveyance. The driver was trying to cross the street diagonally in front of an oncoming car and was struck and killed.

All cars of the company are equipped with a powerful arc headlight, capable of throwing a strong beam some 2,000 ft. in advance of the car. A small "bull's-eye" semaphore lens is also mounted directly beneath the headlights. The government of Springfield, Ohio, in which the accident occurred, would not permit the arc light to be burned inside the city limits and for this reason only the small lamp was used.

Following this accident, the traction officials took up the problem with the city government in an effort to eliminate or at least reduce the hazard. As a result, the city officials approved the suggestion made by the traction men that the arc headlights be kept burning within the city limits but be tilted downward to an angle so that the center of the beam of light would strike the ground approximately 35 ft. ahead of the car.

By this means it was felt that the light would prove ample, so that an oncoming interurban car could be readily distinguished and at the same time the tilting of the headlight would avoid a glare of light in the eyes of motorists and pedestrians. This suggestion was tried out and has met with success. As a result all of the cars of the company have now been equipped with a mechanism for tilting the headlight.

Accompanying illustrations show the mechanism and the mounting provided. A strap iron bracket is added to the dasher of the car just underneath the front window. The support for the headlight hangs from this bracket, the upper end fitting into slots, which enables the bottom end to be moved in and out by a connecting arm at the bottom. This tilting device is operated by the motorman from the inside of his cab by means of a small lever located just to the left of the air-brake operating valve. The headlight fits to its support in the usual manner, and can be removed readily by lifting off. The mechanism was designed by F. J. Foote, superintendent of motive power and equipment for the Indiana, Columbus & Eastern lines, and has been approved for service by the city authorities in Springfield, Ohio.

Cream Separator Cannot Be Used for Oil

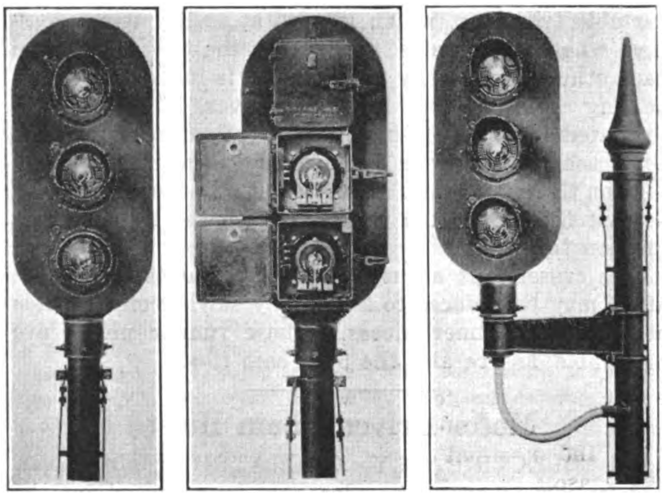
SOME rolling stock engineers have tried to utilize an ordinary cream separator for purifying and reclaiming oil. The separator used for this purpose looks like a cream separator on the outside, but it is constructed on a different principle. The cream separator is a proportional proposition. No matter what fluid goes into it there will always be a discharge from both the cream and skimmed milk spouts. The operation of the oil purifier, however, is governed by the specific gravities of the liquids going into it. If clear water is put into the machine there will be no discharge from the oil outlet, while if pure oil enters the machine there will be no discharge from the water outlet. From this explanation it will be seen that there is really no relation between the mechanisms of the oil and the cream separators, except that in both cases centrifugal force is used.

What's New from the Manufacturers

New Developments in Color Light Signals

THE General Railway Signal Company, Rochester, N. Y., has recently placed on the market a long range, unit-type, color light signal which has advantages over former types of color light signals and which is particularly suited to the protection of electric railway traffic. A satisfactory color light signal for fast electric railway service must give a distinct indication, clearly visible under adverse sunlight conditions, at a reasonably long distance. When the proper lenses have been used and lamps accurately focused, little difficulty has been experienced to secure a signal of the proper range but, due to the irregularities in lamps, it has been necessary to make adjustments to secure the correct focus each and every time a lamp is replaced. These adjustments have not always been accurately made with the result that the range of the signal has sometimes been reduced to the point where the signal indications were not satisfactory.

In the new color light signal a double filament lamp is so placed that the effective light from both filaments is in the focal center of a doublet lense, thereby giving the maximum range for the combined wattage of both filaments. To insure that signals will retain the long range secured in the factory by accurate focusing, all lamps are rebased, using the single contact medium bayonet base, and all lamp receptacles are jig-set. Therefore in changing lamps in the field no adjustment for focus is necessary.



THREE UNIT COLOR LIGHT SIGNAL—AT LEFT, FRONT VIEW SIGNAL ON TOP OF MAST—CENTER, REAR VIEW—AT RIGHT, BRACKET MOUNTED SIGNAL.

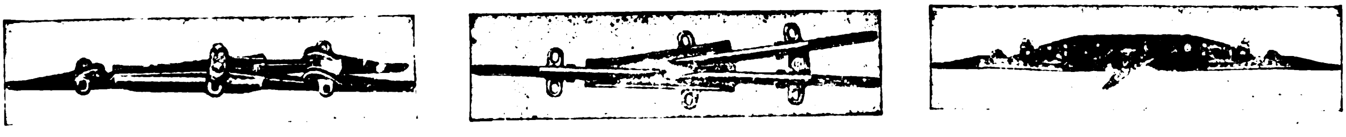
The signal has a range of 4,500 ft. under adverse sunlight conditions and maintains this range in service. The advantage of using a double filament lamp so made that both filaments will not burn out simultaneously will be evident to users of light signals. The signal has the further advantage of unit construction throughout. Each light unit is complete within itself, the signal being composed of these units bolted together. The doublet lenses used in each unit are so mounted that both lenses may be easily removed as a unit or either lens may be removed without disturbing any adjustments. The unit construction permits of any combination of lights after installation and greatly simplifies the stocking of parts. For example, suppose two indication signals are originally installed and later it is desired to change to three indication signals—all that is necessary is to add another unit to each signal. A single-light unit may be used as a take siding signal or for other special purposes.

Each light unit is equipped with a range finder which enables one man to focus the signal to any point desired on the track. Provision is made for the easy adjustment of the signal for grade or curve. The signal may be mounted on top of a 5-in. signal mast or by the use of brackets one or more signals may be mounted on the same mast. Backgrounds may or may not be used, as desired.

New Trolley Frog and Insulated Adjustable Crossover

AMONG the new devices recently introduced by the Ohio Brass Company, Mansfield, Ohio, is the BC trolley frog. A trolley wheel travels through this switch pan on its groove instead of on its flange. It can be placed, successfully, closer to the track switch point, thus reducing the drag and consequent wear on the main line trolley wire. The runners are high enough so that the trolley wheel flanges do not cut the pan of the frog. The BC frog is provided with 6-in. cam tips. It has six pull-off eyes.

Another new development is the type C insulated ad-

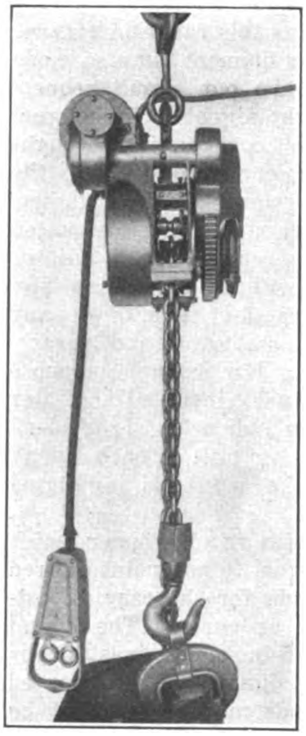


AT LEFT AND CENTER, NEW TROLLEY FROG. AT RIGHT, INSULATED ADJUSTABLE CROSSOVER justable crossover, which is used at trolley wire crossings where it is desired to insulate the two wires from each other. Ordinarily the crossing is installed without cutting either of the wires. However, if desired, the insulated leg may be used as a section insulator. In that case the trolley is dead ended in the rocker clamp lugs on the main beam. These clamps have a cam action so that the higher the trolley tension the tighter their grip on the wire.

The crossing is adjustable from 90 to 45 deg. The angle may be reduced to 20 deg. by sawing off the ends of the fiber runner pieces. These runner pieces are renewable, as are also the 6-in. cam tips.

Motor-Driven Chain Hoist

AN ELECTRICALLY OPERATED chain hoist, known as the Motorbloc, has been placed on the market by the Motorbloc Corporation of Philadelphia, Pa. This new device has been developed to serve the operations lying between the field of the standard hand chain hoist and that of the usual form of traveling electric hoist.



Motor-Operated Chain Hoist

The Motorbloc is a rugged, portable hoist, which can be installed without engineering preliminaries in any location where electric current is available. The self-contained pendant controller permits convenient operation by plugging into the nearest electric circuit. It consists of a standardized chain hoist of steel construction, electrified by the application of a specially designed heavy-duty motor, reduction gearing and slip friction clutch, applied by means of a malleable iron supporting bracket comprising a self-contained electrifiying unit, to which the pendant controller is also attached. In this way a mechanism has been developed for the electrification of the standard spur-geared chain hoist in capacities ranging from ¼ to 10 tons.

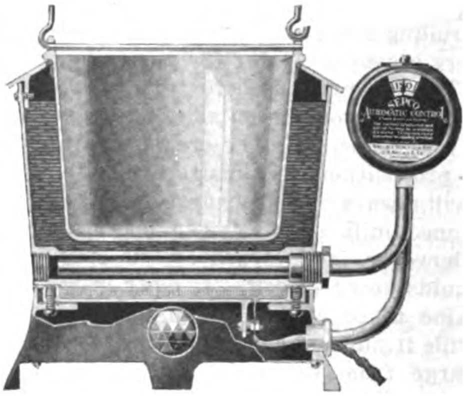
The pendant controller is operated by the fingers of one hand, leaving the other hand free to guide the load. This arrangement makes it possible for one man to accomplish what would otherwise require two or more men for lifting and placing the same load. The 1-ton size complete weighs 148 lb.

Glue Pot with Automatic Heat Control

GLUE is more readily applicable and possesses the greatest holding quality at a temperature of 140 deg. to 150 deg. F. When permitted to heat to a temperature of 176 deg. or more it loses its tensile strength. Generally if cooled to 104 deg. or less there is a decided fluctuation in the strength and holding quality.

To meet these requirements of proper heating temperature J. D. Wallace & Company, Chicago, Ill., have brought out an automatic heat-control device and incorporated this in a new bench glue pot, which keeps the temperature of the glue between the limits of 140 and 150 deg. F.

A tube is installed immediately above the heating element containing a sensitive volatile substance, which contracts and expands with the change in temperature and provides a dependable action of ample power to actuate the control switch. When the heat reaches the proper temperature the control turns off the current. When the temperature falls a few degrees the heat is turned on again, and the action is entirely automatic. A temperature gage dial which constitutes a part of the equipment shows the heat attained and, together with a jewel set in the base casting, acts as a visible check on the heat maintained.

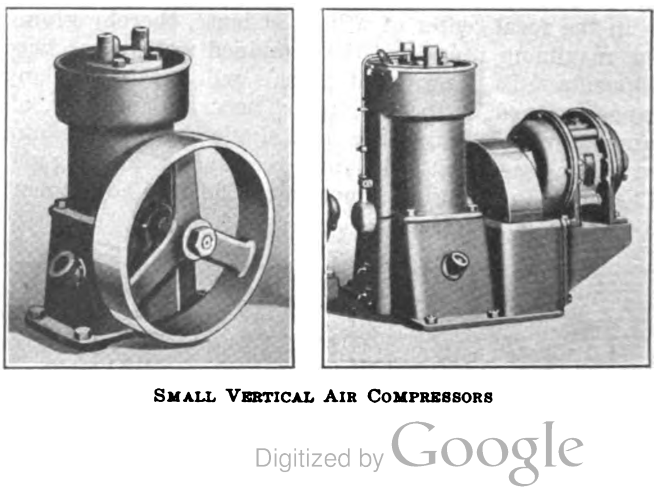


Sectional View of Glue Pot with Automatic Heat Control

This bench glue pot functions either as a water bath, hot air or dry heat pot and can be operated from any electric lighting circuit by merely turning the switch. The glue container is of cast aluminum, supported by special retainer lugs which prevent floating when the pot is but partly filled. Part of the bail extends across the center of the pot as a brush wiper to eliminate overflow and dripping.

New Line of Small Vertical Air Compressors

THE Ingersoll-Rand Company, New York, announces a new line of small vertical air compressors known as Type 15. These are either belt or motor driven. The motor-driven units have the motors mounted on a common sub-base. Special features include a constant-level lubrication system, constant speed unloader for plain belt-driven machines, centrifugal unloader for start and stop control machines, and increased size of water reservoir cooling pot. A bulletin has been issued which gives a detailed description of the important features.



Small Vertical Air Compressors

Utilities Commissioners Meet in Detroit

Valuable Reports Were Presented by Committees on Motor Vehicles, Public Ownership and Operation, Safety, Rates, Service, Statistics and Accounts, and Allied Topics — Abstracts of a Number of the Reports Are Given Below

DURING the week just closed the American Association of Railway and Utilities Commissioners has been holding its thirty-fourth annual meeting at Detroit, Mich. Abstracts of a number of committee reports presented are given below. A report of the meeting and discussion will appear in a later issue of this paper.

MOTOR-VEHICLE TRANSPORTATION

The committee on motor-vehicle transportation is a new committee of the association, the present being its first report. Director E. V. Kuykendall, Washington (Department of Public Works), is chairman. The committee pointed out that the study and regulation of motor-vehicle traffic is in a formative period, but transport regulation which fails to embrace this important facility is necessarily illogical and incomplete. The remarkable development and growth of motor-vehicle transportation are rapidly compelling its regulation. The general trend toward some degree of uniformity of regulation among the states is an influence toward the general assumption of regulatory powers over motor transportation throughout the nation. There should be no disposition on the part of regulatory bodies to evade a responsibility which they must inevitably assume sooner or later.

Regulatory powers of some character are now vested in regulatory bodies in at least twenty-five states, in the Hawaiian Islands, in the Philippine Islands, and in the District of Columbia. Some states have recently assumed the exercise of regulatory powers over motor-vehicle transportation under old general statutes, authorizing the regulation of common carriers, while others having very similar laws have not construed them as applicable to motor vehicles, or at least have not yet begun their regulation thereunder.

There are so many distinctive features in relation to auto transportation that more satisfactory results can be achieved by the enactment of new legislation recognizing the essential differences between auto and rail transportation.

Practically all new legislation on the subject requires auto transportation companies to furnish some sort of bond or insurance to protect the traveling public in case of negligence resulting in death, personal injury or damage to property. In fact, many states not exercising general regulatory powers over auto transportation have statutes requiring the furnishing of such bonds or insurance. Statutes of this kind might properly prescribe maximum and minimum amounts, but between those levels the regulatory body should be authorized to exercise discretion.

In most jurisdictions exercising regulatory powers over auto transportation the statutes require the securing of a certificate of public convenience and necessity as a prerequisite to beginning operation. Many statutes, however, fix a test date and provide that all persons actually operating in good faith on such date shall be granted certificates without regard to the question of public convenience and necessity. The time so fixed is usually a date prior to the enactment of the statutes. The certificate-of-public-convenience feature, at least as to all new operators entering the field, is desirable and should be a requirement of every statute. In no other way can responsible operators, adequate equipment and reliable service be encouraged. Actual experience has proved its benefits to the public by eliminating needless duplication of facilities, and tending toward economy and efficiency of operation in all lines of utility service. It is more essential in the regulation of motor-vehicle transportation than in any other field for the reason that it is a character of business that may be entered with a minimum of investment.

Many difficult problems are encountered in determining whether public convenience and necessity justify the granting of certificates to stages and trucks operating in competition with railroads. Transportation by rail and water is undoubtedly the economic backbone of the country. It moves goods and persons in large masses at comparatively low cost. The automobile, on the contrary, supplies individual transportation at comparatively high cost. The bus and the stage come into the heart of the big city, meander through the little one, stop almost everywhere for everybody. The trucks will come to you for the goods you want to move. Automotive transportation, the committee stated, is not now and probably never will be in a position entirely to take the place of railroads. We need both rail and automobile in a healthy national life. We cannot afford to impose impossible burdens on automobile transportation, neither can we allow the railroads to become crippled or paralyzed. Ways and means should be studied to correlate the services.

Stated briefly, the wishes of the majority of the residents of a given locality constitute an element to be considered in determining whether public convenience and necessity warrant the establishment of automotive transportation. If this principle is observed by regulatory bodies, it will result in the establishment of the new and modern modes of transportation in communities only to the extent that public sentiment is ripe to demand and receive them. The committee did not wish to convey the impression, however, that stage or truck service should be permitted in every instance where popular sentiment seems to demand it. There may be other conditions which would outweigh the element of popular demand.

As to the effect on highways, where the evidence indicates that the operation of a stage or truck line would result in damage disproportionate to the benefits to be derived from the service, then the regulatory body should as a matter of common sense and justice to the public at large refuse the certificate. More people are inconvenienced by ruined roads than, are benefited by stage or truck service.

In order to avoid confusion as to the intent of statutes, the committee expressed the belief that the statute should place under the control of the regulatory body all motor vehicles which perform a common carrier service, whether operating regularly and between fixed termini or otherwise, except those operating exclusively within the corporate limits of cities or towns.

Every regulatory body, continued the committee, assuming the regulation and control of motor-vehicle traffic in a thorough and efficient manner should take notice at the outset that the task is great. It seems to have been the experience of commissions which have assumed this burden that the regulation of motor-vehicle traffic is approximately equal in time and trouble to all the other work of the regulatory body combined. This is especially true during the first year or two of regulation.

A more extended abstract of this report will appear in the December issue of *Bus Transportation.*

PUBLIC OWNERSHIP AND OPERATION

In its report this committee, of which Commissioner A. G. Patterson, Alabama, is chairman, pointed out that the committee was created in 1917, and that it has made four reports. The conclusion reached in the last report was to the effect that private ownership and operation under public regulation is logical, just and equitable, and the best system for conducting the business of public utilities that has been or can be devised to meet the needs and requirements of both the utilities and the public served by them. While conditions have changed materially since the last report was made, these have not changed the inherent basic principles upon which the conclusions of last year's report were predicated.

Referring to the federal control of American railways, adopted solely as a necessary war measure, the report points out that its effect in practice included the following unfavorable elements:

1. Loss of normal incentive for economy and efficiency on the part of subordinates.
2. Loss of competition and the advantage accruing therefrom.
3. Loss of efficiency by reason of the necessary adoption of certain policies, such as: Organization of a highly centralized management, issuance of uniform orders without regard to varying local conditions, disregard of the fundamental relationship which should economically always exist between revenues and expenses, maintenance policy adopted and failure to provide necessary additions to and renewals of plants and plant equipment, extravagant distribution of freight car equipment, and labor policies involving the abolition of piece work and the adoption of the standardization of wages by general classification.

The combined effect of the above was to increase the operating ratio from 70.6 per cent in 1917 to 81.5 per cent in 1918, to 85.3 per cent in 1919, to 93.7 per cent in 1920, and to 82.6 per cent in 1921.

Continuing, the report stated that the public utility business is essentially a private business, always provided that the public be given fair and adequate service at a reasonable cost or rate. It is, of course, always understood that reasonable rates shall be based upon the fair value of the property owned or held by the utility and devoted exclusively to public service. Also, in order to secure a continued adequate service, reasonable allowance must be made in the construction of rates for maintenance, depreciation, reasonable contingency reserve, etc.

On the other hand, the report stated that many utilities are bringing to bear every known pressure that their high degree of business organization and money affords, in order to block or prevent public utility commissions from justly reducing the prevailing high rates. Also the various highly organized labor organizations are likewise resisting reductions in wage scales. On the one hand, the committee pointed out, litigation to delay rate reductions must be made at the expense of the public. As to the labor situation, although government ownership and operation of public utilities is not the most desirable, efficient or economic method of operation, unless such amicable adjustment can be arrived at between labor and capital as to insure to the public adequate and efficient service at reasonable rates, or unless other adequate, efficient and prompt means be devised to secure the same results, it is almost certain, as is presaged in President Harding's address to Congress on Aug. 18, 1922, "that the inherent right of the public to such service at reasonable rates will in fact ultimately force upon the nation public ownership and operation of its public utilities."

Taking up for discussion the Railway Labor Board, the committee pointed out that the existing dual system of control of the railroads of the country is a failure. It is now agreed, or will soon be agreed, that the Railway Labor Board must go. In the opinion of the committee, the only logical, reasonable and practical solution of the present perilous situation is to abolish the board and transfer its functions to the Interstate Commerce Commission; and then enact a law "with teeth in it" which will enable the commission to enforce its decrees and orders. The proper solution of this problem will have a tremendous effect in retarding the sentiment favoring government ownership and operation of railroads and other public utilities, which sentiment, it must be admitted, is rapidly growing among certain classes and in certain sections of the nation, and which, if it should be adopted as a national policy, would prove to be a most destructive and disastrous governmental experiment.

SAFETY OF OPERATION OF PUBLIC UTILITY COMPANIES

The report of the committee on safety of operation of public utilities, of which Commissioner John F. O'Ryan, New York (Transit Commission), is chairman, was presented with the thought of offering general ideas along the line of safety rather than suggesting a concrete plan. It seems necessary, stated the report, that some movement be inaugurated which will result in a more general agreement as to what safety standards should be, and then when the standards have been determined to make every effort to have them adopted and enforced by the regulatory bodies of the United States.

Of the forty-eight railway and utility commissions in the United States, twenty-nine have adopted safety rules relating to the construction and operation of electrical supply and signal lines, and of these about eight follow the National Electrical Safety Code, or vary from it only in unimportant details. Five have recommended this code as the proper one for use by the utilities, while the balance have deviated from the code in important matters or have not followed the code to any considerable extent. In view of the work which has been done by the engineers of the United States Bureau of Standards, and of the fact that the American Engineering Standards Committee has approved the National Electrical Safety Code (with the understanding that a sectional committee will revise or will consider revisions of Part 2 of the code which may be deemed necessary by interested parties), it appears that this code can without error be adopted as a guide.

It is suggested that safety rules following the N. E. Safety Code be worked out with the aid of an advisory committee, composed of persons interested in all industries and utilities affected by the rules.

The committee further recommended that special efforts be made by the association to impress upon the management of utilities, first, the economic value of safety work; second, that the facts which were prominent a few years ago have quite disappeared; third, that some sound, reasonable plan should be followed consistently.

PUBLIC UTILITY RATES

The committee on public utility rates for 1922, of which Commissioner Lewis E. Gettle, Wisconsin, is chairman, dealt largely with the subject of hydro-electric power. It pointed out that in the early days of public utility regulation, commissions naturally gave much attention to the problem of formulating such types of rates as would secure the most equitable distribution possible of the cost of service. The same problem confronted the utility interests themselves. What may be termed the mechanics of rate making will always constitute an important study, but the committee stated that there are no recent developments to report upon at this time.

The committee discussed the relation of kind and location of power plants to rates for electrical energy, with particular reference to the hydro-electric plant, taking the position that proximity of a city or village to a water-power development should not give it a priority of interest in that development. As this matter is somewhat analagous to the subject of paying and non-paying lines in electric railway systems, the following suggestion of the committee will be of interest: The transmission lines which make possible the delivery of the energy generated by water power plants to the community in which it is to be used should be treated to all intents and purposes as if they were part of the power plant. The power system could not exist without the market, and the facilities which make it possible to reach the market, assuming that good business judgment has been exercised in their construction, must in practice be regarded as part of the power system, and the cost incident to transmission be regarded as part of the power cost, or else there will be many instances in which the development of hydro-electric plants will be delayed awaiting the growth of a near-by market, if not prevented altogether.

RAILWAY SERVICE ACCOMMODATIONS AND CLAIMS

The report of this committee, of which Commission President George E. Erb, Idaho, is chairman, pointed out that service, to reach its maximum of value to the public, must be furnished in quantity and character and at times as necessity requires. The public, however, is quite prone to ask for and expect service not demanded or warranted by the traffic afforded. The carriers, on the other hand, while diligent in affording service which they deem warranted by the traffic, are too often negligent and careless in affording the accommodations, reliability and safety which give the service the value which it should have. Service and accommodation, on account of the intimate contact of carriers and patrons in the transaction of business, are matters productive of much friction, resulting in dissatisfaction and consequent complaints to the regulatory body. In no other utility field are commissions called upon to handle so many essential causes of friction between the utility and its patrons.

Continuing, the report stated that in considering the service which may justly be expected and required of a carrier, it should be borne in mind, (1) that the carrier can only be required to furnish service for which, as a whole, it is reasonably remunerated, and (2) the patron can only demand that service which, as a whole, will reasonably remunerate the carrier. It is not to be understood, however, that each particular class of service is to bear a pro rata of the reasonable remuneration.

The problem to be met and solved by the carrier is to afford that service which as a whole will best serve the needs, by the development of the natural resources and establishment of industries within the territory served and, as a whole, afford reasonable remuneration for the service afforded.

Most commissions throughout the country have been called upon during the year last passed to consider applications for permission to discontinue or curtail service heretofore afforded. Service once furnished for any considerable time tends to stimulate certain lines of activity, build up certain industries and results in certain investments. The discontinuance or serious curtailment of such service, after same has existed for any considerable time, results in killing these activities, destroying these industries, and partially, at least, destroying the values of these investments, and should only be permitted by a regulatory body after full notice to the public, full notice to the security holders, and full opportunity on the part of both public and security holders to be heard, and, after full investigation, an unquestionable necessity therefore shown, and only to the extent absolutely necessary to avoid confiscation.

The report then went on to emphasize, in detail, the importance of relieving freight-car shortage and improving distribution through co-operation between the I.C.C. and the state commissions; the duty of the railways to provide satisfactory station facilities; the importance of establishing good public relations between the management and the public through courteous and respectful employees, etc.

CAR SERVICE AND DEMURRAGE

The committee on this subject, of which Commissioner Alexander Forward, Virginia, is chairman, stated that car service was hardly an acute problem anywhere since 1920, until the beginning of the railway strike in July, 1922. It was impossible to report this year on the result of the strike.

In recent years most demurrage matters have been handled by agreements between a committee of railway traffic executives appointed by the American Railway Association and a committee of the National Industrial Traffic League. In most cases the I.C.C. has accepted almost all agreements regarding demurrage rules and charges entered into by these committees. An exception occurred in 1921 when an agreement was entered into for an increase in the demurrage charges contingent upon modification of certain traffic rules. The committee of the league agreed that the carriers might file tariffs carrying these increased charges on less than thirty days statutory notice. This caused a dissension among the members of the league, and the I.C.C. refused to approve the demurrage agreed to between the league and the committee of the carriers.

While a number of decisions have been rendered by the I.C.C. during the past year on the subject of demurrage charges, practically all are merely interpretations of the rules with a view of determining whether or not the carrier has made the proper charge to the shipper; though some, however, relate specifically to the reasonableness of the charge itself.

While the action of a committee like that of the National Industrial Traffic League, the report concludes, may not always meet with the approval of all the membership of the organization, it would seem that as a general proposition it saves much labor and obviates many disputes to have some such agency created to deal with the carriers on questions of demurrage rules and charges.

STATISTICS AND ACCOUNTS OF RAILROAD COMPANIES

The committee on this subject, of which Commissioner B. H. Meyer, I.C.C., is chairman, dealt largely with the steam railroad situation, particularly with reference to the extensive investigations now being conducted by the Bureau of Accounts of the Interstate Commerce Commission and the Railway Accounting Officers' Association. The I.C.C.'s program of revision, however, was stated by the commmittee to apply also to the accounting classification for electric railways and other common carriers. While these groups of carriers are not affected by new legislation in the same degree as the steam roads, the accounting regulations applicable to some of them are incomplete and generally should be brought up to date in the light of the experience gained in their practical application.

The report called attention to the fact that under the transportation act of 1920 the I.C.C. is required to prescribe for all carriers subject to the act "the classes of property for which depreciation charges may properly be included under operating expenses, and the percentages of depreciation which shall be charged with respect to each of such classes of property." The commission has established a depreciation section within its Bureau of Accounts to collect the data necessary for this action. Depreciation accounting under its present regulation is mandatory with respect to equipment, but optional as to fixed improvements. The determination of the rates of depreciation and the classes of fixed improvements which shall be considered depreciable for accounting purposes has been left to the judgment of the carriers, who, however, must be prepared to justify the rates employed.

Early in the course of its investigations and study of the subject the commission perceived the advisability of dealing with each class of carrier separately and it seemed advisable from the progress made to proceed with the telephone companies first.

The above excerpts from the report of the committee are given to indicate where the work of the I.C.C. with respect to electric railways stands. As stated earlier, most of the details in the present report relate to steam railroads.

SAFETY OF RAILROAD OPERATION

The committee on this subject, Commission Chairman C. C. McChord, I.C.C., chairman, called attention to the necessity for extending the installation of preventive safety appliances. The need for a systematic program for extension of the automatic block system, pointed out in previous reports, was reiterated. During the year ended Jan. 1, 1922, there was an increase of but 517.6 miles of road of automatic and 66.5 miles of road of non-automatic block signal systems in the United States. Attention was called to the fact that in June, 1922, the I.C.C. issued an order requiring each of forty-nine railroads to install on one passenger engine division on a designated portion of its line, on or before Jan. 1, 1925, automatic train stop or train control devices, applicable to its need and according to the prescribed specifications and requirements.

Automatic train stop or train control devices, as defined by the commission's order, comprise a system or installation so arranged that its operation will automatically result in either one or the other or both of the following conditions: (1) Automatic train stop; the application of the brakes until the train has been brought to a stop. (2) Automatic speed control; the application of the brakes when the speed of the train exceeds a prescribed rate and continued until the speed has been reduced to a predetermined and prescribed rate.

In regard to maintaining power brakes, the report pointed out that the efficient braking of a train can be secured only by the maintenance in the proper condition of the brakes on each individual car. No car should be considered as satisfactory for service unless its brake equipment is free from excessive leakage, it has the proper length of piston travel and its triple valve has been cleaned and oiled within the prescribed period.

RAILROAD RATES

A report of the committee on railroad rates, written by the chairman, Commission Chairman Campbell Russell, Oklahoma, dealt largely with the relation of the Interstate Commerce Commission and state commissions with respect to jurisdictions. The central feature was an account of the co-operative plan developed as a result of a suggestion made by Commissioner C. C. McChord of the I.C.C. to Commissioner C. D. Jackson, Wisconsin, president of the association. A committee was appointed by the latter to confer with a committee of the I.C.C. and as a result on May 3, 1922, a formulation of the plan was issued. The states generally have given approval to this plan, notwithstanding that by so doing they lessened the chances, for the time being at least, of securing any amendment to the transportation act.

The co-operative plan grew out of the fact that conflicts of jurisdiction between the two systems of public regulation have arisen from time to time, resulting in litigation and action by the courts. It was recognized, however, that the federal and state commissions were alike created in the public interest and have a common purpose, namely, the maintenance of a transportation system which will in all respects best meet the public needs. In general the co-operative plan provides for conferences and joint hearings where petitions are filed with the I.C.C. alleging that intrastate rates unjustly discriminate against interstate commerce, or persons or localities engaged therein. It was recommended that joint conference be held on complaints, attacking interstate rates in those cases where the decision of the I.C.C. appears likely to affect, in substantial and important respects, the relationship between state and interstate rate structures. Likewise, conferences should be held in the case of complaints attacking intrastate rates in those cases where the decision of the state commissions appears likely to affect, in substantial and important respects, the relationship between state and interstate rate structures.

The report concluded with the statement that practice has gradually drifted away from state regulation of state railroad rates to the federal control of such rates. The I.C.C., under the transportation act of 1920, exercises supreme control over railroad rate regulation. Unless there is a repeal or amendment of this act, the states themselves, except in a co-operative way with the I.C.C., can have very little to do with railroad rate regulation.

Street Paving with Regard to Electric Railway Tracks

At Closing Session of Conference Held Under Auspices of Engineers' Club of Philadelphia Prominent New York Attorney Outlined Situation in Clear-Cut Fashion, Answering the Question "What Should Be the Responsibility of the Street Railway Company as to Cost of Installation and Maintenance of Paving?"

THE third and concluding session of a conference on street railway track paving and allied topics, held under the auspices of the Engineers' Club of Philadelphia, occurred on the evening of Oct. 9 following a dinner served under the auspices of the club. Reports of the earlier sessions of the conference were given in the issues of this paper for Nov. 4, page 747, and Nov. 11, page 788. A full report will be published in an early issue of the club's publication, *Engineers and Engineering*. The presiding officer at the evening session was Dr. Robert H. Fernald, president of the club and professor of mechanical engineering University of Pennsylvania.

The paper of the evening was by A. T. Davison, general counsel Third Avenue Railway System, New York City, in which the author covered the subject in a lucid, impartial and convincing manner. An extended abstract of the paper is given elsewhere in this issue.

C. M. Pinckney, New York City, took issue with Mr. Davison, claiming that the street railway should not be entirely free of the paving obligation, although in its present form under conditions of modern traffic, the obligation is not scientifically sound. The track, said Mr. Pinckney, does injure public property, but the difficulty is to measure the extent of the damage. He suggested that observation should be made of a street in which part is occupied by a surface railway, the occupied and unoccupied parts being paved alike. He pointed out also that railway franchises were granted to a certain extent because the public thought that the railway would provide paving. Divided maintenance of the streets, he continued, is bad for everyone concerned. One party should do the whole thing.

Following Mr. Pinckney's general remarks, an animated dialogue occurred between him and Mr. Davison. Mr. Davison's questions were intended to bring out Mr. Pinckney's ideas as to the relative reasonableness of the paving and other charges exacted from the street railway and the license fees paid by owners of motor vehicles; also whether it is better to tax the railways for paving, with consequent higher fares or poorer service or both, or to pay the cost from the general budget. The debate, if such it may be called, did not serve to bring the debaters into agreement, but did bring out the really fundamental questions involved. Mr. Pinckney concluded by saying that if the railways could demonstrate to the public that the amount of damage done to paving is not equal in cost to the expenditure on maintaining track paving, the matter would be equitably adjusted. These two speakers continued to debate the question as to whether it would be practicable to do as Mr. Davison suggested in his paper, namely, assess on the street railway the cost of the damage which its tracks cause. Mr. Pinckney thought it would not, on account of the enormous amount of detailed investigation required. He preferred making an assessment at some agreed-upon figure.

This closed the discussion, but some communications were received by title. An essay upon the subject of reciprocal obligations of the railroad and the municipality as it relates to repairs to pavements, by A. P. Hartmann, city engineer of Yonkers, was presented in printed pamphlet form. Abstracts of other typical communications follow:

ARE CAR TRACKS A NECESSARY EVIL?

George W. Tillson, consulting engineer, LaGrange, Ill., wrote that street car tracks in a street are a nuisance, but necessary. During the last few years much discussion has taken place as to whether the company should lay and maintain the pavement in the track area, this obligation having been imposed upon nearly all street railways in the past. The question of this obligation is complex, it being the fact that the cost of pavement and its maintenance must be paid for by the general public or by the car rider or by the abutting property owners.

In Mr. Tillson's opinion, in no case should the abutting property on a street be put to extra expense on account of the existence of a car track upon its surface. The cost per yard for any pavement on a street car track, he stated, is considerably more than on a street where there is no track. This is true also as to maintenance. From 1913 to 1918, inclusive, the cost of repairs to asphalt pavements in Brooklyn, N. Y., on streets with car tracks averaged 3.9 cents per square yard, while on streets without tracks it was 2.2 cents. This was on more than 40,000,000 sq.yd. of pavement. Previous to 1907 the Philadelphia Rapid Transit Company was required to pave from curb to curb all streets upon which its cars were operated. In that year a contract was entered into between the city and the company under which the latter pays a lump sum annually.

As a street car company operates in a public thoroughfare, where it has no inherent right, it must pay something for the privilege of operating. Admitting that the company must pay for its franchise, the principal conditions to be determined are the amount of the paving to be laid and maintained, if any, and what shall be done about snow removal.

In Mr. Tillson's opinion it is logical to expect a railway to construct and maintain the pavement in and between its tracks and such a distance outside the rails as may be disturbed in repairing or laying new tracks, and it should remove the snow from the same area. These points should be carefully considered, however, when the rate of fare is fixed. Mr. Tillson expressed the belief that all investors in a deserving public utility should have a fair return on their money. He believes further that as a general proposition where a needed public utility, operating under a long franchise, which in a business way cannot pay dividends on account of the advanced costs of operating, it should be permitted to increase its rates for service rather than to modify franchise conditions and so decrease costs.

G. Tracy Rogers, president Waverly, Sayre & Athens Traction Company, Binghamton, N. Y., sent a letter in which he spoke of the effort being made in New York State so to amend the law as to relieve street railways from the unjust and unfair obligation of paving. He spoke of one property in which he is interested where if the company is forced to do certain paving, it will have to go into bankruptcy.

C. E. De Leuw, consulting engineer, Chicago, sent a contribution in which he traced the history of the paving burden and said that any charges which are not solely the result of creating transportation and which are assessed against the car rider prevent his obtaining service at cost. Therefore, from the financial side alone all charges such as the maintenance of paving, sprinkling and sweeping the right-of-way, and the like, should be borne by the public rather than the car rider through payment of fares. However, as track and paving are of intimate construction and design, and as the tracks cannot be repaired without the removal of the paving, it is a difficult matter to draw a sharp line of demarkation in making a separation of the direct charges. Further, paving will be disintegrated should the rails be poorly secured to the ties or should the track foundations fail.

In view of the conditions outlined Mr. De Leuw suggested that a separation of track and paving be made and that the burden of cost to the car rider be held to the lowest possible amount, as determined solely by the actual value he receives from his purchase of transportation.

The Paving Tax Burden Should Be Eliminated*

The Legal Aspects of This Mooted Question Are Set Forth and the Situation as it Exists Today in Most Urban Communities So Explained

By A. T. Davison,

General Counsel Third Avenue Railway System, New York City

ALL PAVING requirements are tax burdens. Not only have the courts upheld the imposing of street paving obligations on street surface railways as an exercise of the taxing power, but from a practical and accounting standpoint as well the paving charge must be regarded as tax. The payment annually by street surface railways of large sums of money for paving and maintenance of paving in the so-called railroad area secures nothing of value to them. No property, either of a revenue-producing nature or otherwise, is added, and the only purpose served is to add to the convenience of the people of the municipality and particularly to a class of persons (owners of motor vehicles, both passenger and freight-carrying) who are not patrons of the street railway.

The attitude and policy of the several states toward street railways, in common with other public utilities, has been radically changed during the last two decades. Formerly the railways were regarded as profit-making corporations, privately owned and privately managed, from which large revenues by way of taxation could be collected because of their ability to meet these tax requirements by reason of the fact that at that time they were unburdened with rate or service regulations by public utility commissions. Now all is different. The states have, by assuming control of the earnings, service and even accounting methods of the street railways, changed their policy toward these public utilities and converted them into publicly managed properties. Hence the municipalities must also change their attitude with respect to the street railways and no longer treat them as privately managed properties able to meet any and all taxes imposed upon them.

PROBLEM NOT AFFECTED FUNDAMENTALLY BY OWNERSHIP

There is, and can be, no distinction between the use of the public streets by the public when riding in private vehicles and the use of such public streets by the public when riding in street cars. The street railway corporation does not, and cannot, under our regulatory and public service commission laws, use the streets for private profit, because the capital invested can never under these laws make any profit over and above a fair return on the capital invested. If the municipality itself owned and operated the railways the paving would be taken care of by the general tax levy. In such cases the investment of capital would still be necessary. It makes no difference whether the municipality earns enough money to pay the interest on its bonds, or whether the investors who have loaned their money for public utility purposes receive a return on the money they have invested.

The position of that class of persons who loan their money to a street railway in order that the public transportation may be furnished is parallel with, and no different from, the case of the investors in municipal bonds the proceeds of which are used for the purpose of the construction of a street railway. If, as we all agree, a municipality which owns and operates a street surface railway should not be required to allocate and charge to and collect out of the fares received any expense of paving, no more should the street railway, which is constructed by capital invested by investors of the same character as investors in municipal bonds, be required to bear paving burdens.

PAVING CHARGE AFFECTS RATE OF FARE

All money paid by street railways for paving obligations must be charged to operating expenses and paid out of the fares collected. Since the operating expenses must include paving obligations, the public is required to pay just that much more in its rate of fare. In the last analysis the cost of paving requirements must come out of the passenger, provided the rate of fare is sufficient to cover a fair return on operating expenses including paving charges.

In practically all municipalities, street railways are the only means of public transportation. If persons were not carried on street cars, they would necessarily be carried in other vehicles which would use the streets in greatly increased numbers and thus greatly increase the wear on and deterioration of the pavement by vehicular traffic.

Admitting for a moment that street railways do cause damage; so do other vehicles, and yet no attempt is made to make them pay. The streets are there to be used by the public and, in proportion to the volume of the public actually served or carried, the damage caused by street cars as compared with other vehicles is negligible.

If vehicular traffic were entirely excluded from that portion of the street known as the railroad area and the street railway lines were given the exclusive use of such area, no greater paving obligations could possibly be imposed than is now imposed, to wit, to construct and at all times maintain the pavement in that area.

Inasmuch as the paving in the streets, including that portion in the so-called railroad area, is used by all classes of vehicles and so is subject to the wear of such vehicles, the only fair method of placing the paving burden where it should lie is to include the expense of paving and maintenance of the entire streets in a general tax levy, of which the street railway would pay its share as a large taxpayer.

SOME CONVINCING DATA ON THE SUBJECT

A canvass of the subject made by the American Electric Railway Association in January, 1919, showed that only nine companies located in nine states of the Union and two companies located in Canada reported that they are not compelled to pay for original paving. Only seven companies located in seven states reported that they are not compelled to pay for paving renewals and maintenance. Twenty-five companies located in seventeen states and one company located in Canada reported generally that they are compelled to pay for repaving when the streets have been torn up by the municipality for purposes other than repairing for street railway purposes.

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*Abstract of paper before conference for discussion on "Design and Construction of Streets for Street Railway Traffic," held at the Engineers' Club of Philadelphia, Oct. 9, 1922.

Although there are varying conditions with respect to the requirements for original paving and for renewal and maintenance, nevertheless the general situation throughout the country is approximately the same. The street railways are carrying an unwarranted and unfair tax burden in the obligation to construct and maintain paving.

The paving obligations now imposed on street railways are a relic of the days of the horse cars. Although the necessity for the statute disappeared with the removal of the horses from the cars, the statute still remains and the amounts required to be paid thereby have, as a result of the improved art and increased cost of street paving, multiplied many times.

From 1911 to 1920, the street railways of New York State each year expended for paving alone an average of 23.4 per cent of their net income, approximately 5 per cent of the total operating expenses. During the same period in the metropolitan area, for every dollar spent for track and roadway purposes, other than paving, from 40 to 80 cents additional was expended for paving.

In streets where street railways operate, new and more costly types of paving are constantly being substituted for pavement which is still in good condition, for the simple reason that the railway companies must finance a large part of the cost of such improvements, the remainder generally being assessed upon the municipality at large.

On streets where there are double tracks, the street railways are required to pave and keep in repair from 18 to 19 ft. of the roadway, or from one-third to two-thirds of the entire paving obligations on those streets. The percentage which the area maintained by street surface railroads bears to the total paved area in those streets is as follows in several cities: New York, 35 per cent; Utica, 38.6 per cent; Syracuse, 46 per cent; Rochester, 56 per cent.

The use of private automobiles and motor buses has decreased the riding on street cars, reducing the income of the street railways, and at the same time these motor vehicles have greatly increased the wear and tear upon the pavement in the streets upon which they operate. The vehicular traffic in the railroad area amounts to from 40 to more than 90 per cent of the total vehicular traffic in the streets. The railway company not only pays for the pavement worn out by vehicles, but owing to the large proportion of vehicles using the railroad area, it pays for a larger proportion of damage done by vehicles than is borne by the municipalities with respect to the remainder of the street.

The only theory upon which the present drastic paving obligation could be justified, if at all, would be on the theory that all vehicular traffic was excluded from the railroad area.

PAVING CHARGE IS ILLOGICAL

The obligation on street railroads to do any original paving should unquestionably be entirely eliminated. Obviously the only purpose of paving the railroad area is to make it more convenient for purpose of travel by vehicles other than street cars. In other words, the presence of the tracks in the streets has nothing to do with the requirement that the street should be paved.

If the municipalities are to assume the responsibility for placing direct paving burdens on street railways, regardless of the effect of such action, then the most which the street railway should be required to do in the way of keeping pavement in repair is to restore to its former condition so much of the pavement of the streets as shall have become in need of repair in consequence of the existence and use of their track. If, as has been argued by some, the work of modern electric cars causes vibration, which is increased by flattened wheels or defective rolling stock, and thus the pavement is caused to be disintegrated, the obligation to restore to its former condition so much of the pavement as shall have become in need of repair in consequence of the existence and use of such track fully meets the situation.

The same argument applies to the claim by city engineers and authorities that the street pavement adjacent to the railroad track is weakened by reason of the many and several lines of cleavage or joints existing here, allowing considerable surface water to percolate through these joints into the subsurface and weakening the foundation of the roadbed. It also applies to the claim that it is impossible to maintain any modern satisfactory pavement adjacent to any car-track construction, unless such construction is made rigid, and if, as has also been claimed in this connection, the companies usually refuse to do this because of the cost involved. It applies further to the claim that where tracks exist it is practically impossible to make repairs without removing at least 9 ft. of paving space on extended reconstruction work; that long before the expiration of the life of the road pavement the railway companies are compelled to disturb the pavement to shim joints, renew bonds, replace broken rails and retighten joints, and that in doing this work it is necessary to disturb fully 20 in. of pavement on each side of the rail and much more than this in cases where it is necessary to replace the ties.

If, as has also been argued, the life of the roadbed of a railroad company is about twelve years and the life of a durably constructed pavement is more than twenty years; and if, as is claimed, engineers generally hold that no matter how well a pavement is constructed it will heave along the rail line and does not settle back in the spring as it should; and if, as is also argued, the life of a pavement on any street on which the street cars are located is reduced 50 per cent, the answer is still the same.

COMMISSION OUGHT TO DECIDE MATTER

The question may be asked: "What tribunal is to determine whether the need of repair is in consequence of the existence and use of the track?" Obviously, if no other tribunal is selected, the courts must determine this. However, because the question is somewhat technical, it would seem appropriate that all questions under such obligations should be referred to and determined by the public utility commission which has control of the street railway in question. The repair itself should not be delayed pending determination of responsibility. In case of dispute or refusal of the railway to make the repair, the city itself can do the necessary restoration and then recover from the railway such amount, if any, as the public utility commission shall determine should be paid.

There is no legal obstacle in the way of altering the present paving obligations, notwithstanding that such paving obligations are embodied in the franchises themselves. The United States Supreme Court has upheld the authority of the state to alter the obligations contained in franchises granted by municipalities and accepted by the street railway companies.

Executive Committee on Welded Rail Joints Holds Well Attended Meeting

THE executive committee of the committee on welded rail joints operating under the auspices of the American Bureau of Welding met in the rooms of the American Society of Mechanical Engineers, New York, Nov. 13. Those present were G. K. Burgess, chief of the Division of Metallurgy, Bureau of Standards, Washington, D. C., chairman; E. M. T. Ryder, Third Avenue Railway, New York, N. Y.; W. Spraragen, National Research Council, New York, N. Y.; C. A. Adams, Harvard University, Cambridge, Mass.; R. C. Cram, Brooklyn Rapid Transit Company; G. C. Hecker, New York, N. Y.; E. J. McIlraith, Philadelphia Rapid Transit Company; H. M. Steward, Boston Elevated Railway, and W. W. Wysor, United Railways & Electric Company, Baltimore, Md.

The committee discussed details of making the bending and tensile tests previously outlined. Mr. Steward exhibited a number of photographs showing results of tests made at the Massachusetts Institute of Technology. It was decided that the auxiliary head for the Emery testing machine, which is to be used in the tests, should be adapted to take 7-in. rails only. The rotary service testing machine was discussed and a communication from Mr. Ryder was read setting forth his views in regard to essentials in making these tests. Copies of this letter are to be mailed to every member of the committee on welded rail joints, with a request for each member's opinion in regard to the matter under discussion. A sub-committee on the design of the rotary testing machine was appointed, with W. W. Wysor as chairman. A resolution was passed thanking the American Electric Railway Engineering Association for the fund provided and several other resolutions were adopted regulating the procedure for disbursement of the fund, for approving bills, for requisitions and for accounting methods. The style of letterhead to be used by the executive committee was approved. Impact tests previously outlined were discussed and the committee members expressed themselves as considering this a most vital part of the tests to be made. A committee to work out details and equipment for making these tests was appointed, with E. J. McIlraith chairman.

British Municipal Tramways Men Meet

Feature of Principal Interest Was Discussion on Decrease of Car Weight and Provision of Better Suspension, Better Bearings, Etc.—Brief Abstracts of a Few Papers Are Given

AT THE annual conference of the Municipal Tramways Association held in Newcastle-on-Tyne Sept. 13, 14 and 15, several papers were presented and discussed. Perhaps the most interesting paper from the American point of view was one on tramway rolling stock by E. S. Rayner, general manager and engineer of the Hull Corporation Tramways. In the course of this he said that in the endeavor to emulate steam-road rolling-stock practice the tramway designer and engineer had forgotten or neglected the essential difference between the resilient sleeper track of the railroads and the supersolid rigid track of the tramways. The mistake was that tramway engineers had attempted to build their rolling-stock on the same principles as they built their track. Rigidity has been their fetish. Existing troubles are traceable to this rigidity together with the excessive unsprung weight on the axles, and the inadequate spring supporting of the remainder of the weight.

Weight has been increased out of all proportion. Present double-deck cars weigh from 11 to 15 tons, while the weight might be easily below 9 tons. There is no reason why tramcar construction should not follow that of the motor vehicle. The outstanding feature of the latter is the small amount of unsprung weight, due to the type of drive adopted, the propeller shaft with bevel or worm gearing. There is no insurmountable difficulty in adopting this type of drive for tramway work. The evil of unsprung motors has disappeared. With a worm drive the gear ratio can be increased, the speed of the motors increased, the weight reduced, and a smooth start obtained with a comparatively low starting current. The road clearance can be increased and smaller wheels can be used. The principal drawback of the worm gear is the amount of wear between the worm and the wheel, but the advantages are well worth a little extra cost.

Another bad feature of tramway work is the solid axle without a differential, causing slip between wheels and rails on curves, producing wear of the rail and torque on the axle. Nearly the whole of this can be eliminated by the use of a split axle. In regard to bearings, insufficient advantage has been taken of roller and ball bearings. The saving in friction amounts to about 20 per cent, but the principal saving is in the decreased starting effort, and the reduction in the cost of lubrication attention, inspection, and renewal.

Mr. Rayner said that he is convinced that the greasing staff can be reduced by 50 per cent and the repair bill cut down by a similar amount. There will be no dropped armatures, smoking axle boxes or worn axles. As to brakes, they need redesigning. The weight of the brake rigging of an ordinary tramcar is about 600 lb., while the brake gear on a motor vehicle weighs about 100 lb. There should be no serious difficulty in applying the ordinary internal expanding brake of an automobile to tramcar practice. Equal braking power can be obtained with a fraction of the force required with the existing design. The weight of a truck designed on the lines suggested can be decreased at least 25 per cent over present designs. Wheels and axles can also be reduced.

Mr. Rayner said that the Hull tramway department is now working on the design of a new car embodying the points discussed. This car will have a split back axle with a double worm drive and two high-speed motors suspended clear of the axle. The wheels, other than the drivers, will be free and drum brakes will be used. A continuous frame will carry the body, which will be kept low and platform cantilevers will be omitted. The spring arrangement will be kept as flexible as possible and the weight will be reduced to the lowest possible figure compatible with safety and stability. Ball and roller bearings will be used throughout.

The other papers presented at the meeting dealt with subjects of less interest to American operators as they related to British conditions. Ernest Hatton, engineer and general manager of the Newcastle Corporation Tramways, argued in favor of the penny fare for short distances, instead of having a minimum of 1½d. or 2d. He based himself on actual experience in Newcastle. Henry Mattinson, general manager of the Manchester Corporation Tramways, introduced a discussion on the highway cost borne by tramways, and insisted that relief must be obtained from the heavy burden of local rates on the value of the tracks and of maintenance of the road surface between the rails and between the tracks, as required by British law. P. M. Heath, town clerk, Manchester, discussed the legal aspect in Britain on the question of liability for damage done by electrolysis of pipes and other underground structures by leakage of electric current from the rails of tramways. He dealt especially with the fact that it is now a settled law that the negligence of the Postmaster-General in selecting the places for his telegraph or telephone cables did not relieve tramway undertakers from paying the cost of alterations of these cables necessary to remedy damage by electrolysis from tramway currents. A change in the law appears necessary.

Motor Bus Association Organized

THE National Motor Transport Association, composed of bus companies operating passenger-carrying buses over regular routes, was organized at a meeting held Nov. 16 at the Hotel Pennsylvania, New York. Better bus transportation service throughout the country is the association aim. Letters were read from bus operators in a number of states. At the meeting it was decided that there should be three classes of membership: operators, manufacturers and individuals. Patrick Healey, president of the Connecticut Motor Stage Association of Waterbury, Conn., was elected president, and E. B. Burritt, formerly secretary of the American Electric Railway Association, was elected manager.

Personnel Experts Confer

A THREE-DAY national forum of personnel experts was held in Pittsburgh, Pa., Nov. 8 to 10 under the auspices of the National Personnel Association. Among the notable reports presented was one dealing with co-operation with engineering colleges, outlining ways and means by which, through the association, assistance can be rendered by industries to the colleges. The committee on shop training reported that at no previous time has there been the same appreciation by wage earners of the value of practical education which pertains to their job.

One committee reported on psychological tests and rating scales, stating that these are used today by a number of corporations and their use is being extended within those companies and to still other companies. A few companies are now satisfied that their devices are really worth while and have incorporated them as a part of the regular machinery of administration. A larger number of companies are feeling their way and trying out the tests usually upon restricted groups of employees. Other topics considered at the meeting were immigration, trade apprenticeship progress, economics for employees, industrial and public school relations, personnel problems of small offices, job analysis, etc.

Traffic Signal Colors Being Studied

THE American Electric Railway Association is one of about forty interests represented on the sectional committee on colors for traffic signals organized under A.E.S.C. procedure. This committee will investigate the use of various types of semaphores and silent policemen, as well as the efficiency of all color signals now in use as traffic signals. The reason for adopting certain colors for specific uses will be ascertained. Original studies of specific colors for definite uses will be made as a check upon previous researches and to establish certain colors for traffic signals. Nonluminous signs and signals will also be made the subject of research. The chairman of this sectional committee is Charles J. Bennett, State Highway Commissioner of Connecticut.

C. E. R. A. Meeting

THE Central Electric Railway Association will hold its annual meeting in Louisville, Ky., at the Seelbach Hotel on Jan. 18 and 19, 1923.

Safety Institute Awards Medal

ON NOV. 2 the Safety Institute of America awarded to Judge Elbert H. Gary the Louis Livingston Seaman medal for "conspicuous achievement in the conservation of human life." The award in particular recognized Judge Gary's work in connection with the recent "safety week" campaign conducted in New York City. This campaign, said Arthur Williams, president of the Institute, resulted in the saving of forty-seven lives, assuming that without it the same number of persons would have been killed as last year, even allowing for seven persons who died later from safety week accidents.

The Safety Institute awards several safety medals annually, among them the Anthony N. Brady medal, which goes to encourage safety among the electric railways of the country.

A Transportation Lesson from the Circus

AT A MEETING of the American Society of Terminal Engineers, held in New York City on Nov. 14, the subject of discussion was freight containers. J. C. Bonner, president Bonner Railwagon System, Inc., contributed a paper in which he referred to the demountable container, or a van-body equivalent, as the beginning in the journey from unscientific toward scientific terminal freight handling. He then went on to draw an analogy from the ways in which circus vans are transported from city to city, to show that scientific loading of wheeled "strided" containers is to be had with minimum of time and cost. The natural evolution, he said, is from the circus type of four-wheel strided container to an automatic wagon, which will be at home anywhere. This, of course, is the fundamental principle of the Bonner System.

A.E.S.C. Calls Conference on Numbering of Steel

AT THE request of the United States Bureau of Standards, the American Engineering Standards Committee has called a conference to attempt to determine the desirability of applying a uniform numbering system to forging steel, casting steel and structural steel, including plate, tool steel, or other steels not so classified. The conference will be held in Room 704, Department of Commerce Building, Washington, D. C., at 10 a.m., Dec. 6. All who are interested are invited to attend.

American Association News

Suggestions on Publicity Desired

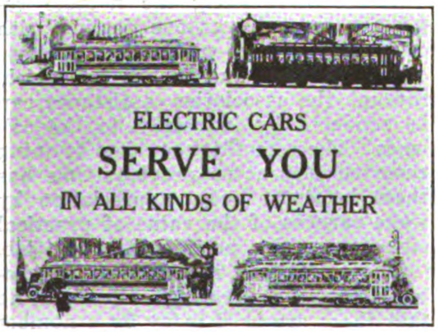
THE association office has sent to all members of the American Association copies of the report of the committee on publicity for the past year, with a request from the committee on publicity that the members read the report carefully and send in suggestions for improving the publicity service.

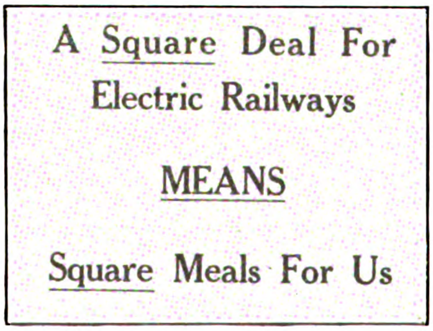
To California for the Mid-Year?

SECRETARY WELSH is sending out a second letter to member companies requesting an expression of opinion as to the desirability of accepting the invitation of the California members to hold the mid-year meeting on the Pacific Coast. Only 168 replies to the first letter were received from 612 member companies. It is urged that the secretary be advised by letter as to the feeling about the advisability of the California mid-year meeting. The comments of W. R. Alberger, San Francisco, in extending the invitation, were published in *Electric Railway Journal*, page 682, issue of Oct. 21.

Advertising Posters Effective

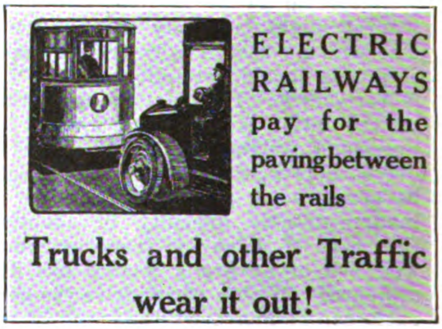
THE advertising section of the American Association reports that the posters recently issued for the purpose of helping make good will for the railways are proving effective. A new edition is about to be issued. Executive Secretary Welsh desires to ascertain the probable demand so as to determine the number to be printed.

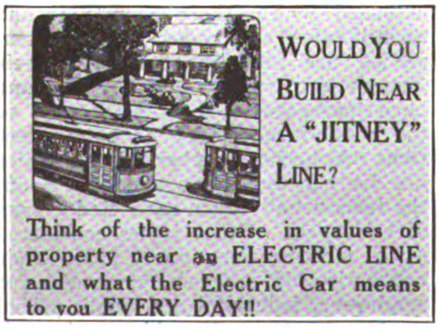


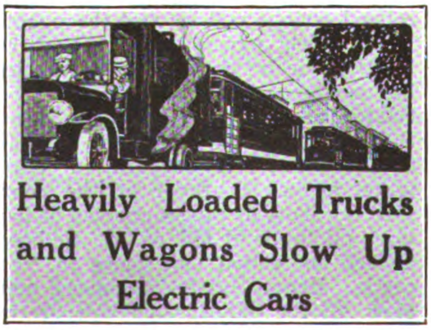

A Square Deal For Electric Railways

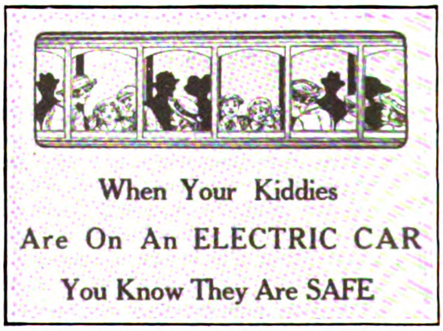
MEANS

Square Meals For Us


ELECTRIC RAILWAYS pay for the paving between the rails
Trucks and other Traffic wear it out!


WOULD YOU BUILD NEAR A "JITNEY" LINE?
Think of the increase in values of property near an ELECTRIC LINE and what the Electric Car means to you EVERY DAY!!


Heavily Loaded Trucks and Wagons Slow Up Electric Cars


When Your Kiddies
Are On An ELECTRIC CAR
You Know They Are SAFE

POSTERS DESIGNED BY A. E. R. A. ADVERTISING SECTION TO FOSTER GOOD RELATIONS BETWEEN PUBLIC AND ELECTRIC RAILWAYS

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Seeks to Revoke Charter

City of Birmingham Claims Right to Regulate Fares—Jitney Also Issue—Improvements Sought

A suit filed against the Birmingham Railway, Light & Power Company by the City Commissioners in the state courts at Birmingham recently has been transferred to the United States District Court, owing to the fact that the company has been operated by a receiver for some time.

This suit, as filed by the city, would revoke the charter of the company, were it decided in favor of the city. The city contends that the charter issued to the company several years ago, and which fixes the fare at 5 cents, still regulates the amount of fare, regardless of the fact that in 1920 the State Legislature of Alabama created a Public Service Commission and empowered it with the right to fix the charge of all public utilities corporations.

BELATED FARE INCREASE

The company contends that the creation of the state commission with the right to fix rates of all public utilities invalidates that portion of a city charter which refers to rates. Officials of the company say they do not know when this suit will likely be heard. In the meantime the company is collecting an 8-cent fare and an additional 2 cents for transfers, as allowed by the state Public Service Commission, June, 1921.

All during the world war the company operated on a 5-cent fare. After the war the fare was first raised to 6 cents, then to 7 cents and then to the present rate. The company claimed that neither the 6 nor the 7-cent fare would pay operating expenses. According to officials of the company the present fare is barely paying these expenses, and the company has no capital for extensions or improvements of the system. An official of the company says that the suit filed by the city against the company has so greatly impaired the credit of the company that it is impossible to borrow money for extension or any other purpose.

Real estate men and others who have property to develop in various parts of the city are interested in the extension of street car lines to this property. Owing to these facts these citizens have taken the matter up with the City Commissioners with a view to a settlement of the pending suit against the company. Various meetings and conferences have accomplished nothing, and the case still remains on the docket of the United States Court, to be set for a hearing at some future date. With this suit off the court dockets the company claims its credit would be restored and it would be enabled to borrow sufficient money for a number of necessary extensions.

Another matter which has entered into these discussions is that of the jitney. Recently a large number of streets, over which lines of the Birmingham Railway, Light & Power Company are operated, have been paved. The company has been taxed several thousands of dollars by the city for the paving work between its tracks. The company says if it has this paving done, and by so doing places the streets in condition for automobile traffic, it will be creating an opposition to its business by aiding in the establishment of additional jitney lines. This, officials of the company say, should be remedied in some way. This matter has been taken before the City Commissioners, but no action has been taken one way or the other.

Real estate men and other citizens who have discussed the situation with members of the City Council are not entering into a discussion of fares charged. What they want is an amicable adjustment of the pending suit, filed by the city against the company, in order that the railway's credit may be restored to enable the company to secure sufficient funds for the many needed extensions of its lines at this time.

Commission Proposals Receive Cold Reception

Mayor Hylan and the Board of Estimate of New York indicated on Nov. 9 that they would act to forestall any measures or projects set forth by the Transit Commission until after the new Legislature convenes and the Democratic Governor takes office in January.

Plans calling for the expenditure of $119,000,000 in the Transit Commission's program were virtually rejected on Nov. 9 by the Estimate Board upon the Mayor's recommendation.

The commission's routes for Manhattan and its tunnel route to Staten Island, costing $30,000,000, and $25,000,000 respectively, were sent back to the commission for alteration. Its Queens-Brooklyn, Jackson Avenue, Roebling Street, Bedford Avenue crosstown subway route, estimated at $64,000,000, also received a cold reception.

The $600,000,000 transit scheme concocted by the Mayor was favored over the plans of the Transit Commission. Mayor Hylan declared that he had investigated the commission's Queens-Brooklyn crosstown project and found it inadequate. Action would have been taken on Nov. 9 to reject the plan had not William G. Fullen, counsel for the commission, appealed for an opportunity for the Transit Commissioners to be heard before final action was taken.

Extension Granted for Report

More Time Granted in Which to Effect Financial Changes in the Cincinnati Street Railway

Committees of the Cincinnati (Ohio) Traction Company and the Cincinnati Street Railway have been given until Dec. 1 to announce a plan for meeting the financial situation that confronts the Cincinnati Traction Company, the operating company, that is satisfactory to Mayor George P. Carrel's traction committee.

The extension of time was granted the committees on Nov. 10, after Walter Draper, vice-president of the traction company, and Attorney Robert Taft, representing the railway, reported to the city's traction committee that committees of the two railway companies are making progress as to a reorganization, but that they would like more time to report. Delay, they said, was occasioned by the illness of W. Kesley Schoepf, president of the traction company, and Judge Rufus B. Smith of the street railway company.

The Mayor's committee several months ago urged representatives of the Cincinnati Street Railway and the operating company to work out a solution of the difficulties that beset them. At a recent meeting of the Mayor's committee the announcement was made that several conferences had been held by the representatives of the two companies and it was likely that a report would be submitted on Nov. 10.

An executive session was held by the Mayor's committee on Nov. 10, after Messrs. Draper and Taft appeared before the committee and asked for an extension of time. At the conclusion of the meeting the following letter, which purports to be the action of the committee, was sent to the Cincinnati Traction Company and the Cincinnati Street Railway over the signature of Mayor George P. Carrel:

> In reply to your request for additional time to formulate a plan to solve the traction situation in Cincinnati, I hereby beg to acknowledge same by reporting to you the resolution passed by the committee unanimously as follows:
>
> Be it resolved, That it is the sense of this committee that the request of your two companies, to wit, until Dec. 1 is granted with the understanding that if no positive announcement of your plans, acceptable to this committee is made by that time, this committee will act as it sees fit.

That the two committees should not be permitted to delay their report too long again was urged by Froome Morris, vice-mayor. It was pointed out that the question of again deferring collection of the franchise tax from the traction company must come up Jan. 1. Collection of the tax must be deferred if fares are to remain at 7½ cents. The franchise tax amounts to the sum of $350,000 a year.

Ordinance Defeated—Traction Tie-Up No Nearer Settlement

Voters of East Liverpool, Ohio, at an election on Nov. 7 defeated by a big majority the initiated railway ordinance. Principals in the traction tie-up intimate that there are no further moves towards resumption of service in East Liverpool and Columbiana County which has been at a standstill since May 1 when carmen employed by the Steubenville, East Liverpool & Beaver Valley Traction Company walked out following a lockout. The ordinance voted on was proposed by the railway as a step toward solving the controversy. It provided for an increase in fares and would place the East Liverpool situation in the hands of the State Public Utilities Commission. Liverpool turned out strong against the passage of the ordinance.

FUTURE ACTION DEPENDS ON COURT RULING

A mandamus action has been instituted in Columbiana County court to compel the railway to operate under the award of the arbitration board and no further steps will be taken until the court rules on the action. A decision is expected in the near future.

The Trades and Labor Council of Wellsville recently held an open meeting, with the railway situation the topic of discussion. Opinions were expressed but a solution of the problem seemed remote. It was stressed at the meeting, as contended by the men since the inception of the tie-up, that the employees are not on strike, but that they refuse to operate cars because of a lockout.

Very little has been accomplished in numerous endeavors to bring about a settlement of the controversy which has caused Columbiana County to be without railway service for a period of six months. The East Liverpool and Wellsville City Councils have held sessions frequently for the purpose of discussing a probable solution, but practically nothing has been accomplished. It was hoped by the company that the passage of the ordinance would be a step toward some solution, but its defeat practically brings the situation back to the status of affairs at the inception of the tie-up, while the citizens of Columbiana County await the court decision on the mandamus action which may or may not be a step toward ending the tie-up.

The strike on these lines has been referred to in previous issues.

RESUMPTION PROMISED SOON

Announcement was made on Nov. 14 from an official source that the cars of the Steubenville, East Liverpool & Beaver Valley Traction Company would begin operation within three or four days between the Pittsburgh & Lake Erie station, Beaver, and the Ohio State line.

Definite notice will be given the men employed on the lines prior to suspension last May that they will be reengaged if they will apply to the company, C. A. Smith, general manager, is reported to have said, but that the places will be given to workers from outside if the members of Division 52 do not accept within the time limit.

General Manager Smith expressed the opinion that the 25-cent fare provided for the 11-mile stretch in Pennsylvania, which is the same distance to East Liverpool and Wellsville on which the company was allowed to charge 5 cents, will be sufficient to pay operating expenses with the proper allowance for maintenance, repair and return on investment.

General Manager Boyce, of the Beaver Valley Traction Company, stated that such arrangements had been made to operate cars in connection with the Beaver Valley lines through Beaver.

Ohio Railway Men Discuss the Bus

The bus transportation situation in Ohio was discussed at a meeting of the executive committee of the Ohio Electric Railway Association, held in the office of President F. W. Coen in the Williamson Building, Cleveland, recently. The meeting was called primarily to ascertain from the committee members what effect the bus was having on electric transportation in their respective communities. The question of traction companies operating bus lines in connection with their business also was discussed. It was the sense of the meeting that something should be done in a legislative way to compel buses to be operated under conditions similar to those which govern the operation of electric cars. Another meeting to discuss this subject will be held in President Coen's office on Nov. 20. Representatives of electric railways in adjoining states will be present to give their views on the bus transportation problem.

Governor Smith Refuses to Comment

Abolition of the Transit Commission and its replacement by a new city department to be known as the Department of Transportation, headed by a commissioner appointed by the Mayor, was forecast as one of the first acts of the new Legislature by Comptroller Charles L. Craig in an address on Nov. 13 before the West End Association at the Hotel Ansonia. Mr. Craig reviewed the transit situation in the city at length, explaining that the Board of Estimate had rejected all the plans of the Transit Commission for new lines because they connected with the lines of the present operating companies.

The following day Alfred E. Smith, Governor-elect, declined to state whether or not Charles L. Craig, comptroller, had represented correctly his views on the city transit situation. Mr. Smith in fact is reported to have declined to comment in any way on the comptroller's remarks and said that he was very busy with the consideration of other matters.

Commission Orders Viaduct to Be Built

The Public Service Commission of Louisiana, through Huey I. Long, chairman, and Francis Williams, commissioner, on Nov. 11 issued an order commanding the Southern Pacific Railroad to build the viaduct over its tracks, shop and switching yards, at Newton Street, in Algiers, opposite New Orleans. The railroad is given thirty days within which to file plans with the commission for approval and ninety days for completion of the work. This is the controversy in which the South New Orleans Light & Traction Company has been involved, work upon which the traction company pleaded its inability to undertake, on account of lack of funds, when the viaduct was ordered closed by City Engineer Klorer.

Counsel for the railroad signified its intention of resisting the efforts of the state to place the expense upon the company and it is likely that the case will now go to the courts. This struggle has been referred to previously in the *Electric Railway Journal.*

Buffalo Still Shows Signs of Strike

Intimidation tactics are being used from time to time by striking platform employees of the International Railway, Buffalo, N. Y., and their sympathizers, but car riding continues almost normal with more than 450 cars in operation on the local lines of the company during peak hours. Another interurban car on the old Buffalo-Niagara Falls line was wrecked several days ago by the placing of a heavy granite gravestone on the track. The speeding car was derailed and several passengers seriously injured. Local cars of the company are stoned from time to time and several arrests of strikers have been made.

The results of the November election in Buffalo show the influence of the strike on the masses which make up the majority of the electorate of the city. Robert C. Lacey, former president of the Central Labor Council and chairman of the arbitration committee of the council, who is under arrest in connection with the finding of dynamite after the wrecking of the high-speed line car on the Buffalo-Niagara Falls interurban division, was elected a member of the State Senate by a large majority. The referendum on municipal bus lines advocated by Mayor Frank X. Schwab, who has been fighting the railway company since the outset of the strike July 1, was carried by an overwhelming majority.

Striking employees of the International re-elected their officers a month in advance of the regular election date. A meeting had been called to discuss relief funds when it was suggested that the present officers remain for another year. Such a motion was carried despite the by-laws of the organization that the election shall be held by secret ballot.

Detroit Vote Changes Municipal Railway Plans

Three propositions sponsored by the Mayor and the Department of Street Railways were defeated at the Nov. 7 election in Detroit. The proposal for termination of the permit to the Detroit United Railway to operate interurban service within the Detroit city limits was defeated by a large majority vote. The charter amendment proposed for removing from the street railway system, the cost of paving, repairing and watering between car tracks was rejected and the proposed $5,000,000 issue of public utility bonds for extensions, additions and betterments of the Municipal Street Railway system failed to receive the necessary 60 per cent of the votes cast. Brief mention of all this has been made before in the *Electric Railway Journal*, but not in its local aspects.

Relative to the failure of the bond issue to carry the Mayor stated that he believed that the voters were not thoroughly familiar with the proposition and that as a result of the vote, the public must wait for several much needed extensions.

No announcement has been made as to what steps will be taken in the case of the Detroit United's interurbans. The proposition backed by Mayor Couzens would have barred the interurbans from Detroit city tracks after Dec. 31, 1924. The possibility of action by the city to obtain a new track rental agreement with the Detroit United Railway has been suggested. The present purchase agreement under which the city took over the Detroit United Lines provides for arbitration of the interurban question. The Mayor believes that the city is not being paid sufficient money by the Detroit United Railway for use of the city tracks, the present sum amounting to approximately $80,000 a month.

Plans for extensions to the municipal railway to be carried out next spring had been formulated, but they will have to be considerably changed as a result of the outcome of the popular vote on the bond issue.

I. C. C. Rules on Leased Lands

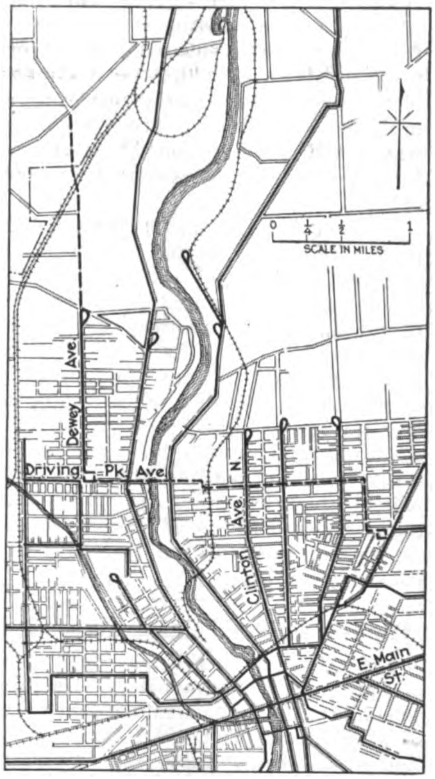
Railroads which lease lands along their right-of-way to private users must charge rentals equal to the sums which private owners would charge for similar property, or the transaction thereafter will be considered by the Interstate Commerce Commission as a form of rebating in violation of law.

The commission on Nov. 6 held that in some cases the fixing of a low rental charge in leases of lands to large shippers had been "in practical effect" a reduction of transportation charges amounting to a refund.

The commission based its conclusions chiefly upon facts brought at Spokane, Wash., and at Fresno, Calif. At Spokane it was found that a city had practically grown up around the right-of-way of the Northern Pacific, making the lease privileges on the land of railroads as well as others valuable.

Trackless Trolley Application Before Rochester Council

Since mid-summer the possible use of the trackless trolley in Rochester, N. Y., has been under consideration. If Charles R. Barnes, local railway commissioner there, was not the originator of the idea, then he certainly was one of its first advocates. Along with James F. Hamilton, president of the company, he was reported months ago as looking into the matter. Three lines were then reported to be in prospect. Gradually the plan unfolded itself until late in September, in fact on Sept. 25, the railway applied to the Council for permits. The outstanding feature of the cross-town line is that it cross connects seven north and south railway lines. The company's application said:



DASH LINES SHOW ROUTES OF PROPOSED TROLLEY BUSES

> New York State Railways respectfully petitions your honorable body to grant to it consent and permission to construct and maintain necessary poles, overhead trolley wires, guy wires, feeders and appurtenances in the streets hereinafter named, for the transmission of electric current for power and to operate in said streets by means of said electric power a system of trackless trolleys or trolley buses for the conveyance of passengers. The streets and avenues on which said permit is requested are Dewey Avenue, from the end of your petitioner's existing electric railway line to the north city line; also, on Dewey Avenue, between Driving Park Avenue and Selye Terrace; on Selye Terrace, between Dewey Avenue and Pierpont Street; on Pierpont Street, between Selye Terrace and Driving Park Avenue; on Driving Park Avenue, between Dewey Avenue and St. Paul Street; across St. Paul Street to Avenue E; on Avenue E from St. Paul Street to Conkey Avenue; on Conkey Avenue from Avenue E to Avenue D; on Avenue D from Conkey Avenue to North Street; and on North Street from Avenue D to Clifford Avenue; on Clifford Avenue from North Street to Portland Avenue.
>
> Pursuant to authority contained in Paragraph 16 of the service-at-cost contract, between the city of Rochester and this company, dated Aug. 1, 1920, the commissioner of railways and this company have determined that the interests of good service make it proper and necessary to install the trackless trolley method of transportation on said streets to supplement surface railroad car operation. This method of transportation can be installed in a short time and is a feasible and proper method of transportation over and across Driving Park Avenue Bridge and will be of great convenience to many citizens of Rochester who are now compelled to walk or take a circuitous route of surface railroad cars.

It is understood that the company's plans for installing the new lines are well along in their development, but nothing further about them will probably be done until after the Council has acted on the application.

San Francisco Charter Amended to Permit Purchase of San Mateo Railway Line

At the general election on Nov. 7, San Francisco voters approved by a vote of almost two to one, an amendment to the city charter authorizing the purchase by the city, under certain conditions, of the line of the Market Street Railway which extends into San Mateo County as far as the city of San Mateo.

Authority was given in an amendment passed on Nov. 2, 1920, for the city to arrange the purchase of the private company's property within the city; the new amendment extends this authority to include the San Mateo line, which is the only part of those properties outside the city limits.

The new amendment, which merely adds two paragraphs to article 12 of the city charter, is as follows:

> The City and County of San Francisco shall have power to purchase the whole or any part of the street railways, street railway system, street railway properties, equipment, franchises or other property operated, owned or controlled by the Market Street Railway Company and situated within the city and county of San Francisco and the county of San Mateo, and to own, operate, improve or extend the same, and any indebtedness incurred for such purchase shall not be subject to the limitation of Section 9 of Article XII of the Charter.
>
> Proceedings for such purchase may be taken pursuant to the provisions of this Article XII of the Charter, or by initiative of the registered voters as provided in Chapter III of Article XI of this Charter, which is hereby declared to be applicable in the matter of the purchase provided for in this section. Such purchase or acquisition shall not, however, be consummated or become effective in the event such purchase shall involve the incurring of indebtedness or liability exceeding in any year the income or revenue provided for such year, unless the same shall be approved by two-thirds of the qualified electors voting thereon, as specified in Section 18 of Article XI of the Constitution of the State of California.

Seeks Franchise Extension

The Niagara, St. Catherines & Toronto Railway, St. Catherines, Ont., wants an extension of its franchise in return for extensions and improvements in service. About three years ago, despite promises from the company, the St. Catherines City Council turned the proposition down because Sir Adam Beck assured the aldermen the hydro-radials were coming and the railway would be made a part of them.

Five Dollars a Day

Detroit Experiments With Flat Rate for Eight-Hour Day on Its Municipal Railroad

A new pay plan has been put in effect on the Trumbull line by the Department of Street Railways in Detroit for a month's trial. The proposed scheme puts the men on a daily instead of an hourly basis and provides for a basic rate of $5 for eight hours work. If the schedule being tried out on the Trumbull line proves satisfactory, it will be extended to include car operators on all other municipal railway lines in the city.

FIVE CENTS ADDITIONAL FOR ONE-MAN CAR OPERATORS

Platform men other than operators of the one-man safety cars will be put on an eight-hour day at the present rate. Operators of one-man cars will receive an increase of 5 cents an hour. The minimum monthly wage rate for all platform employees for the first six months will be $80. After six months' service employees will be entitled to seven days vacation annually with full pay.

After one year the wage rate will be $5.40 for eight hours for operators of one-man cars, and $5 for eight hours for other platform men. For time in excess of eight hours, the man will be paid time and one quarter and no provision is made for free transportation of men while not in uniform. Motormen and conductors will receive 50 cents a day in addition to their regular wage scale while instructing students.

Officials of the railway men's union at first voiced objections to some of the provisions and wage scales announced by the city department. The main objections were made on the grounds that the new proposition would virtually amount to a reduction of wages for the majority of the men. One point mentioned in particular was the proposal to reduce the rate for overtime from time and one half to time and one quarter. While the men's counter plan did not differ materially from that proposed by the city, the men were asked to make such revisions as they desired and return with them to a later conference. The main points of difference between the city and the men were in regard to the recognition of the union through the signing of an agreement along the line of the one which the men formerly had with the Detroit United Railway, and the question as to free transportation for men not in uniform.

NO FRICTION NOTED

According to a statement made by Garrett Burns, business agent for the men, the men were satisfied with the recording of an understanding as to wages and working conditions in the form of incorporation in the minutes of the Street Railway Commission, the courtesy of thirty days' notice before changes could be made, and the understanding that in negotiations with the men on working conditions, the city would deal with the representatives of the employees in their associated character. He further stated that the men would rather deal with the Mayor and members of the Street Railway Commission than any other men in Detroit, the little differences that originally arose having been adjusted. At no time was any friction between the men and the city noted and at no time did the Mayor and other city officials evidence that they had any purpose of destroying the associated character of the employees, they having no purpose of denying the employees the right to function as an associated body of employees in dealing with the management in effecting and maintaining mutual and collective arrangement of wages and working conditions and adjustments of other matters which may arise.

In a signed statement given to the press the Mayor stated that the city had had no dealings with Division No. 26 of the Amalgamated Association of Street & Electric Railway Employees. Some of the men discussed working conditions just as any committee of employees would do, or the same as any lawyer or other representative of a corporation would do. The Mayor denied the intimation that the city officials had backed down from their stand on recognition of the union, and on monthly contract as to wages and conditions.

Minnesota Road Being Extended

Extension of the Electric Short Line, operating from Minneapolis to Hutchinson, Minn., 44 miles westward to Clara City, Minn., is promised in an application of the company to the Interstate Commerce Commission for authority to issue $660,000 of fifteen-year 5 per cent bonds. Officers of the company expect approval and they say disposal of the bonds will finance the work, which should be completed in 1923. Of this distance 15 miles have been railed and 27 miles graded. The new territory has lacked rail access to the Twin Cities and it is rich in possibilities for dairy extension and sugar beet raising. The cars are operated by gas-electric engines.

Work on the extension was begun in 1916, but was halted by the war, and it was not resumed until April 21, 1922. Towns already are springing up along the line in expectation of rail service after forty years wait. The first is Cedar Mills, 11 miles west of Hutchinson; Marsh, Cosmos, Thompson, Lake Thorpe, Lake Lillian, Roseland, Prinsburgh and Clara City. The next extension will be to Montevideo, a division point on the Milwaukee road coast line from Minneapolis to the Pacific. At present 60,000 cu.yd. of earth is being moved a month and half a mile of steel is being laid a day. The steel being laid is 72 lb., with 18 in. of gravel ballast. The maximum grade is one-half of 1 per cent.

$12,000,000 to Be Spent on New Project

A new railroad, to be known as the Missouri Hydro-Electric Interurban Railroad, is being formed by the M. G. Shaner Company, Sand Springs, Okla. The company expects to begin construction work soon and has announced that it will spend $12,000,000 on the project. The road will traverse the counties of Texas, Dent, Shannon, Reynolds, Iron, Washington and St. François. The new railroad, the promoters assert, will make connections with eleven other standard gage railroads.

The proposed railroad will be approximately 300 miles long and the electric power to run it will be supplied by a dam and power plant which it is proposed to build on Current River near Round Springs. The company will be chartered for fifty years and will do a general freight, passenger, mail and express business. The territory to be served is rich with ore and minerals and is without railroad facilities of any kind.

News Notes

May Abolish Terminal Point.—The North Adams, Mass., City Council will appoint a committee to investigate the feasibility of abolishing the use of Main Street as a terminal point for trolley lines running into the city.

Scale in Force for Another Six Months.—An announcement has been made by A. E. Reynolds, general manager of the United Traction Company, Albany, N. Y., of a continuation of the pay scale which terminated on Nov. 1. The scale guaranteed until May 1 is 45 cents an hour for operators of two-men cars and 50 cents an hour for one-man car operators.

Applies for Charter.—The Arkansas City, Winfield & Northern Interurban Railroad has applied to the Kansas Court of Industrial Relations at Topeka, for a certificate of authority to do business as a public utility and to issue $100,000 in bonds. This company owns the interurban line between Winfield and Arkansas City. It recently was taken over by the Arkansas Valley Interurban and is to be entirely rebuilt.

Camden Employees Meet.—A general meeting of employees of the Camden, N. J., division of the Public Service Railway was held recently at the Newton Avenue carhouse in the interest of the safety first work. The Mayor of Camden and the public service director of safety education were the principal speakers. The Mayor said he was in full accord with the company's efforts in behalf of safe travel in the city of Camden. Director Van Brunt explained to the men the new Schaefer system of resuscitation. The meeting was pronounced a real success.

Financial and Corporate

Opportunities in Traction Bonds

Philadelphia Expert Calls Attention to Well Secured Issues Quoted at Discount

Attention was called by "The Bond Man," writing in the Philadelphia *Public Ledger* of Nov. 13, to the "Availability to Investors of Certain Traction Bonds." That was the caption. Of such securities the writer stressed particularly secured underlying issues of railway companies affiliated with strong light and power companies. To utility men the facts used by "The Bond Man" to get his message across are not new, but the method of their use was. The writer said:

> Mention has been made in this column on more than one occasion that the time probably has arrived for those investors who choose to buy good securities at low prices to give some consideration to certain of the traction issues and particularly to the secured, underlying bonds of railway companies that are affiliated with strong electric light and power corporations, and in some instances also the bonds of interurban lines.
>
> Electric railways have been and probably will continue to be the chief means of local transportation, and in this connection there are fundamentals whose influence, while occasionally interfered with, is sure to have constructive effect in time. The only way in which people can be effectively transported, in modern, clean cars, at reasonable speed and at low cost, is by moving as large a number as possible in one operation. This is the real answer to the jitney and the omnibus, and it is the reason why travelers return to the trolley after having experimented with these and other more costly methods of movement.
>
> In addition, people have become reconciled to increased fares, there is not so much political aggression as formerly and the movement of population from city centers to the suburbs constantly increases.

Mention is next made to the increasing adoption and use of the weekly pass and to the improved condition of the industry generally, Mr. Todd's figures as given at Chicago being quoted.

As if that were not enough "The Bond Man" went right ahead and assumed the responsibility for making specific investment suggestions. Among the issues which he cited as worth considering at present prices were the following:

Birmingham Railway, Light & Power general 4½s, due 1954, at about 78.

Detroit & Port Huron Shore Line first 5s, due 1950, at about 85, and Detroit, Monroe & Toledo Short Line first 5s, due 1933, at about 90.

Easton Consolidated Electric Company 5s, due 1949, at about 78.

Lackawanna & Wyoming Valley Rapid Transit Company collateral trust 5s, due 1951, around 89.

West Penn Traction Company 5s, due 1960, at about 85.

The Public Service Railway, the transportation department of the Public Service Corporation of New Jersey, has underlying bonds outstanding that are quoted very low. Jersey City, Hoboken and Paterson first 4s, due 1949, are selling at about 60. They have been in the market as a promptly paying interest-bearing obligation since 1889. North Jersey Street Railway first 4s, due 1948, sell at about 66. These have been outstanding since 1888.

In each instance "The Bond Man" cited how the issue was secured by property, collateral or direct guarantee.

Will Apply for Bond Issuance to Finance Improvements

The Indiana Service Corporation Fort Wayne, Ind., is making application for the issuance of $750,000 of first mortgage bonds to cover the cost of additions to property of the corporation made during the last three years. Due to the fact that the company has only been paying to its security holders 3 per cent on the money in the property it has been able to invest from earnings the sum of $900,000 in improvements to property. This is the money which has gone into the building of new lines, purchase of cars and building of sub-stations to improve the service.

These bonds, when authorized by the commission, will be put into the treasury of the company to be held until additional new construction work is required. At that time the bonds will be sold to the public and the cash thus obtained used to make additions and improvements. A detailed list of the construction work done and its cost has been furnished the commission which will make an investigation to determine how the money was spent before authorizing the bond issue.

Kokomo Property Included in Consolidation

Announcement has been made that the properties of the Indiana Railway & Light Company, Kokomo, the Wabash Water & Light Company, the Public Service Company, Rochester, the Noblesville Heat, Light & Power Company, the Sheridan Water, Light & Heat Company, the Logansport Utility Company and the Roann Light & Power Company, all located in north central Indiana cities, have been purchased by the Northern Indiana Power Company. These properties all have been connected by transmission lines and the actual consolidation of the companies will be completed in a short time.

The value of the properties which have been purchased is approximately $8,000,000 and the total of stocks and bonds to be issued by the new company is approximately the total of the present outstanding stocks and bonds of all the companies. The purchase of the properties has been completely financed. It is the intention of the new owners to connect the plants as soon as possible with the super-power plant for which preparations are being made in the coal fields of the Wabash River.

The Northern Indiana Power Company is owned by the Brewer interests.

One Man-Car Operation Decreases Cost

According to figures compiled by general Superintendent D. W. Henderson, the Seattle (Wash.) Municipal Railway cleared $22,087 above all actual expenses of operation and maintenance and payment of interest and principal during the month of September. This takes into consideration $20,000 actually set aside during the month for depreciation charge, instead of $57,093 marked off on the books for this item, but not actually accumulated. The gross revenues for the month were $508,303, and the total expenses, including $70,250, the monthly apportionment on the annual payment of principal, were $486,216. If the full $57,093 depreciation is counted, the railway failed by $15,005 to clear a sufficient amount to meet the month's apportionment of the annual installment on principal. The operating expense, $384,582 for September was $33,889 less than for the same month in 1921. The decrease in cost, according to Superintendent Henderson, has resulted largely from increased operation of one-man cars.

President Explains Need for Surplus

Harry Bronner was elected a director of the Third Avenue Railway, New York, at the annual meeting of the stockholders, succeeding the late E. M. Burghard. In commenting on the operations of the company, President Huff indicated that there would be a continuance of the present policy in maintaining a substantial safety fund. The company's present surplus of approximately $3,000,000 in cash, Liberty bonds and Treasury notes was not excessive, said Mr. Huff. His statement was brought out when a question was raised as to the right of the board to withhold four years' interest payment on the 5 per cent adjustment bonds, when the books show quick assets, exclusive of materials and supplies, amounting to $4,795,933. There is still 20 per cent unpaid interest on these bonds.

Railways Organize to Effect Resumption of International Trade and Traffic

As a result of a recent conference in Paris of the International Railways, a permanent organization has been created for the study and resumption of international trade and traffic. The delegations were not confined to Europe, but included Japan and China as well. The headquarters of the International Railways will be in Paris and its official language will be French. A Frenchman, M. Mange, was elected president of the managing committee and this fact coupled with the designation of Paris as the seat of the Union, has made the French capital the headquarters of the railways from the Atlantic to the Pacific. The general assembly of the Union will meet in ordinary session every five years.

Financial News Notes

Co-Receiver Appointed.—J. S. Pevear has been appointed co-receiver of the Birmingham Railway, Light & Power Company, Birmingham, Ala., with Lee C. Bradley. Mr. Pevear is manager of the company.

Dividend Declared.—The Middle West Utilities Company, Chicago, Ill., has declared a dividend of $1.25 on the preferred stock, payable on Dec. 15, to stockholders of record Nov. 30. This is the first dividend at the rate of $5.

Approve Bond Issue. — Ashtabula, Ohio, voters, on election day, Nov. 7, approved a bond issue for $60,000 to be used in the purchase of new street cars and improvements to the municipally owned traction system. The vote was 2,618 in favor of the bonds and 1,129 against.

Common Stock for Sale.—A block of common stock of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., is being offered by John Nickerson, Jr. The stock, on a 5 per cent dividend basis, is offered at $59 a share to yield 8.47 per cent.

Director Named.—By unanimous vote of the city sinking fund trustees S. O. Richardson was named the new member of the board of directors of the Community Traction Company, Toledo, Ohio. He fills the place of W. L. Milner, who represented the city's stock and bond interest in the company.

Line Bought.—At a special master's sale at Phillipsburg, N. J., on Nov. 3, the property of the Northampton, Easton & Washington Traction Company operating between Phillipsburg and Washington, N. J., and which has been in the hands of a receiver, was purchased by an attorney for the bondholders for $25,000.

Sale of Carhouse Postponed.—The sale of the carhouse owned by the New York Railways located between Thirty-second and Thirty-third Streets and Fourth and Lexington Avenues, New York, N. Y., which was to have been auctioned off at the County Court House a few days ago by Joseph P. Day, has been postponed until Nov. 20.

Property Reorganized.—It is announced that the Pottstown & Phoenixville Street Railway Company, Pottstown, Pa., has been reorganized, with John J. Tyler, president; C. Taylor Leland, secretary and general manager; Charles W. Rambo, treasurer, and Harry Swinehart, superintendent. Several improvements to the property are contemplated at once.

Hearing Held on Discontinuance.—On petition of the receiver for the Northern Massachusetts Street Railway, Athol, Mass., the State Public Utilities Commission gave a hearing on Nov. 10 on the proposed discontinuance of the Athol and Orange track in West Main Street, Orange. Suspension is sought owing to the small amount of traffic at that end of the line.

Additional Bonds Authorized.—The Public Service Commission has authorized the Southern New York Power & Railway Corporation to issue $300,000 additional first 6s, due April 1, 1928, to be sold at not less than 85 and interest. The Associated Gas & Electric Company has underwritten the issue and agreed to take an additional $200,000 when the approval of the commission is obtained.

Property Sold.—The Asheville & East Tennessee Railroad, which operates between Asheville, N. C., and Weaverville, Tenn., was sold on Oct. 23 by an order of the Superior Court to Morrison & Risman Company of Buffalo, N. Y. The price was $15,500. It is said that the new owners intend to dismantle the railway and sell the property piecemeal, if the sale is confirmed by the court.

Dismantling Road.—Workmen are engaged in tearing up the rails of the interurban branch of the Cleveland & Erie Railway which operated between Erie, Pa., and Conneaut, Ohio. The work of dismantling has been under way for several days, and while it is in progress a number of bus line operators have made application for a franchise to operate between the two cities. The line had been operating twenty years.

Seeks to Abandon Line. — The Boise Valley Traction Company Boise, Idaho, recently applied to the Public Utilities Commission for permission to abandon permanently its Tenth Street line, to build two blocks of new track and to acquire the Eighth Street line from the Boise Street Car Company. The commission authorized temporary abandonment of the Tenth Street line last June. The city has given its approval for the building of the new line.

Sale Approved.—Sales of the property of the Springfield Terminal & Power Company, Springfield, Ohio, for $87,000 has been approved by Judge John Weld Peck of the United States District Court at Cincinnati. The property was bid in by Joseph Schoenthal, representing the Central Trust Company, Chicago, Ill., acting as trustee for the security holders. The sale followed the recent bankruptcy action brought against the company by its creditors.

Gold Bond Offering Announced.—Beverly Bogart & Company are offering $4,000,000 first refunding mortgage 6 per cent gold bonds series A of the Cincinnati, Newport & Covington Railway, Covington, Ky., a subsidiary of the Columbia Gas & Electric Company. The bonds, dated July 1, 1922, and due July 1, 1947, are offered at par and interest. They are callable during the first five years at 107½. A majority of the corporation's $3,709,000 bonds which matured on July 1 have been exchanged for this new issue.

Agreement Has Commission's Approval.—The Chicago, Aurora & Elgin Railroad, Chicago, Ill., will lease twenty passenger cars and one electric locomotive to Alfred E. Pfahler. An agreement to this effect was recently approved by the Illinois Commerce Commission. The railroad has been authorized to issue and deliver to Mr. Pfahler $470,000 equipment trust certificates as consideration. The details of the reorganization of the Chicago, Aurora & Elgin property and the plans under which this rolling stock has already been secured have been given previously in this paper.

Preferred Stock Offered.—J. G. White Company, Inc., Spencer Trask & Company and Marshall Field, Glore, Ward & Company are offering 12,000 shares of 7 per cent preferred stock of the East Penn Electric Company. The price is $92.50 per share and accrued dividends. This stock has no par value and is redeemable in whole or in part on any dividend date at $115 per share and accrued dividends. The proceeds will be used for plant extensions. The East Penn Electric owns or controls some public utility properties supplying most of Schuylkill County, Pa., with electric light, power and railway service.

Holders of Crosstown Bonds Organize.—A committee consisting of Henry W. George, treasurer of the Metropolitan Life Insurance Company, as chairman, John W. Platten and William Carnegie Ewen has been formed in the interests of the holders of the first mortgage 6 per cent forty-year bonds of the Central Crosstown Railroad, New York, N. Y. The committee made this statement: "The properties of the New York Railways, lessee of the properties of the Central Crosstown Railroad, having been placed in the hands of a receiver and the receiver having been ordered by the court appointing him not to pay the principal and interest on said bonds, due Nov. 1, 1922, and the trustee under the mortgage securing the bonds having gone out of existence, the committee has agreed to represent and protect the interests of the holders of the bonds."

Prepared to Absorb Subsidiaries.—Preparations are under way for the absorption by the Interstate Public Service Company, Indianapolis, Ind., of its seven subsidiary corporations said to be worth near $6,002,000. The Interstate Company will request authority of the Public Service Commission of Indiana for the issuance of $3,100,000 of securities and authority to assume the $2,075,000 of underlying obligations or bonded indebtedness of the subsidiaries. The subsidiary properties to be taken into the Interstate Company are the Hydro-Electric Light & Power Company of Connersville, Hawks Electric Company of Goshen, Middlebury Electric Company; Electrical Transmission Company of Northern Indiana; Winona Electric Light & Power Company; Southern Indiana Power Company and Indianapolis & Louisville Traction Railway Company.

Traffic and Transportation

Dallas Case Before Court

Fare Issue Must Be Argued on Its Merits —City Made Party to Suit Started by Taxpayer

That the city ordinance passed by the city of Dallas, Tex., on June 24, 1922, extending for one year the 6-cent fare ordinance granted the Dallas Railway should be held inoperative but not void is the substance of an opinion written by Chief Justice George Sargeant of the Fifth Court of Civil Appeals at Dallas. The decision was handed down by that court in the case wherein F. J. Geller, et al., sought by mandamus to compel the City Commission to submit the fare extension ordinance for a referendum vote of the qualified voters of Dallas. The case was decided on appeal from the Forty-fourth District Court of Dallas, which had held that the fare extension ordinance was legally passed by the City Commission and was legally in effect, and that no referendum could be ordered.

NEW FRANCHISE A CONTRACT

As originally entered in the Forty-fourth District Court, complainants in the suit alleged that under the provisions of the franchise granted the Strickland-Hobson interests on Jan. 8, 1917, was a contract entered into between the city and the company whereby the company bound itself to charge a fare of 5 cents during the life of the contract. It was further alleged that the fare ordinance enacted on June 24, 1922, was in effect a franchise grant, and could not become effective except by ratification of the voters of the city in a referendum election and that no emergency existed which warranted the City Commission in enacting the fare ordinance to become effective immediately.

DISTRICT COURT REVERSED

In reversing the decision of the Forty-fourth District Court and in remanding the case to that court for trial on its merits, Justice Sargeant upheld the allegations of the complainant in nearly every important particular.

In summarizing his opinion, Chief Justice Sargeant said:

> We conclude that a franchise is not a fixed contract but one subject to constant regulation by the governing body of the municipality granting it; that the ordinance involved in this case was not one granting a franchise but one regulating the rate schedule; that such regulatory ordinance could not go into effect immediately because none of the exceptions creating an emergency existed; that the suspension of the prescribed method of passing ordinances was not required for the immediate preservation of the public peace, health or safety; that the declaration of the Board of Commissioners declaring an emergency existed did not create such an emergency, was not binding and conclusive, but was subject to judicial ascertainment; that the emergency clause in the ordinance in question is void, but that the ordinance itself is not void but merely inoperative until it shall have been published for the thirty days required by law. And if within thirty days referendum is demanded by the electorate of the city of Dallas in the manner provided in Art. 8, Sec. 2 of the city charter, then such referendum must be held and the ordinance ratified by the people before it will take effect.
>
> Appellant (F. J. Geller) had no adequate legal remedy by mandamus because the declaration of an emergency, coupled with the provision that the ordinance should take immediate effect, cut off his right to file his protest and to proceed under it.
>
> It may be that the proceeds accruing to the company under the 5-cent schedule are wholly insufficient to enable it to make the necessary returns on its investment and properly to carry on its business, but, if such is a fact, this can be shown to the electorate, in whom the power of referendum resides, and the people will see that a just and fair rate is fixed, not confiscatory but adequate.
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> The judgment of the trial court sustaining appellee's general demurrer and special exceptions is here reversed and this cause remanded to such court for trial on its merits.

Since the development just noted the city of Dallas has been brought into the contest against the 6-cent fare extension granted the Dallas Railway, which extension is being contested by Mr. Geller. The latest move by those opposing the fare increase is the filing of a petition with the City Commission asking that the Dallas Railway be directed to issue a receipt for every 6-cent fare collected and that the 1-cent increase be impounded so that it may be available for refunds to patrons of the traction company in case the 6-cent fare is knocked out. The commission received the petition and referred it to City Attorney J. J. Collins for recommendation.

In the meantime preparations are being made for the rehearing of the injunction case, which was recently reversed and remanded by the Fifth Court of Civil Appeals. The matter was taken to the latter court on appeal when the case was thrown out of court by John W. Pope, sitting as special judge in the Forty-fourth District Court when he sustained the general demurrer filed by attorneys for the traction company. The case was remanded by the Appellate Court for hearing on the issues, and the case will be heard by Judge E. B. Muse in the Forty-fourth District Court.

The Dallas Railway continues to charge a 6-cent fare and is not issuing receipts for fares collected.

Day & Zimmermann Install Weekly Pass at Franklin, Too

Following the installation on Nov. 6 of a weekly pass for the Washington-Alexandria section of the Washington-Virginia Railway, Washington, D. C., reported in the *Electric Railway Journal* for Nov. 11, Day & Zimmermann, general managers of that property, have arranged to try the same plan on the Franklin (Pa.) city lines of the Citizens' Traction Company. The pass system was started on Monday, Nov. 13, at $1.25 against a cash fare of 8 cents and a ticket fare of 7½ cents (four for 30 cents). If the pass meets with popular and financial success, it will be applied also to Oil City, which has the same scale of fares.

Rerouting Plan Advanced

This Is One of the Matters Before the Louisville Railway—Transfers Also Considered

Plans are being discussed by the Louisville Railway and city of Louisville relative to rerouting cars and the disposition of one-man cars on several of the smaller lines. Some time ago an agreement was reached calling for the use of about 100 one-man cars, but decision was reserved at that time as to lines on which the new cars would be used. Tentative plans call for rerouting some of the lines and looping them in the downtown district, instead of running them straight through from one side to the other. Nothing definite has been decided upon as yet, and the company isn't ready to discuss the plans.

UNION DEPOT PLANNED

News also broke during the past few days regarding a plan for installation of a union depot or central station in the downtown section for all interurban cars entering the city. At present two stations are now in use. All of the cars going across the river to southern Indiana now leave a station on Third Street, this being the Interstate station. The Louisville Railway handles all of its interurban business from its own station at Jefferson and Green Streets between Third and Fourth. Both stations are small and inadequate, and in the case of the Interstate a good deal of switching is required on a busy street. The company is refusing to discuss this plan at the present time, and won't say whether it has optioned, bought, or even decided on any specific property.

NEW TRANSFER IN PROSPECT

There is also considerable discussion concerning possible use of a new transfer usable on any line, except for a return trip over the line originating. However, the company refuses to comment on this matter. It is one of many ideas advanced, including the sale of weekly or monthly tickets good for unlimited use.

Although Louisville is on a 6-cent ticket fare, or 7-cent cash fare, many 7-cent cash fares are being paid daily. Some people apparently don't want to be bothered with tickets, and some of those who ride only now and then, among them many auto owners, don't care to carry tickets, while the negroes and poor whites except a few of the more frugal never have seemed to care to make a 30-cent investment. It is being shown daily in Louisville that the cash fare of 7 cents is a considerable revenue producer over a ticket fare of 6 cents.

Agreement Carried Out—Fares Reduced

Fares in San Antonio, Tex., were reduced by the San Antonio Public Service Company, which owns and operates the electric railway system in that city, from 8 cents to 6 cents on Nov. 4. This action was taken following an agreement with Mayor O. B. Black and city officials under which the city's jitney control ordinance will be strictly enforced. The jitney ordinance has been tied up in the courts ever since its enactment on Dec. 1, 1921, during which time the jitney drivers have exhausted every legal means at their disposal to prevent enforcement of this ordinance, but the case was decided favorable to the city of San Antonio by the Supreme Court of Texas sitting at Austin on Nov. 1. The ordinance prohibited the operation of jitney buses within the city of San Antonio except on certain streets, and these streets were so designated that jitneys operating on them would not come in competition with the street cars. Six specific routes are established in the ordinance and regulations covering the operation of jitneys are prescribed.

Within one hour after the mandate of the court declaring the ordinance valid had been issued and Mayor O. B. Black had announced that the provisions of the jitney ordinance would be enforced the police had arrested seventy-five drivers of jitneys on charges of violating the provisions of the ordinance. With the enforcement of the jitney ordinance, Mayor Black addressed a letter to the company advising that the jitney ordinance was being enforced and calling on the company to carry out its part of the agreement and reduce fares to 6 cents. The reduction was put into effect immediately.

Steps Toward Permanent Fare Settlement

Steps are being taken by the receiver of the Denver (Colo.) Tramway looking toward a more permanent settlement of the fare situation in Denver. A short time after the appointment of the receiver a petition was filed in the Federal District Court for an injunction to restrain the city from enforcing a 6-cent maximum fare ordinance upon the ground that it was confiscatory. At the preliminary hearing the city claimed that the company was bound to carry passengers under a 5-cent fare provision in its franchise, upon the theory that this constituted a contract.

This contention was overruled by the lower court and the ordinance held confiscatory and a cash fare not to exceed 8 cents or two tickets for 15 cents was permitted to be charged by the court. On appeal, this ruling was sustained by the Circuit Court of Appeals.

The present proceedings are in the same case, but on an application to make permanent the temporary injunction which was granted at the preliminary hearing. The court has entered an order that the case must be ready for the presentation of testimony on the value of the property not later than March 1, 1923.

Delos F. Wilcox has been retained by the city of Denver as its valuation expert and he is now engaged in inspecting and valuing the company's property, and in connection with this has a copy of the inventory originally brought down to Dec. 31, 1917, and later supplemented to Aug. 31, 1922. A. L. Drum & Company, consulting engineers, Chicago, have been retained by the receiver to handle the details of the valuation.

Morris County Traction New Jersey's First Pass User

New Jersey entered the ranks of users of the unlimited-ride weekly pass on Sunday, Nov. 12, through the leadership of the Morris County Traction Company. This company operates an extensive cross-country and private right-of-way system through a number of small towns, some of which are of suburban and others of more industrial type. The pass is being introduced in two zones at the industrial end of the line, namely, between Wharton and Dickerson Bridge or Kenvil, and Wharton Junction and Rockaway. The cash fare per zone is 7 cents and the corresponding pass for each is sold at $1.

Before installing the pass the company sent out circulars to its patrons urging their consideration of the merits of the weekly pass, and suggesting that each family have not one but two passes on hand. In the announcement the company said that for the steady, everyday customer the best value can be obtained through the use of the unlimited ride transferable weekly pass.

Will Take Over Erie Passenger Traffic

The passenger service of the Erie Railroad between Bradford, Pa., and Salamanca, N. Y., will be taken over by the Olean, Bradford & Salamanca Railway.

The Erie depot has been leased to the traction company and will be used for the sale of tickets to all points served by the Erie system.

Passenger service on the local branch of the Erie was abandoned during the shopmen's strike owing to an alleged shortage of fuel and promise of early resumption of service was made at that time. Recently, however, announcement was made that an arrangement had been made with the Olean, Bradford & Salamanca Railway to take over the passenger traffic.

Interline tickets will be sold by the company at the Erie station to all points served by or connecting with the Erie Railroad. The regular railroad tariff will be in force through railroad tickets with connections at either Salamanca or Olean. Fare to Salamanca or Olean alone remain at the same rate charged by the traction company.

The traction company's terminus at Salamanca is at the Erie station.

Transportation News Notes

Passengers Must Call Streets.—All cars of the Los Angeles (Calif.) Railway are to be equipped with signs reading "Please call your street." The company has received many suggestions about this matter.

Vote for Six-Cent Fare Retention.—Voters of Piqua, Ohio, on Nov. 7 voted in favor of continuing the 6-cent fare on the lines of the Dayton & Troy Electric Railway which controls the Piqua Street Railway. The company had announced that it would discontinue service if the 6-cent rate were discontinued.

Arranging for Pass System.—The Valdosta (Ga.) Street Railway is planning to put on sale a weekly pass school ticket good for any number of rides for 50 cents. A weekly transferable pass to sell for $1 is also under consideration. The company has already received permission from the Georgia Public Service Commission to try these passes out for a period of three months.

Conducts Safety Campaign. — The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is conducting a safety-first campaign. As a special inducement for its employees to prevent accidents, the company has offered $200 to those making the best showing. Two contests, one for city operators and one for interurban operators, have been started. The divisions have been divided into teams and will be scored according to accidents of all types.

Seeks Sunday Tickets.—Asking that Sunday school pupils be provided with street car tickets for Sunday at the same rate as those sold to the pupils of the public schools, Rev. J. P. Anshutz, rector of Trinity Episcopal Church, Tacoma, has written a letter to the Tacoma Railway & Power Company. He recommends a sale of ten tickets for 25 cents good for use on Sunday until 2 p.m. The letter refers to the part the company could play in making available for the children the resources of the churches in the city of Tacoma.

Suggests Safety Stop Lights.—William Jerome Kuertz, street railway director of Cincinnati, Ohio, is investigating the feasibility of a plan proposed by the Cincinnati Automobile Club that cars operated by the Cincinnati Traction Company should be equipped with safety stop lights. Mr. Kuertz said that such a plan is in effect in Cleveland. The system provides for lights of one color while the car is in motion, another while the car is coming to a halt and still another while the car is at a standstill. Mr. Kuertz said that the Automobile Club regards the plan as a big step in the direction of safety.

Personal Mention

Clinton E. Morgan Is Now Vice-President

Arnold Bennett in one of his little homilies says that the path to Mecca is extremely hard and stormy and that the worst of it is "you never quite get there after all." For most people that is, perhaps, true, if they sit in judgment on their own accomplishments, but others often see something accomplished, something done, and a goal reached, where the capable but modest individual himself remains filled with the consciousness of the emptiness of his own attainments.

Fortunately for most of us, others pass judgment in the matter of our achievements. That is just what the directors of the Brooklyn City Railroad have been doing. In consequence they have made General Manager Morgan vice president, saying in effect that their property is well on the road to Mecca. And such certainly appears to be the fact, for the company has recently declared a dividend of 20 cents a share payable on Dec. 15.

The facts speak for themselves. For the year ended June 30, last, the income statement of the Brooklyn City Railroad showed a surplus after all charges of $1,765,528, equivalent to $1.47 a share (par $10) earned on $12,000,000 of capital stock. For the first quarter of the current fiscal year the surplus after charges was $460,311.

A Remarkable Showing, Indeed

This showing is all the more remarkable in the light of the fact that as recently as Oct. 19, 1919, the property of the Brooklyn City Railroad was returned to its owners following a default by the lessee, the Brooklyn Heights Railroad, in the payment of the installment of rent due on Oct. 1, 1919, in accordance with the terms of the lease, which called for annual payments totaling 10 per cent on the stock of the Brooklyn City Railroad.

Only as recently as Jan. 17, 1921, the company began collecting a second 5-cent fare on its Flatbush Avenue line, in order to increase its revenue and preserve adequate service to the public. So rapid has been the recovery of the road since then, however, that the collection of the second fare has now been suspended. This is sound business from the point of view of better public relations, and is in accord with ideas of management expressed previously and publicly by Mr. Morgan. Some of these views Mr. Morgan incorporated in a paper which he read at the recent annual convention of the American Electric Railway Association in Chicago.

It is not on record that Mr. Morgan reduced to dollars and cents in his paper at Chicago the ideas of selling transportation that he has applied in Brooklyn, but the directors of the Brooklyn City Railroad have now done that very forcefully for him. Incidentally, as stated before, they took occasion publicly to recognize the record that Mr. Morgan has made by electing him vice-president in addition to general manager. Previous to going to Brooklyn in February, 1920, Mr. Morgan received his railroad training on properties in the Middle West. In all Mr. Morgan is the responsible operating official for 525 miles of surface railway track in Brooklyn operated by seven companies.

Duties Rearranged on Columbus, Newark & Zanesville Line

Because of increased duties, F. G. Clunis, who has been serving as division superintendent of the Columbus, Newark & Zanesville traction line, as well as manager of the Columbus Interurban Terminal Company at Columbus, Ohio, has been relieved from the former duties and will devote his full time hereafter to his duties as terminal manager.

E. J. Lemasters, for seventeen years assistant superintendent of the Columbus, Newark & Zanesville line, has been promoted to be division superintendent of the line.

This announcement was made on Nov. 11 by John S. Bleecker, general manager of the Columbus, Newark & Zanesville Traction Company. Division offices of that company will be transferred to Newark, while Mr. Clunis will retain the terminal office in Columbus.

The changes were made, according to Mr. Bleecker, because it was thought that better results could be secured by having the division offices in Newark rather than Columbus, and because the duties of both offices were becoming so heavy that it was impossible for one man to handle them properly.

Dr. Conway's Book Delayed

Lawrence Chamberlain, of Lawrence Chamberlain & Company, New York, N. Y., chairman of the committee on education of the Investment Bankers Association of America, in presenting the report of that committee at the recent meeting of the bankers in New York said that Dr. Thomas Conway, Jr., has been repeatedly delayed in his literary work. His promised book on "Public Utility Securities" was due last September. The illness of his statistician for a period of months and his own varied engagements have been the leading causes of the delay. More recently the untimely death of Robert M. Stinson has thrown on him, as technical adviser, an unexpected amount of protective committee work. Mr. Chamberlain said that Dr. Conway now hopes to have his book before the committee by Feb. 1. Dr. Conway is well known in electric railway circles as a consulting expert on fares and finances. He is president of the Chicago, Aurora & Elgin Railroad.

"Jack" Shannahan's Record Reduced to Figures

Tucked away in most unexpected places, sometimes, are the records of what men in industry are doing. Thus a balance sheet or an income statement may contain silent data that are a more accurate record of the measure of a man than any amount of ordinary biographical facts. Everybody in the railway business knows, for instance, that John N. Shannahan, the second vice-president of the American Electric Railway Association, has done a mighty good job in rehabilitating the utility properties at Newport News and Hampton, but few of them have, perhaps, had a really accurate idea of his actual accomplishments along this line. Certainly, they would never learn about them from "Jack" Shannahan himself. He is not that manner of man. But a statement recently issued by a financial house in New York in relation to a block of the common stock of the Newport News & Hampton Railway, Gas & Electric Company, of which Mr. Shannahan is president and operating head, has spread on the record for the benefit of those who care to look beyond the figures the story of the accomplishment of Mr. Shannahan.

Earnings Put Back Into Property

Thus it is learned the company was organized in 1914. Since that time the properties taken over have been welded into an efficiently operated unit with a balance for the twelve months ended Aug. 31, 1922, equal to $9.62 a share on the common stock. The preferred stock has always been in the investment class, dividends having been paid regularly since its creation. The present common dividend is at the rate of 5 per cent per annum, and the expectation is that the directors will maintain at least this dividend. Moreover, the value of the equity in the property, based on the average reproduction cost during the years 1917 to 1921 inclusive, less depreciation, is equal to $129 a share of common stock. Incidentally the advertisement offering the stock pays a silent but none the less striking compliment to Mr. Shannahan as a successful public utility operator.

Mr. Burritt with New Motor Transport Association

E. B. Burritt, formerly secretary of the American Electric Railway Association, has been elected manager of the National Motor Transport Association, organized in New York on Nov. 16. The new association will be composed of bus companies operating passenger carrying buses over regular routes. Mr. Burritt has been active for some time in helping to organize the bus men nationally.

New Offices for Monongahela Property—T. R. Norris Promoted

Made effective by an order just issued, the general superintendent of railroads of the Monongahela Power & Railway Company will maintain offices in Fairmont, W. Va., instead of Clarksburg, with a divisional superintendent in charge of the company's affairs in Clarksburg. This order, issued by W. C. Kline, manager of railways, means that J. I. Beals, the general superintendent, will open offices in the Railroad Building in Jefferson Street and conduct his portion of the affairs of the company from that point. It is announced that Theodore Randolph Norris will be the divisional superintendent at Clarksburg.

Mr. Norris has been in charge of the engineering crews of the company in Clarksburg for the past five years, and his promotion will be a popular one, for he is well liked both by the public and his fellow employees. No stranger to the railroad operating game, he has spent much time in the business before going with the local company. He is a native of South Carolina and came to the local system from the Carolina, Clinchfield & Ohio Railway at Erwin, Tenn. He was with an engineering outfit in the world war, doing service at the front.

Mr. Beals has been with the company for a number of years and has resided in Clarksburg.

Sport Writers Turn to Mr. Stigall for Help

E. E. Stigall, purchasing agent of the Kansas City (Mo.) Railways, is declared by sports writers of that city to be one of the most enthusiastic football rooters in that city. In fact, writers there turn to him for "dope," as the rough material is termed out of which stories are made. Mr. Stigall was graduated from William Jewell College at Liberty, Mo., and never misses any of the big college games in that section of the country. Last year he took his vacation during the football season and he made it include the Yale-Princeton and the Harvard-Yale games. So far this year he has seen the Princeton-Chicago game at Chicago, the Oklahoma-Kansas game at Lawrence, Kan., and the Nebraska-Kansas game, also at Lawrence. He also expects to see the Yale-Princeton and the Harvard-Yale contests.

Barron G. Collier, Deputy Police Commissioner

The Department of Public Safety, the newest branch of the New York city government, opened on the morning of Nov. 13 at Police Headquarters under the direction of Barron G. Collier, Special Deputy Police Commissioner, who will have charge of the work to decrease the hundreds of avoidable accidents in this city every year.

Mr. Collier has a staff of expert safety men, including Marcus Dow, who is president of the National Bureau of Safety and head of the safety service of the New York Central Railroad; Frederick J. Hall, formerly with the Habirshaw Electric Cable Company, and Police Lieut. Edward Walsh. Mr. Walsh said:

> Without the understanding of the people generally and without the co-operation of the press and of the people we cannot most quickly and effectively achieve the purpose of this bureau. Chiefly we are looking to the homes and to the individual members of families for help in making New York the safest city in the world.
>
> The majority of accidents in this city—accidents which took the appalling total of 3,483 human lives last year—are due to easily preventable causes, chief of which is individual carelessness. It is toward the abatement of individual carelessness that our people and this department of safety must first devote their thought.
>
> Be cautious and alert and you will be safe.

Makes Plan for Fate of Utilities

Public utilities, traction companies especially, are menaced today by some of the restrictions and regulations imposed on them by the government, and many of them have failed and defaulted on their bonds because of such conditions, John S. Bleecker, general manager of the Indiana, Columbus & Eastern Traction Company, Cincinnati, Ohio, declared in an address in Springfield, on Nov. 7.

Approximately $15,000,000,000 is invested in public utilities of the country, the meeting was told. To impress his hearers, Mr. Bleecker compared this sum with the national debt of $23,000,000,000. Of the total invested, approximately one-fifteenth, he said, is invested in Ohio utilities.

The speaker made a plea that his hearers take greater interest in the fate of the utilities, emphasizing that practically every person in the country was hit when utilities were unable to operate at a profit.

J. S. Pevear has been appointed co-receiver of the Birmingham Railway, Light & Power Company, Birmingham, Ala., with Lee C. Bradley. Mr. Pevear has been in active charge of operation of the Birmingham property since 1916. At one time he was president of the New Orleans Railway & Light Company.

Hugh Smith, superintendent of the Pinawa hydro-electric plant of the Winnipeg (Man.) Electric Railway, has left the company's employ after several years of service. He has gone to Vancouver Island, B. C., where he has started business for himself. C. Ferguson, who has been in the company's electrical department for some time, has taken Mr. Smith's position at Pinawa.

S. A. Lane, known among most of the people in Arkansas as "Gus," the general manager of the Bell Telephone Company in Arkansas and one of the most popular and influential young men in the State, was recently honored by being elected the head of the Arkansas Association of Public Utilities. His election took place at the close of its fifteenth annual session in Hot Springs, Ark.

S. Wilkins has resigned as engineer of maintenance of way and structures with the Winnipeg (Man.) Electric Railway after fifteen years of service with the company. Mr. Wilkins has gone to the Pacific Coast and has not made any definite plans regarding the future. His successor with the company has not yet been appointed.

S. H. Anderson, in addition to his duties as electrical superintendent of the Pacific Electric Railway, Los Angeles, Calif., has been appointed acting mechanical superintendent, vice Fred F. Small, who has been temporarily assigned to the study of problems in connection with single units for use on street car lines and on Southern Pacific lines where the present returns are not satisfactory.

M. A. Welsh, superintendent of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., recently wrote a suggestion to the Ford Car Company that it instruct its demonstrators to emphasize the necessity of exercising care at railroad crossings when they are explaining the car to a purchaser. It is Mr. Welsh's belief that impressions made on the "new" automobilist will prove lasting. The *Ford News* of Nov. 1 contains a reprint of Mr. Welsh's suggestions

Obituary

Robert F. Andrews, one of the pioneers in the Ohio electric interurban industry, died recently at the age of sixty at his home in Cleveland Heights. In recent years Mr. Andrews was not identified with the electric railway business, but twenty-five years ago he was active in and around Cleveland and East Liverpool in promoting and operating some of the first interurbans in those sections. Besides his wife, Mr. Andrews is survived by two sons and two daughters.

Luke Robinson, who was superintendent of the Montreal Park & Island Railway from 1895 to 1900, died on Nov. 11 as a result of injuries received when he was run down by an automobile in White Plains, N. Y. Mr. Robinson left Montreal in 1900 and went to Paris to work on street railways in the suburbs of the French capital. In 1903 he returned to the Montreal Street Railway as general superintendent, which position he held until he received an appointment as general manager of the Dallas (Tex.) Street Railway. The owners of that railway, who were also interested in Standard Varnish, later took him into the Varnish Company. When he left them about three years ago he had charge of the insulating section of the business. He then went into business for himself in New York. His whole career, in fact, had been one of progress and advancement, he having risen from a platform employee of the railway system at London, Ont.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Power Plant Improvements Going Forward

The Louisville (Ky.) Railway is steadily improving its Riverside power plant, and eventually will discard the old station on Campbell Street, and produce all of its power at the Riverside plant, at a considerable reduction in operating costs.

Just recently the company moved two 500-hp. B. & W. water-tube boilers to the Riverside plant from Campbell Street, and installed Westinghouse underfeed stokers to supply these two with fuel. The plant already had eight 500-hp. boilers at Riverside, these having chain grate stokers. The present big battery of ten 500-hp. boilers operates two 6,000-kw. units.

The eight boilers already in operation were hooked up to one large smokestack. The company has just recently completed a second brick stack, 16 ft. at the bottom, 209 ft. high. It was installed by Heinicke, New York and Indianapolis. New soot blowers, meters, new boiler feed pumps, etc., were installed. Surface condensers are used for all condensation at the new plant.

This new stack is equipped for taking care of eight boilers, the same as the first stack. The company may shortly move two more boilers from the Campbell Street house and attach them at the Riverside plant. It still has eighteen boilers, all of 500 hp., left in the old plant. Plans call for eventually placing two more steam turbines in the Riverside plant. One of 3,500-kw. capacity will be moved from the old plant, and another will have to be bought.

At the present time the Riverside plant is carrying about 80 per cent of the twenty-four-hour output of current and about 60 per cent of the peak loads, the old station coming in on the peaks and in emergencies.

It may be some time yet before the company completes its plans for bringing all of its power together in the one plant, and dismantling the old plant entirely. However, the enlarged newer station could be operated at a big saving to the company. When the new plant was built some years ago it was planned to move the old plant equipment gradually, but then with the war and high prices, along with small earnings and inability to secure an advanced fare for some years, the company was forced to sidetrack all of the plans which it had made.

The Riverside plant is conveniently located as to water as well as rail and river shipments, and can handle its coal very economically. At present other than surplus yard stock of some three months supply carried at all times, the company dumps cars direct to hoppers, from which small cars carry it to the feed bunkers. Loading from yard stock to hoppers is now done by portable conveyors, but eventually a locomotive crane will be installed in the plant for this purpose.

Extensive Track Work Undertaken in Minneapolis and St. Paul

Seasonal track work by the Twin City Lines (Minneapolis and St. Paul, Minn.) has included numerous extensions of existing lines with standard construction and granite block, concrete or tarvia paving; readjustment of some tracks to grade with paving, renewal of expensive layouts and of railroad crossings, also renewal of wood ties on some unpaved streets. In all 1,100 tons of steel were laid in 1922. The standard construction is 93-lb. T-rail.

Memoranda of the work for the season includes:

Johnson Street from Broadway to 18th Avenue NE., double track replaced with standard construction and paved with first class granite on concrete foundation; ½ mile.

Chicago Avenue, Thirty-ninth to Forty-fourth Streets, same type of reconstruction paving, 3,300 ft.

Tenth Avenue SE., Eighth Street to Como Avenue, same class of work, 500 ft.

West Broadway, Girard to Second, Logan Avenues, double track renewed, granite blocks, 3,000 ft.

Nineteenth Avenue line, on Morgan Avenue, West Broadway to Nineteenth Avenue, on Nineteenth Avenue to Upton Avenue, 3,400 ft. double track, several blocks dirt on concrete paving, new line ready Dec. 1.

Johnson Street, Eighteenth to Twenty-fifth Avenues NE., readjusted to grade, concrete paving, 2,600 ft.

Johnson Street, Twenty-fifth to Twenty-ninth Avenues, readjusted to grade, tarvia paving, 2,550 ft.

Minnehaha Avenue, Franklin Avenue, to East Twenty-fifth Street, and on Twenty-fifth Street, Minnehaha Avenue to Thirty-sixth Avenue, tracks readjusted and paved with concrete, about 7,600 ft.

Important special work layouts and railroad crossing at Twenty-seventh Avenue and Twenty-seventh Street, at Bloomington Avenue and Lake Street, First Avenue N. and Sixth Street, First Avenue N. and Fifth Street, Hennepin Avenue and Sixth Street, Bryant Avenue and Thirty-eighth Street, Lyndale Avenue and Lake Street, Hennepin Avenue and Lake Street.

On 5,300 ft. of street railway tracks have been laid to side of street to make room for sewer work, then replaced.

The company has constructed and operated since Sept. 11 two short extensions aggregating 2,700 ft. of double track, on Chicago Avenue, Forty-sixth to Forty-eighth Streets and on Thirty-eighth Avenue N., Penn to Thomas Avenues.

A considerable amount of maintenance work has been performed, some of which, such as repairs to track and paving on different streets, had accumulated from previous years. One of the most extensive of these jobs was relaying a large amount of creosote block paving on Hennepin Avenue between Summit Avenue and Thirty-first Street, about 1½ miles of double track. Repairs have been made on other streets amounting in the aggregate to a large amount, but nothing so extensive has been found necessary as was required on Hennepin Avenue, where conditions have clearly demonstrated to the engineering department the failure of creosote block paving as a material to utilize in street railway tracks.

In St. Paul about 1½ miles of double track were rebuilt with 93-lb. rail from Victoria Street to Nina Avenue. Incidental to this channels for cable equipment had to be removed, a laborious task due to the character of the cement used in setting them.

Tracks were readjusted to grade on Randolph Street for 2 miles, Snelling Avenue to West Seventh Street, two-thirds of which was paved with tarvia macadam, and one third concrete.

Copper Price Trend Upward

Copper prices have moved within narrow limits. The tendency, however, has been slightly upward. Most producers are asking 13⅞ cents to the end of the year, with the result that 13¾-cent copper has been difficult to get. The volume of buying has been good. Price of electrolytic copper for domestic shipment is 13¾ to 13⅞ cents a pound delivered to end of January and 13⅞ to end of April. Price of Lake copper is 14 cents a pound delivered to end of January. Price aside ship New York is 13.70 cents. Prices for European destinations are at levels corresponding with 14 cents c.i.f, Hamburg or London.

Foreign and domestic sales of copper for October are estimated at 110,000,000 to 120,000,000 pounds. This compares with estimated sales of 130,000,000 pounds in September, 100,000,000 in August, 125,000,000 for July, 140,000,000 for June and 210,000,000 pounds for May.

Total sales for last six months are estimated at 820,000,000 pounds, or an average of 135,000,000 pounds a month. Shipments during the last six months have averaged better than 160,000,000 pounds a month.

It is explained that the difference between sales and shipment averages is due partly to conservatism of estimates, but mainly to the fact that sales during the first five months of the year were considerably higher than shipments, making a considerable advance buying that appeared as shipments during the last six months.

Metal, Coal and Material Prices

Metals—New York	Nov. 14, 1922
Copper, electrolytic, cents per lb.	13.875
Copper wire base, cents per lb.	15 625
Lead, cents per lb.	7 05
Zinc, cents per lb.	7 65
Tin, Straits, cents per lb.	36.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7 125
Somerset mine run, Boston, net tons	3 75
Pittsburgh mine run, Pittsburgh, net tons	3 37
Franklin, Ill., screenings, Chicago, net tons	2 625
Central, Ill., screenings, Chicago, net tons	1.87
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	6.50
Weatherproof wire base, N.Y., cents per lb.	16 00
Cement, Chicago net prices, without bags	$2 20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	90 00
White lead, (100-lb. keg), N.Y., cents per lb.	12 125
Turpentine, (bbl. lots), N.Y., per gal.	$1.57

F. F. Rohrer Made General Contract Manager of Westinghouse Company

F. F. Rohrer, assistant to the manager of both the power and the railway departments of the Westinghouse Electric & Manufacturing Company, has been appointed general contract manager of that company. Mr. Rohrer will hereafter be a member of the staff of W. S. Rugg, general sales manager.

In his new position, Mr. Rohrer assumes responsibility for service to customers under contracts and will have general supervision of all contract and order work of the company. In addition to this general work, he will continue to have direct charge of the contract work of the power and the railway departments, which duties he performed in his previous position.

Mr. Rohrer was born in Harrisburg, Pa., on April 22, 1876. He entered the employ of the Westinghouse Company as a student in 1896. After serving in the shops for four years, during which time he obtained extensive training in the manufacturing and the testing departments, he was transferred to the sales department. His services in the latter department have included a number of positions of responsibility.

During the world war Mr. Rohrer was a member of the Committee of the War Industries Board appointed to conserve the production of turbine-generating equipment for government needs. After the armistice was signed he became the representative of the Westinghouse Company in the settlement of contracts which were terminated as a result of the ending of the war. When this work was completed he served in the capacity of assistant to the managers of both the power and the railway departments, which position he held until his present appointment.

Manufacturers' Association to Meet

The fall meeting of the Stoker Manufacturers' Association will be held at The Homestead, Hot Springs, Va., on Nov. 21-23 inclusive. Committee reports and addresses will feature the sessions. Golf tournaments will be the main diversion.

Rolling Stock

Altoona & Logan Valley Electric Railway, Altoona, Pa., will soon receive a number of newly built one-man cars of the double-truck type.

Ashtabula, Ohio.—A bond issue of $60,000 has been approved to be used to purchase new cars and otherwise improve the municipally-owned traction system.

Track and Roadway

Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio, received permission from the Willard City Council on Nov. 6 to lay a Y in Woodland Avenue at city hall.

Los Angeles (Calif.) Railway will soon start on a big construction job involving intricate special work at the Temple Block and Plaza. Another construction of importance is the double tracking of a part of Temple Street line west of Park View.

Berkshire (Mass.) Street Railway is replacing 9 in. with 6 in. rails in West Street, Pittsfield, because the one-man cars do not require such heavy rails. In connection with repaving operations the tracks in New West Street and on the curve at the junction with West Street are being moved to the west side of the street.

Public Service Railway, Newark, N. J., is laying double trolley tracks on the White Horse Pike, between Park Avenue, Collingswood, and the city line, for the contemplated rerouting of the Haddon Heights branch. When the work is completed the cars will run down Haddon Avenue and White Horse Pike to the cut-off now being built by the company.

Power Houses, Shops and Buildings

United Electric Railways, Providence, R. I., will take bids shortly on the erection of a one-story 535-ft. x 170-ft. brick and steel carhouse on North Broadway, in East Providence. The authorities have issued the building permit and preliminary work is now being done by the company.

Cincinnati, Milford & Blanchester Traction Company, Cincinnati, Ohio, has been awarded the contract to furnish Blanchester and adjoining villages with light and power. Work will be started on 9 miles of new electric line between Newtonville and Blanchester to connect with the Blanchester city line, on Dec. 1. The traction company's power plant is located at Milford.

Interstate Public Service Company, Indianapolis, Ind., operating the interurban line between Louisville, Jeffersonville and Indianapolis, will join with the Louisville Railway in building a union interurban station for use of all electric roads entering Louisville. The Louisville Railway owns a number of traction lines besides the city street railway. The street railway and most of the interurban lines out of the city are built to wide gage whereas the Interstate and one or two other lines out of Louisville are built to standard gage.

Fort Wayne & Northwestern Railway, Kendallville, Ind., has decided to close its power plant at Kendallville and purchase power from the Indiana Service Corporation, of Fort Wayne. The company believes that the expense of overhauling its plant would be too great. The Kendallville plant will be closed in about two months. Towns along the line will be supplied with electric current as heretofore, but twenty-four-hour service will be given instead of twenty-hour service as formerly. The arrangement includes the lighting of the city of Auburn.

Trade Notes

Johns-Pratt Company, Hartford, Conn., announces the appointment of George Saylor as Western sales manager, electrical division, with headquarters at 36-37 South Desplaines Street, Chicago.

Detroit (Mich.) Stoker Company announces the appointment of R. L. Beers as chief engineer. He will be in direct charge of the design and application of the company's single retort and multiple retort underfeed stokers. Mr. Beers has been associated with the Underfeed Stoker Company of America as testing engineer and as assistant chief engineer.

L. A. Christiansen, vice-president of the Corporation Service Bureau, Cleveland, Ohio, has been commissioned to make certain investigations in regard to tramway conditions in the European countries. Incidentally Mr. Christiansen's trip will enable him to visit his old home in Norway after an absence of thirty-six years. Mr. Christiansen has booked passage and is sailing on Nov. 24.

The Florandin Equipment Company, New York, N. Y., which is New York representative of the Conveyors Corporation of America, Chicago, is also representing the Perfection Grate & Supply Company, Springfield, Mass., manufacturer of hand stokers and soot cleaners. C. H. Florandin, of this sales organization, has a wide acquaintance among the power plant engineers of New York and New Jersey, and, no doubt, will be successful in handling the new line.

Link-Belt Company, Chicago, Ill., announces the promotion of W. W. Sayers to the position of chief engineer of the company's Philadelphia works and Eastern operations. For many years Mr. Sayers was a popular representative of the company in its Chicago territory, in the lines related to power house machinery, coal storage, Peck carriers, crushers, etc., and later in charge of the locomotive crane department. His headquarters will be at the Philadelphia office for the future.

New Advertising Literature

Electric Service Supplies Company, Philadelphia, Pa., has issued a new circular, No. 186, describing the Keystone overhead material.

R. D. Nuttall Company, Pittsburgh, Pa., has published Bulletin No. 35, a nineteen page booklet describing Nuttall products for electric railway service.

St. Louis Car Company, St. Louis, Mo., has issued Catalog No. 101 describing and illustrating a number of the latest types of seats manufactured in the shops of the company for city, suburban and interurban cars. Bulletin No. 102 has also been issued covering the St. Louis No. 7 single truck for safety cars.

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Consolidation of Street Railway Journal and Electric Railway Review

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Volume 60 New York, November 25, 1922 *Number* 22

The Transportation Department Must Get Its Own Information

WHETHER a railway company, particularly a street railway company, makes money or loses it, has an increasing traffic or a stationary or decreasing one, depends to a very large extent on how closely service is fitted to the amount of riding. With too few cars, traffic is driven to other channels, but with too many cars all the revenue goes in excessive platform expense. In order to be able to follow rapidly changing conditions, it is essential that the transportation department know promptly about shifts in riding. It is too late to make corrections if the transportation department has to wait upon the accounting department for the figures showing what happened on a certain day, for that means usually that the day referred to is one passed two weeks ago. This is not in criticism of the accounting department, for that routine is necessary. But the transportation department leads; it is the source of all the revenue and the cause of 60 per cent or more of the expenditures. Why then should it have to wait for some other department, that has only an indirect interest, to supply it with the data with which to check itself?

To be truly successful in building revenue and in conserving its expenditure, the transportation department must have early today data that show yesterday's operation. There is only one way to get this and that is for the transportation department to get it itself. This is not particularly hard nor expensive to do. Just how to go about it will be brought out in a later issue of this paper.

Graphs Help to Visualize Transportation Problems

ON A SIZABLE system with its intricate time-tables it is next to impossible to visualize just how the car spacing works out at various points of the line, how the layover time is distributed, etc., unless the time-tables are reduced to graphic form. On a system where this practice has not been followed some most surprising inconsistencies will often come to light when the existing time-tables are graphed. The cause of bunching of cars may quickly be discovered, as may also errors which lead to expensive layover or non-revenue platform expenditures. It would seem almost presumptuous to suggest that the practice of plotting out time-tables be followed by electric railway men, yet it is not done as generally as one would suppose its usefulness would compel. Hence it may be in place here to urge transportation superintendents to reduce their existing schedules to the graphic form and see—what they shall see.

But the use of the graph should not stop here. The daily check-up of yesterday's operation, spoken of just above, is tremendously facilitated by having the information put in graphic form, showing for each line the seats per passenger at several points, platform cost per hour, the ratio of platform expense to revenue, passengers per car-mile and per car-hour, etc. From this form of presenting the data the trend is immediately discernible, and any undesirable operation can be readily picked out and checked up. The expense of doing this is exceedingly small compared to its great value in saving money from useless service or making money by putting the service where it is needed.

There Is Little Warrant for the Paving Tax as at Present Assessed

ELECTRIC railway managers are amply justified in urging upon public service commissions and the public the inconsistency of the paving requirements at present made of electric railway companies in general. In many cities of this country the railways are obliged to pave a considerable strip of the streets occupied by tracks and to maintain this paving. The reasons for pushing this matter, and it must be pushed by the electric railways if any results are to be secured, are two-fold: In the first place the burden is becoming heavier from year to year, and in the second place there is a growing demand that all utility taxes should be put upon a logical basis.

As has often been said, the fundamental cause of the present difficulty is a historic one, an inheritance from horse-car days. However, it is necessary to go deeper than this. The present franchises, at least those that date back to the early days, represent bargains made between municipalities and railways under radically different conditions from those now obtaining. When it was proposed that the railways assume certain paving obligations, the doing so was undoubtedly considered a comparatively trifling matter. That this was true is indicated by the jubilant welcome which was given to the new form of transportation by the communities which it was to benefit. It would not have been logical for them to impose burdensome restrictions upon this development. Electric transportation promised inestimable benefits to the communities served, and there was no serious competitor in sight or prospect to suggest the driving of a hard bargain. In other words, the public anxiously desired the new form of transportation and made what, in most cases, appeared to be liberal terms to get it.

On the side of the electric railway promoters, also, something needs to be said. Capital, seeking an outlet for its surplus, saw opportunities in the street railways for a reasonable return on investment and for considerable profit in addition. The franchise terms which communities were willing to give did not seem burdensome in view of any operating conditions which could then be visualized. Hence the imposition of paving and snow-cleaning requirements, limitation of fare, etc., did not appear unreasonable.

Now everything is different, and it is only fair that franchise terms made in good faith under conditions quite foreign to those of today should be revised. This fact is recognized in the principle now well established that the state is superior to contractual obligations of a franchise given by a municipality to a public utility. In most communities the electric railways are under state control as to practically all of the details of operation. They are heavily taxed by the municipalities to provide money for the performance of all municipal functions, of which paving construction and maintenance is a salient one. Having thus paid once for a share in the general paving program, they should not have to submit to a direct paving charge in addition. In fact they should have nothing to do with paving, except in the necessary co-operation with city engineers to insure proper correlation of track and pavement. If this idea prevailed, they could properly be billed by the city for damage done by railway operation to the pavement, the public service commission being the natural arbiter in this case.

Philadelphia's Rapid Transit System Is Nearly Doubled by Frankford "L"

SINCE Nov. 5 an important section of Philadelphia, before that date rather isolated from the central portion of the city, has been enjoying rapid transit. The new line runs in a northeasterly direction from Second and Market Streets to the center of Frankford, passing through some of the most important manufacturing sections in the city. This increases by 88 per cent the rapid transit mileage in Philadelphia. The jubilation which marked the opening of the line and the heavy traffic which has immediately come to it testify to the transportation need that has been met by this new development. It was built and completely equipped by the city of Philadelphia and is the first part of a comprehensive rapid transit program. The subway running north on Broad Street from City Hall will logically be the next step.

There is no doubt that Philadelphia needs rapid transit and ought to be able to support a reasonable amount of it. At the same time the people of Philadelphia could not expect a privately owned railway property to finance such expensive transportation extensions as this one, unless there was reasonable prospect of a fair return upon the investment. The Frankford "L" appeared not to be a feasible undertaking from the Philadelphia Rapid Transit Company's standpoint, as it would not pay its way for many years to come. The only thing for the city to do, therefore, if it felt it must have this transportation, was to go ahead with the rapid transit program laid out and make up deficits out of taxes. This is an illustration of cases where the transportation needs of a community sometimes have to be considered from a standpoint other than that of financial return.

In Philadelphia the city also built and equipped a 6-mile surface line, as an adjunct to the Frankford "L," and turned it over to the P. R. T. for operation without payment of rental for a period of five years at least. In this case and with the new elevated line the whole city has made a contribution to the welfare of a given section, with a view to assisting in the equable development of all of its parts.

It would have been disastrous for the public if the city had been obliged to operate the Frankford elevated line as a separate unit, although provision was made for doing so in case agreement as to terms of lease could not be reached. The citizens would have had the service, but with city operation they would have paid two fares instead of having through service for one fare over the entire rapid transit route, the former rapid transit line being the property of the P. R. T. They would also have missed many other advantages that go with a unified system of transportation.

Getting Useful Information Out of Masses of Statistics

AT THE last meeting of the Institute of Transport, the first "ordinary" meeting of the year, Sir William Acworth read a paper on "British Railway Operating Statistics and Their Lessons." He quoted a friend who asked him only recently whether he could give a single instance where operating statistics have effected practical economies. This was to illustrate the attitude toward statistics that is still taken by people in a position to know better. This question of Sir William's friend, however, comes as a challenge to all who are fond of "figures."

Sir William demonstrated by a convincing array of examples that statistics have shown the inaccuracy of many guesses as to railway conditions in Great Britain. The same could undoubtedly be said with respect to the electric railway industry in this country. Nevertheless, it is true that much statistical research fails of its full purpose because either the results are not what were needed or because the necessary effort was not made to determine what the data really show.

Statistics are not an end in themselves, even to the statistician. To justify their cost they must influence procedure. The real test of value is in the economies or the better service produced. Some electric railways have statisticians whose duty is to compile and interpret data. This is an excellent plan if the property is large enough, but on every property some individual might profitably undertake a study of the data which are compiled as a matter of course in connection with reports to regulatory bodies, as well as those made for special purposes. The work of the statistician is dry and uninteresting until it begins to yield suggestions of real value. Then it becomes an inspiration.

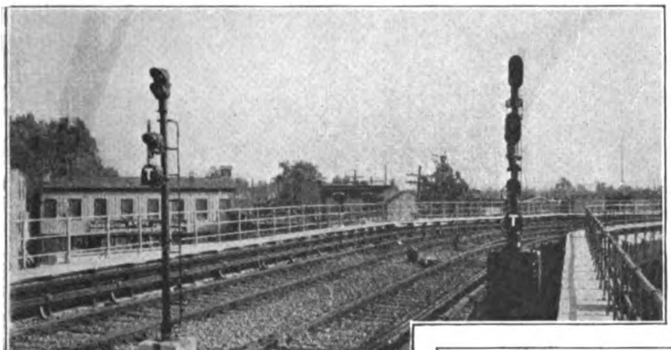
The Utility's Problems Are the Problems of the Public Utility Commission

IN INVITING Henry L. Doherty to address its recent convention in Detroit, the National Association of Railway and Utilities Commissioners showed a real desire to get the point of view of the utilities. Mr. Doherty's experience has been so broad and his personality is so convincing that he was a logical representative for the public service industries, of which the largest, as measured by capitalization, is the electric railway. He spoke frankly, but in a spirit of co-operation, pointing out first that state commission regulation is an improvement over regulation by state legislatures or municipal councils, and second that there are many features of utility operation regarding which the commissions can do much along the line of improvement. His remarks are abstracted briefly in another column.

Under the present régime of regulatory control much of the responsibility formerly carried by the utility managements has been transferred to the commissioners. The commissioners feel this responsibility and respond to it, but they have the double duty, a difficult one, of dealing justly with the utilities and at the same time selling the public the idea that they are doing so. Addresses like Mr. Doherty's should help them to do so.

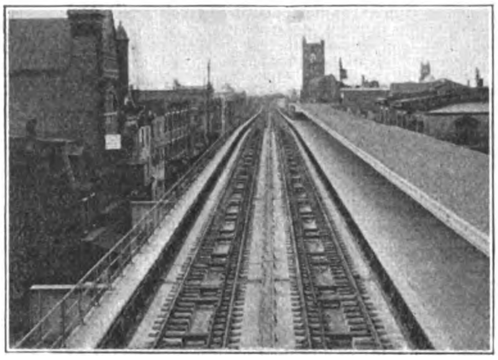
Philadelphia's Rapid Transit Greatly Augmented

City-Owned Elevated Line to Frankford Now Operated Under Five-Year Lease by Philadelphia Rapid Transit Company—Estimated Annual Traffic 33,000,000—Steel Superstructure Carries Concrete Floor Upon Which Ballasted Track Is Laid—Design Was Made with Economy in Maintenance as a Prime Consideration



This Rock-Ballasted Track on the Frankford Elevated Railway Gives One an Impression of Permanence

The Chamfered Ends of the Transverse Girders Give the Superstructure a Finished Appearance



A Portion of the Track Is Constructed with Short Tie Blocks Set in Concrete, but Not Bolted Thereto

PRIOR to Nov. 5, 1922, the operating rapid-transit system of Philadelphia, Pa., consisted of a 7.35-mile double-track line on Market Street, partly in subway, the remainder elevated. On the day previous to that date the city, with due ceremony, turned over to the Philadelphia Rapid Transit Company for operation the Frankford Elevated line, a 6½-mile double-track extension, complete in all details, including 100 new cars specially designed. The P. R. T. immediately inaugurated through service from Sixty-ninth and Market Streets, the western terminus of the older line, to Frankford, the northern terminus of the new one. The accompanying map shows the location of the new line and its relation to the Market Street line as well as the proposed Broad Street subway. At the time the new line was taken over it was estimated that the annual number of passengers who would be carried on the Frankford Elevated would be 33,000,000, which indicates the importance to Philadelphians of the service which this line is now rendering.

The fare on the extended elevated line is the same as that prevailing over the P. R. T. system, 7 cents cash or four tickets for a quarter. Free transfers are given to intersecting surface lines and to a new line connecting Frankford and Bustleton. The latter, however, is divided into two regular fare zones, the free transfer covering only the one connecting with the elevated. The Bustleton line is covered in an article elsewhere in this issue.

As a result of the opening of the new lines, considerable rerouting was carried out, both to eliminate duplication of service and to provide the best possible service by utilizing as many lines as possible as feeders for the elevated. Some routes were discontinued, new ones were opened, and others were modified for the purposes mentioned.

This Frankford Elevated line is the first step in a rapid transit program originally laid out by A. Merritt Taylor, former Director of the Department of City Transit. On July 24, 1913, Mr. Taylor recommended the construction by the city of the line from Arch Street to Bridge Street (Frankford). Nearly two years later the City Councils appropriated $3,000,000 toward the project. The first certificate of public convenience was issued by the Public Service Commission on Aug. 14, 1915, and construction contracts were awarded immediately thereafter.

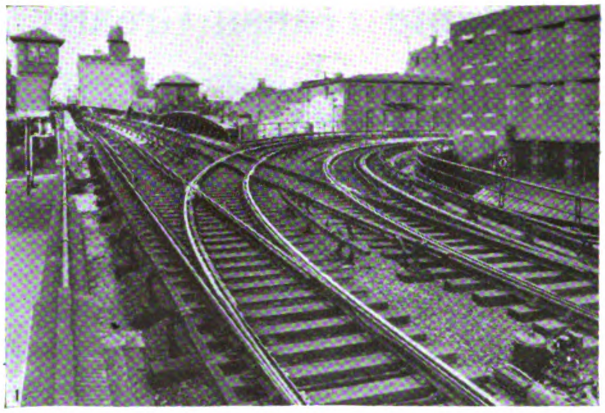
Thus, there elapsed a period of seven years between the letting of the first contract and the inauguration of service, the delay being in part ascribed to the war and in part to the difficulty experienced in negotiating an operating contract. The Department of City Transit estimated that with the experience gained on this first section the work could be duplicated in about three years, the time originally estimated.

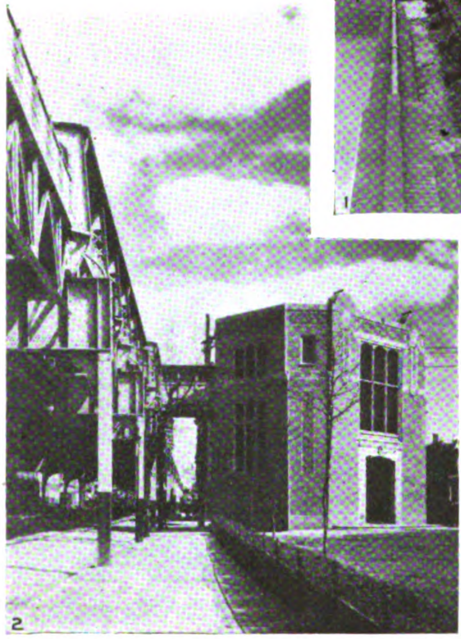
The construction of the Frankford Elevated involved the letting of 100 contracts to sixty contractors. The largest single contract for the elevated structure was for $1,453,848 to the McClintic-Marshall Company, for 22,550 lin.ft. of steel superstructure. The J. G. Brill Company was paid approximately $1,644,000 for the second lot of fifty completely equipped steel passenger cars.

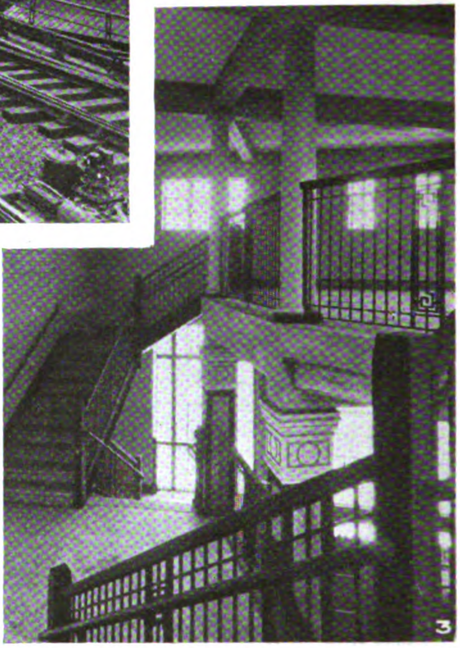
In the prosecution of the plan six city ordinances condemning property for station purposes, one striking a city street from the city plan and one authorizing an agreement with the Pennsylvania Railroad for the location of a station on the railroad property, were necessary.

Architectural Features of Frankford "L" Approved by Philadelphia Art Jury

The Superstructure and Stations Present a Finished Appearance

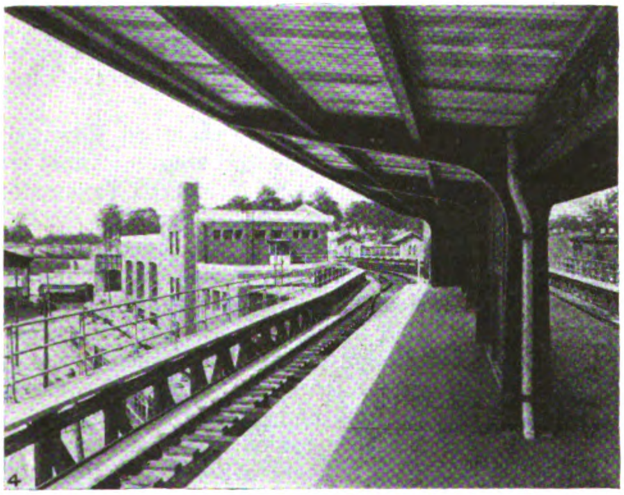


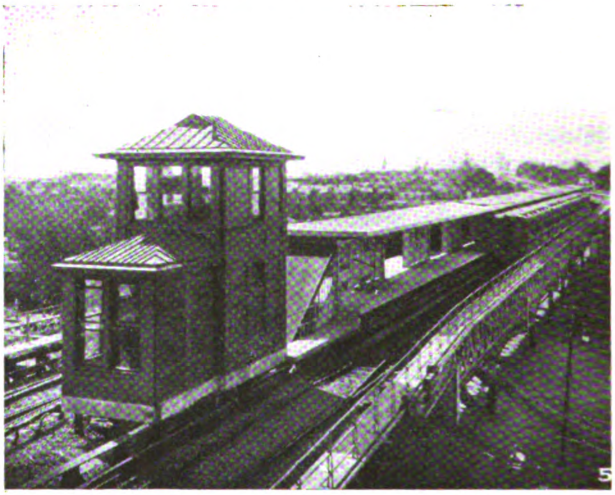


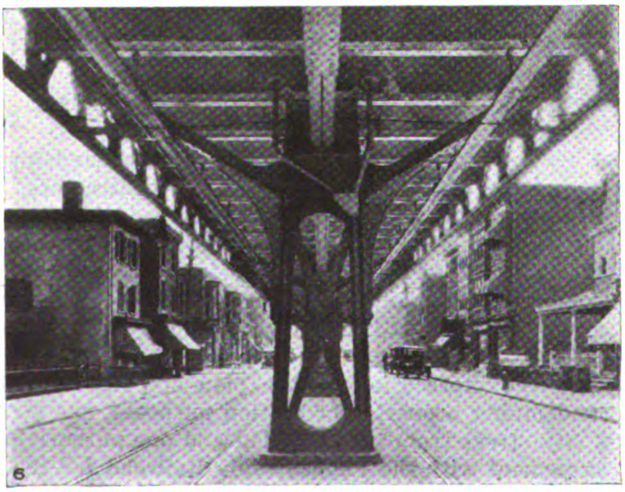


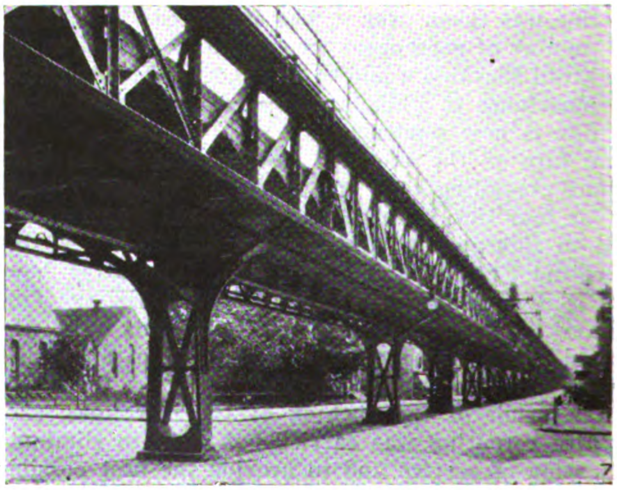
Here and There Along Frankford Elevated

1—Where Frankford Elevated Line joins P. R. T.'s Market Street Line. 2—Tioga Street Station typical of architectural design. 3—Attractive interior of Allegheny Avenue Station. 4—View from the Bridge Street Station platform. 5—Train pulling out from island platform at Bridge Street terminal. Copper-covered signal tower and remote control house in foreground. 6—Center-column type superstructure in Frankford Avenue section. 7—Longitudinal trusses have flat tension members. Concrete-slab walkway on top chord.









The actual investment in the Frankford Elevated to Oct. 1 comprised the following items, totaling $13,383,219: For construction and equipment, $10,078,211; for real estate, $529,745; for engineering and administration, $1,171,897; for legal expenses, $33,000; for interest, $1,570,366. At that date the amounts estimated as required to complete the work were: For construction and equipment, $1,900,000; for real estate, $170,000; for engineering and administration, $45,000; for interest, $40,000, totaling $2,155,000, and making the grand total for the undertaking $15,538,219.

As the total length of developed profile of the line is 6.42 miles, the cost per mile will have totaled approximately $2,420,280.

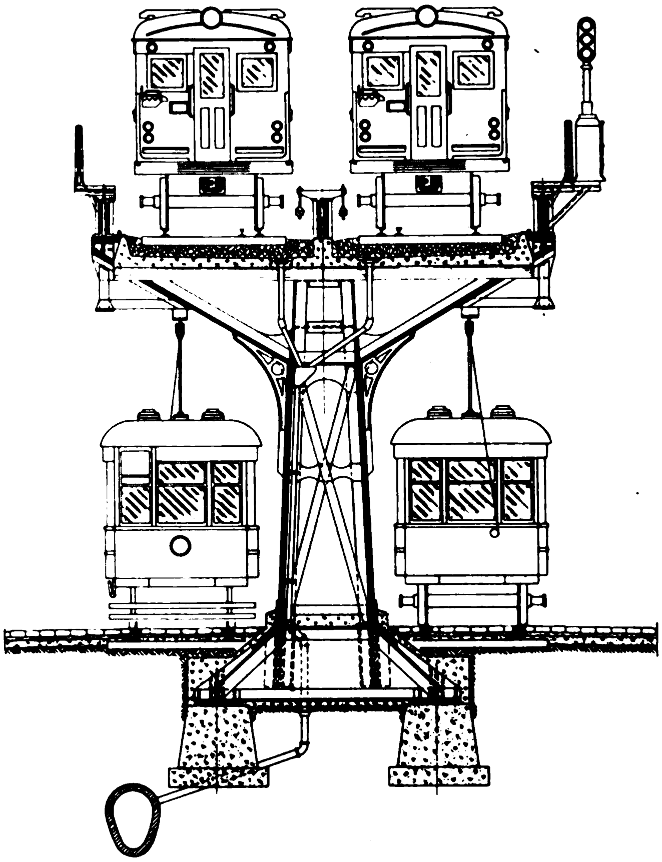
Some of the more interesting details of cost were as follows: Average cost of stations, excluding Bridge Street terminal and trainmen's building, $68,435; average cost of platforms (two to each station), $61,220; cost of land per station (two properties), $37,418; making the total cost per station $167,073. Total cost of 100 cars, approximately $3,000,000. Cost of three 4,000-kw. substations, exclusive of real estate, approximately $455,236.

The rapid-transit improvement was financed largely by city bonds, about $13,500,000, as compared with roughly $2,000,000 from general appropriations. The latest loans bore an interest rate of 5½ per cent, earlier ones being floated at 4 per cent or better.

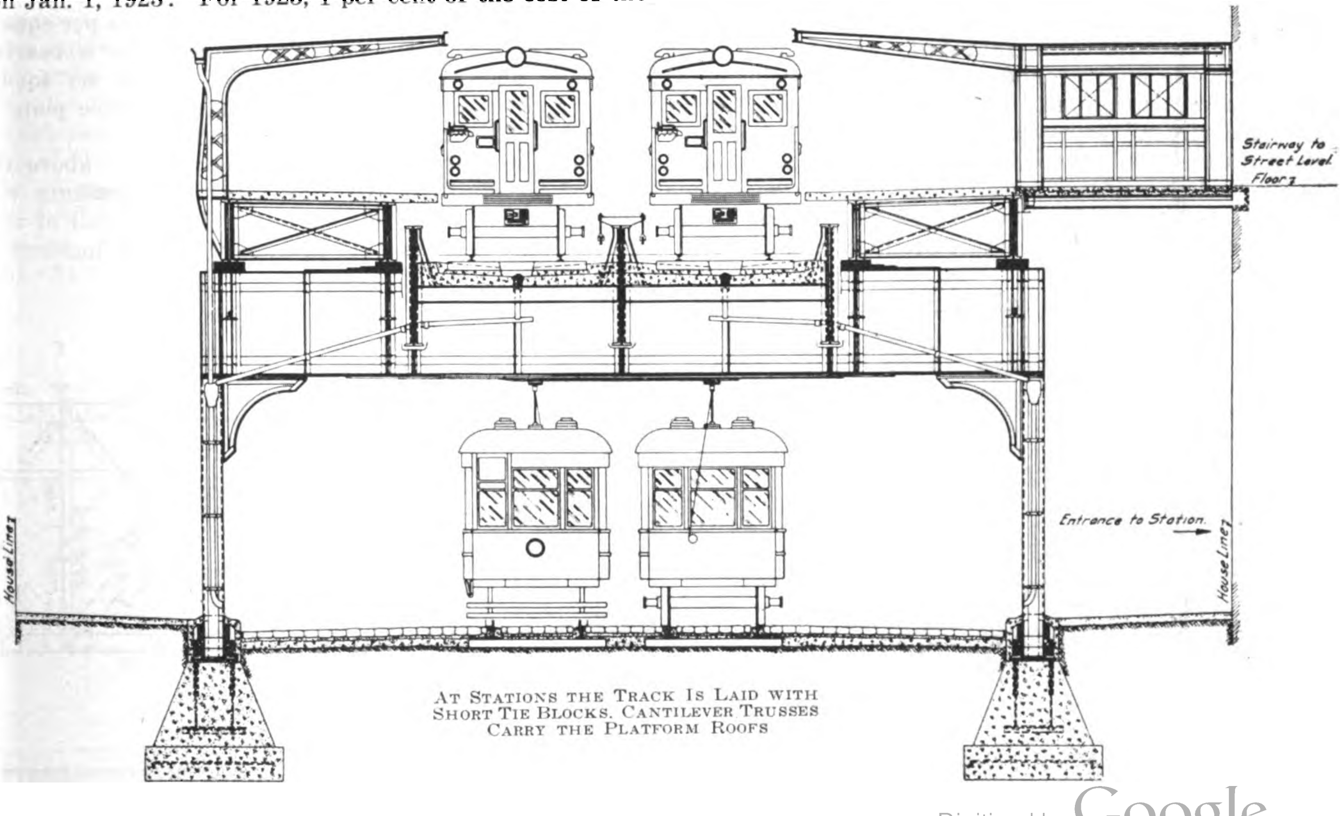
The operating contract was a source of contention between the city and the Philadelphia Rapid Transit Company for several years. The city was naturally desirous of securing a return on its investment, and, on its side, the railway company was not able to see a profit in the proposition for many years to come.

Finally a five-year lease was signed, dating from Nov. 5, 1922, with the right or option on behalf of the city to renew and extend it until July 1, 1957, by written notice given by the city not later than May 5, 1927. The lease specifies the fare privileges already mentioned and provides for the following rentals to begin to accrue on Jan. 1, 1923: For 1923, 1 per cent of the cost of the Frankford Elevated Railroad; for 1924, 2 per cent; for 1925, 3 per cent; for 1926, 4 per cent, and for 1927, 5 per cent. Thereafter, if the lease should be extended, 5 per cent per annum will be paid, rental payable quarterly.

In general, the Frankford Elevated structure rests on a row of concrete column piers set on the curb line of



THE CENTER-COLUMN SUPERSTRUCTURE IN FRANKFORD AVENUE RESTS UPON CONCRETE PIERS PLACED DIRECTLY BELOW THE TRACK CENTER LINES



AT STATIONS THE TRACK IS LAID WITH SHORT TIE BLOCKS. CANTILEVER TRUSSES CARRY THE PLATFORM ROOFS each sidewalk. On these are steel columns, each pair carrying a cross girder, usually of the plate type. Three longitudinal lines of trusses supported from these transverse girders carry the I-section floor beams.

Between the floor beams are sprung concrete jack arches, filled in over the tops of the beams to form a continuous floor from bent to bent. A guard or curb of concrete extends above the floor on each side to retain the ballast. Along each side, also, is a concrete slab walkway supported on top of the longitudinal truss.

On the floor, which was mopped with coal tar, the double track is laid, part of it on broken stone ballast and part with the ties set in concrete.

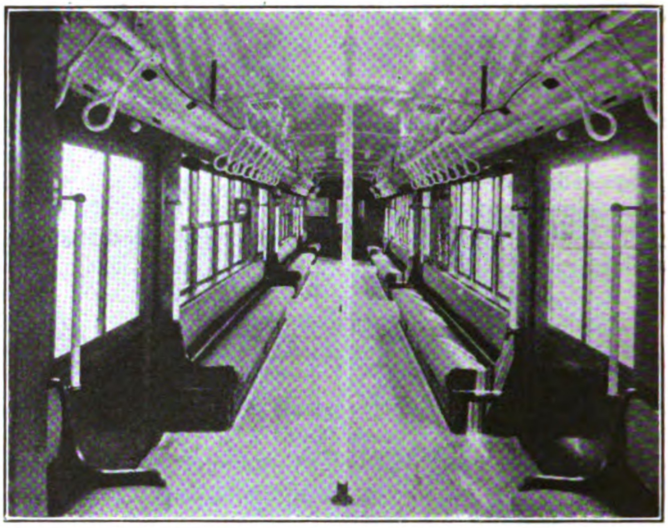
Twelve passenger stations are distributed over the line, thus averaging a ½-mile spacing. Each comprises a platform to accommodate six-car trains, or about 350 ft. in length, with an entrance-exit building set alongside but off the street area and connected with the platform by a covered passageway.

At the Frankford end of the line is a larger station building containing the offices of the operating staff, besides a recreation room, a locker room and toilet accommodations for the trainmen. At this point also is a storage yard with a commodius car inspection shop. There are a number of graceful signal towers and remote-control switch houses along the line. These are covered with 16-oz. sheet copper to insure durability.

Power is supplied to the elevated line from three manually operated substations, each of 4,000 kw. capacity. These receive power from the supply system of the Philadelphia Electric Company at 13,000 volts, 60 cycles, through duplicate and separately fed cables.

Each cable is of the three-conductor type, 350,000 circ.mils in area, and installed in an underground conduit. The substations contain each two six-phase rotary converters. Two contain six 700-kw., single-phase, air-cooled transformers and standard switchboard and auxiliary equipment, and one contains seven transformers and equipment. A 20-ton crane is provided in each substation for handling the apparatus.

The feeder conductors, leading from the substation to the conductor rail, are mostly laid under the sidewalk in 3½-in.-bore terra cotta duct. Iron-pipe conduits lead from the underground conduits up the columns of the superstructure to the conductor rail. Twenty 2,000,000-circ.mil paper-insulated cables lead from the substations to outlet manholes, where they are spliced to the rubber-insulated cables used in the risers. Some cable of the same size is also used to supplement the carrying capacity of the contact or third rail.



THE CAR INTERIOR IS WELL DESIGNED FOR HANDLING RUSH-HOUR CROWDS

No return cables are used to supplement the carrying capacity of the track rails, of which but one is used for the return circuit, the other being used for signaling purposes. The return rail is bonded to the structure which forms the main return.

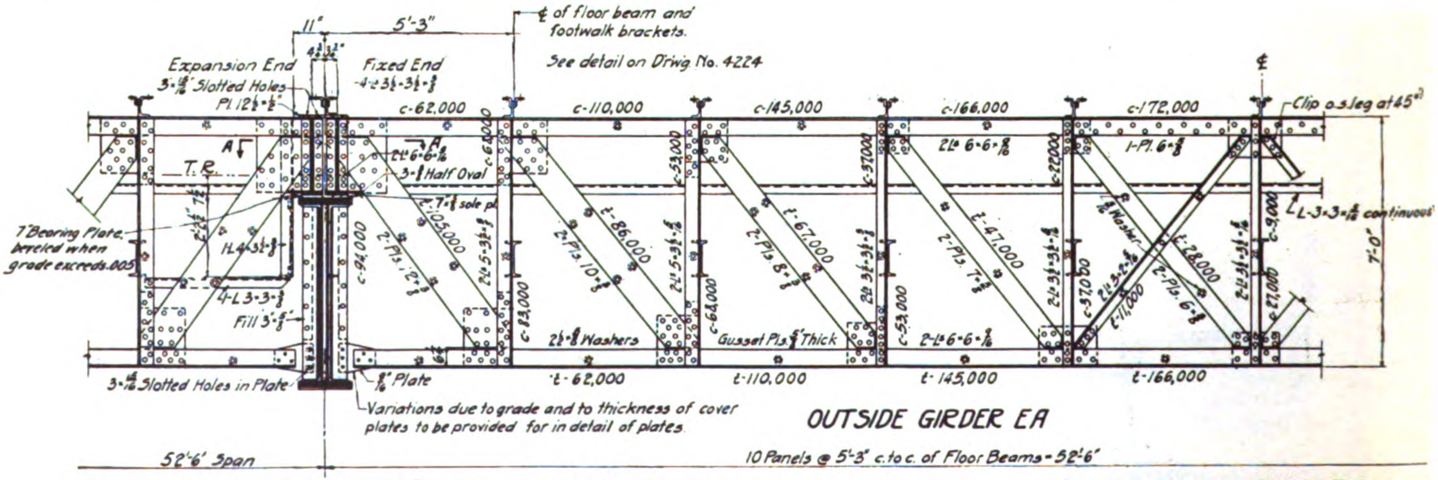
SUPERSTRUCTURE EMBODIES SEVERAL NOVEL FEATURES

In the foregoing paragraphs the general character of the elevated structure was explained. Some features of the design may be profitably examined in more detail, as they are either new or unusual.

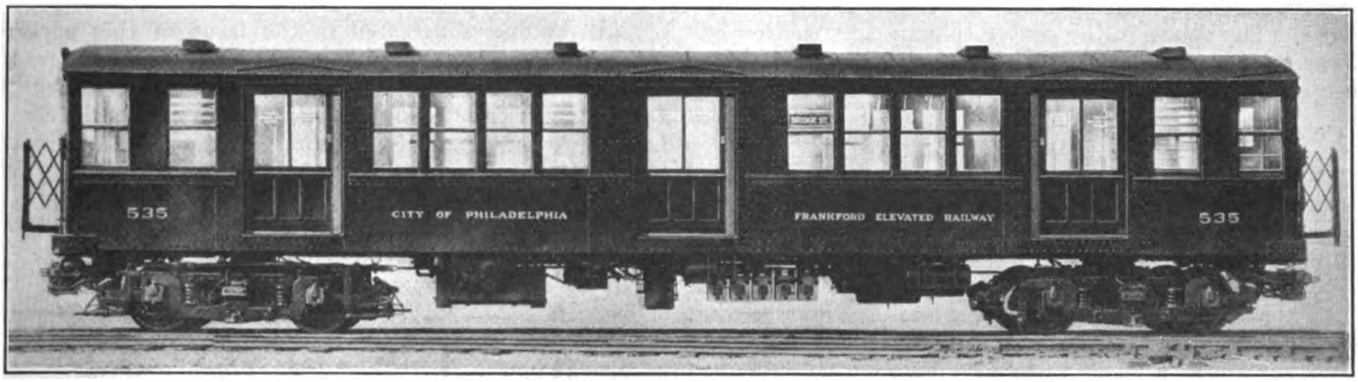
The columns are in general formed of Bethlehem H and channel sections, with plates added where loads to be carried required larger sections. The bases are formed of sole plates attached to the column shaft by gusset plates and stiffened with angles.

The columns are anchored by four 1⅜-in. bolts to concrete piers, made with a pyramidal top. This pier was designed to load the soil to about 3½ tons per square foot. The top of the pier was designed for a bearing pressure under the column space of 500 lb. per square inch, and the minimum distance from the sole plate to the edge of the concrete was fixed at 6 in.

The base plates were set from ½ to 1 in. above the top of the finished pier, and after the structure was leveled and aligned, this space was tamped full of stiff cement mortar. The entire base was then inclosed in


11"
5'-3"
℄ of floor beam and footwalk brackets.
See detail on Drwg No. 4224
Expansion End
3-13/16" Slotted Holes
Pl. 12½-½"
Fixed End
-4-∠3½-3½-⅜
c-62,000
c-110,000
c-145,000
c-166,000
c-172,000
℄
Clip o.s.leg at 45°
A
T.R.
2L 6-6-7/16
3-⅜ Half Oval
7-⅞ sole pl
7" Bearing Plate beveled when grade exceeds .005
H.4-3½-⅜
4-L3-3-⅜
Fill 3-⅝"
c-94,000
2-Pls 12-⅜
t-105,000
c-64,000
c-83,000
2½-⅞ Washers
2-Pls 10-⅞
t-86,000
c-53,000
c-64,000
2-Pls 8-⅞
t-67,000
Gusset Pls ⅝" Thick
c-37,000
2L 6-6-7/16
2-L 6-6-7/16
2-Pls 7-⅞
t-47,000
c-53,000
c-22,000
1-Pl. 6-⅜
⅞ Washer
c-37,000
t-11,000
t-28,000
2-Pls 6-⅞
c-9,000
c-27,000
L-3-3-7/16 continuous
7'-0"
3-13/16 Slotted Holes in Plate
⅝" Plate
Variations due to grade and to thickness of cover plates to be provided for in detail of plates.
t-62,000
t-110,000
t-145,000
t-166,000
OUTSIDE GIRDER EA
52'-6" Span
10 Panels @ 5'-3" c. to c. of Floor Beams - 52'-6"

THE USE OF FLATS FOR DIAGONAL TENSION MEMBERS FACILITATES DESIGN AND FABRICATION. THIS DRAWING SHOWS DETAILS OF



THE CAR-DOOR ARRANGEMENT PROVIDES FOR QUICK PASSENGER INTERCHANGE

concrete, which on its top formed the sidewalk surface, and the edge next to the cartway was reinforced with a steel binding that formed the curb.

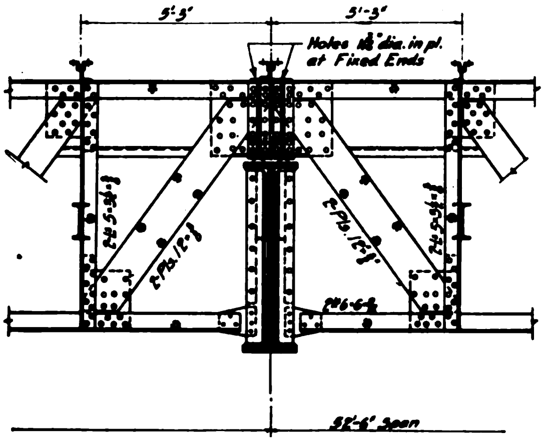
The columns were filled with concrete, to prevent accumulation of dirt and secure some additional strength from the filling. This also improves their appearance.

On Frankford Avenue, through which the elevated line runs in Frankford, objection was raised to the placing of the columns on the sidewalks on account of the narrowness of the street. A special type of column was therefore designed for this location, having the form shown in an accompanying cross-section of the structure. The column has a single shaft located in the center of the street and supported below the street surface by plate girders, which in turn rest on concrete piers spaced 12 ft. between centers. This brings the line of action of the force due to the weight of the train directly through the center of the foundation.

The outside trusses in this construction are supported by means of diagonal braces, stiffened with curved brackets, of cast iron. These also render the structure more graceful.

TRANSVERSE GIRDERS HAVE SLOPED ENDS

The transverse girders, mentioned previously as being of the plate girder type, have their ends sloped down to a height of 16 in. over the columns. This construction gives the girders a finished appearance, but involves reinforcement on both sides of the web plate to provide resistance against shear. The girder is seated on the top of the column and attached to it by rivets through the column cap and by a tie plate extending up from the back of the column and riveted to the end of the girder. Where the clear height of the structure is less than 21 ft. transverse stiffness is secured by knee braces of plates and angles. Over that height stiffness is secured by angle struts and ties. At stations the top chord of the transverse girder is carried parallel to the bottom chord for its full length and furnishes support for the platform girders.



THE EXPANSION JOINTS AND SOME OF THE DESIGN DATA

FLATS FOR DIAGONALS IN LONGITUDINAL TRUSSES

The longitudinal girders are in general 7 ft. deep and of the half-through Pratt type. They are of especial interest in view of the use of flats for the diagonals, except counters, the width of the flats being selected in accordance with the tension in the member. The chords are of plates and angles, and angles are used for the verticals and end stiffeners.

The floor is carried by Bethlehem beams riveted to the truss verticals, which are 5 ft. 3 in. apart. The top chord of the trusses is held by knee braces of angles attached to the top of each floor beam. Lateral stiffness against wind and centrifugal forces is obtained by the use of a continuous angle member riveted to the top of the floor beam adjacent to the outside girders.

The longitudinal girders rest on half oval bars attached to the top chord of the transverse girders. This facilitates adjustment of the structure to variations in grade and elevation. Each girder bearing is fastened to the transverse girder by two rivets and the bottom chord of the longitudinal girder is attached to the stiffener angle of the transverse girders. The ends of the longitudinal girders do not meet; this allows ends to be made normal to the chords and simplifies fabrication. The top chords of adjoining girders are fastened together by light plates. At crossovers the center girder is a plate girder and is depressed to allow the track to pass over it.

The designers of the structure provided for contraction and expansion by placing an expansion joint at the end of every fourth span, or at about 200-ft. intervals on tangents. This joint is shown in the elevation of the girder reproduced. On curves the expansion joints are located at the ends of the curves. The movement is taken up by allowing one end of the longitudinal girder to slide on its seat on the top of the transverse girder. The girders are held in position by bolts working in slotted holes.

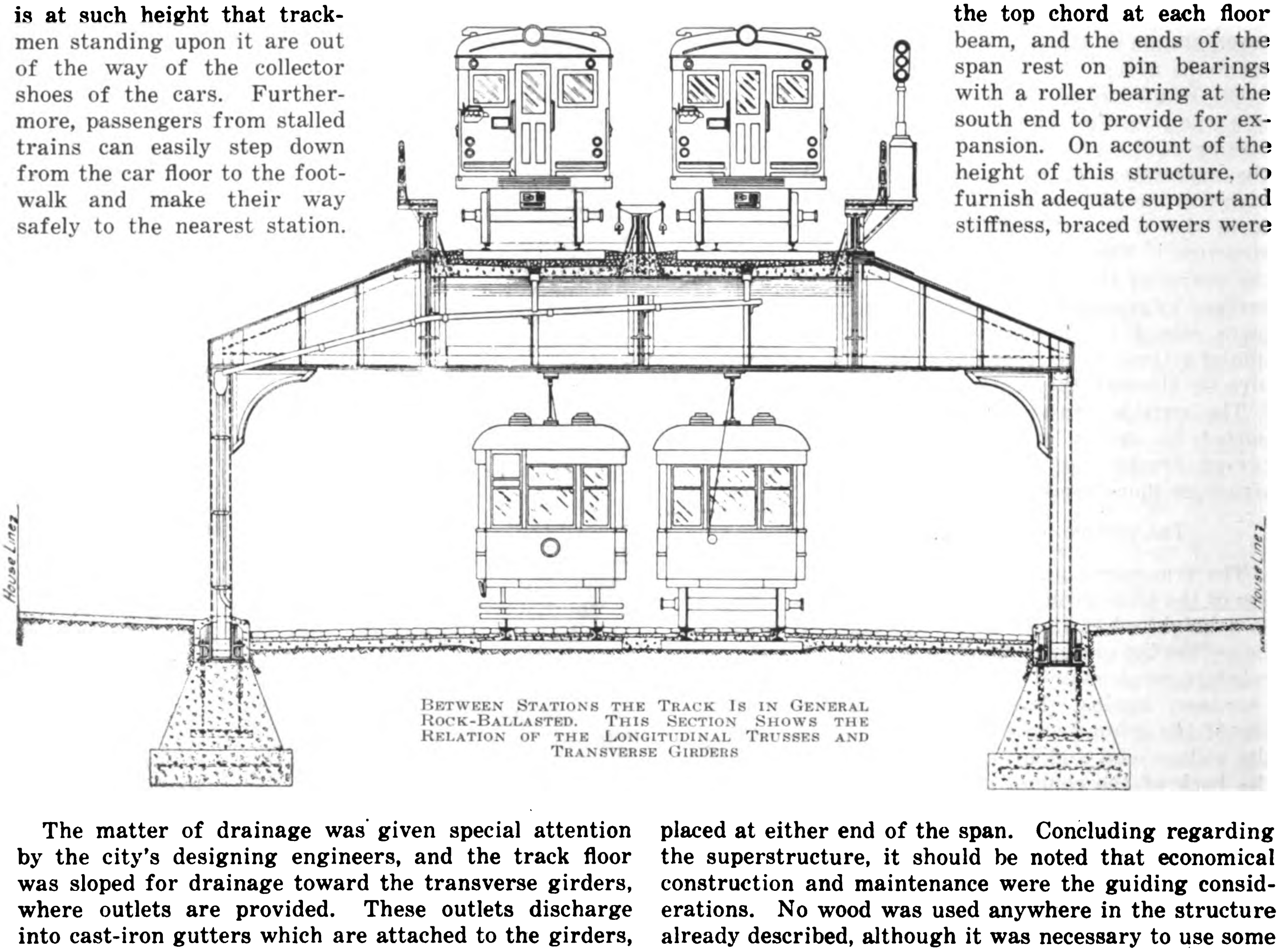
In connection with the statement regarding the use of flats for tension members in the trusses, it may be said that they were used on account of the economical distribution of steel which they made possible and for the facility with which joints can be made with this shape.

The span of the longitudinal girders varies by increments of 5 ft. 3 in. from 31 ft. 6 in. to 73 ft. 6 in., the length being determined by the local condition in each block. The spans in the center column construction on Frankford Avenue average about 42 ft., measured from center to center of columns.

CONCRETE JACK ARCH PROVIDES SUBSTANTIAL FLOOR

The provision of a track floor through the use of jack arches results in a substantial support for the track because the arches distribute the load from floor beam to floor beam, between transverse girders. This brings a number of floor beams into action for each point of load application. For this reason, and also because the jack arch uses concrete with greatest economy, the construction as a whole is an economical one.

An attractive feature of the superstructure, already referred to, is the reinforced concrete footwalk on each side. The slabs, of which the walkway is composed, are bolted in place. The walkways are provided with galvanized pipe railing, and the level of the walkway is at such height that trackmen standing upon it are out of the way of the collector shoes of the cars. Furthermore, passengers from stalled trains can easily step down from the car floor to the footwalk and make their way safely to the nearest station.



BETWEEN STATIONS THE TRACK IS IN GENERAL ROCK-BALLASTED. THIS SECTION SHOWS THE RELATION OF THE LONGITUDINAL TRUSSES AND TRANSVERSE GIRDERS

The matter of drainage was given special attention by the city's designing engineers, and the track floor was sloped for drainage toward the transverse girders, where outlets are provided. These outlets discharge into cast-iron gutters which are attached to the girders, and these in turn discharge through down spouts to the street gutter. An exception is made in the case of the Frankford Avenue center-column construction, where the drainage is into the sewer.

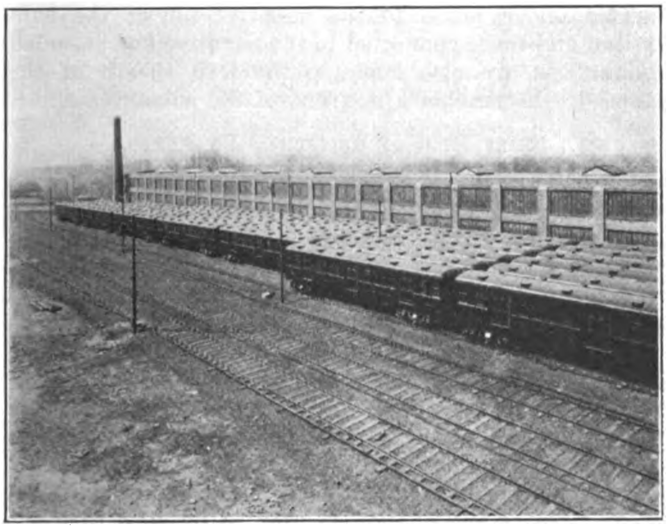
A question may be raised at this point as to why the superstructure was provided with the continuous concrete floor. The first reason was that City Councils required that a tight floor be provided. The construction above described was selected as the most economical and permanent for the purpose.

While the spans provided by the trusses already mentioned were in general sufficient for street crossings, there were several cases which involved special structures. An excellent illustration was the steel arch over Lehigh Avenue, illustrated in the issue of this paper for Nov. 11, page 792. A span of 112 ft. 6 in. was necessary at this point, due to the width of the street and to the fact that double car tracks curved north from Lehigh Avenue into Kensington Avenue at this street intersection. In addition the structure here had to be unusually high.

Where the structure crosses the tracks of the Richmond branch of the Philadelphia & Reading Railway north of Lehigh Avenue and those of the connecting railway of the Pennsylvania Railroad System at Pacific Street, spans of 196 ft. and 143 ft. respectively were required. Through trusses of the Pratt type were used for the P. & R. crossing and pony trusses of the Pratt type, with inclined end posts and parallel chords, were used for the Pennsylvania crossing. In the latter case Bethlehem beams 24 in. deep span the space between trusses to carry the track floor. Knee braces support the top chord at each floor beam, and the ends of the span rest on pin bearings with a roller bearing at the south end to provide for expansion. On account of the height of this structure, to furnish adequate support and stiffness, braced towers were placed at either end of the span. Concluding regarding the superstructure, it should be noted that economical construction and maintenance were the guiding considerations. No wood was used anywhere in the structure already described, although it was necessary to use some slag-covered wood roof on station platforms due to inability to obtain the asbestos roofing desired.

Special attention was given to the painting, paints of the city's own formulas being employed. Tops of girders especially exposed to rust were coated with coal tar as well as painted with pigments and oils in which the engineers had thorough confidence. As already suggested, drainage was a prime consideration.

A large part of the track on the Frankford Elevated is of the rock-ballasted type, with 90-lb. A.S.C.E. rail attached to the ties by means of screw spikes and cast-iron clips. The ties are heart grade longleaf yellow pine impregnated with 10 lb. of creosote oil per cubic foot.



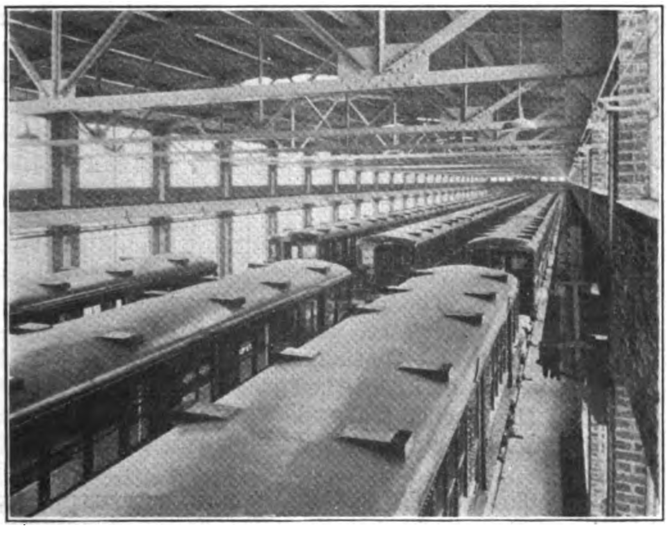
THE STORAGE YARD AT FRANKFORD HAS CAPACITY FOR ALL OF THE ROLLING STOCK OF THE FRANKFORD ELEVATED

A part of the track, that between Arch Street and Girard Avenue, as well as the track in front of stations, was laid with tie blocks, beveled on the side and imbedded in concrete. These blocks are not bolted in place, but to hold the gage every third and sixth tie alternately was made a cross-tie. Between the rows of tie blocks a deep gutter leads to the drain.

Dowel stones set in the top surface of the concrete deck provide against movement of the concrete support of the tie blocks.

A continuous T-rail guard was placed along the inner rail to prevent derailed trains from striking the outside line of track girders. Working and emergency guard rails were provided at curves and special trackwork. The emergency and working guard rails are of 90-lb. A.R.A. section, type A, and the continuous guard rail and the rail used in the yard for sidings are of a 67-lb. relayer rail of a type rolled for the Russian government. Special trackwork is of 90-lb. A.S.C.E. rail, with manganese inserts, and continuous rail joints were used on the running rail except at points where the working guard rail is used and at the insulated joints required for the operation of the signal system. The joint plates are of the 4-bolt type, attached by buttonhead track bolts with spring lock washers under the nuts.

The track grade at stations is ½ per cent, with a maximum of 3 per cent between. At the south end the grade of the connection to the tracks of the Market Street subway is 4.6 per cent.



THE INSPECTION SHOP IS CAPACIOUS AND WELL LIGHTED

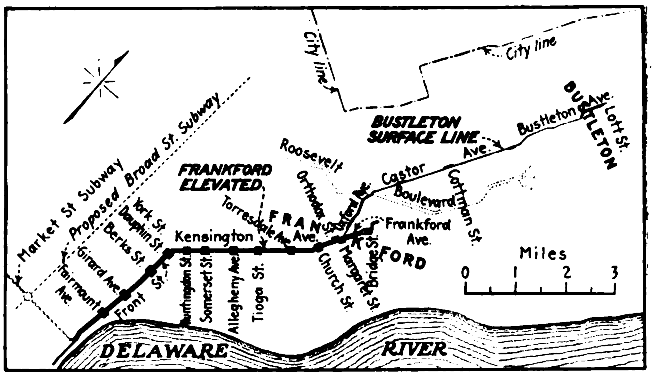
AN UNUSUAL TYPE OF PASSENGER STATION

An important feature of the design of the new elevated line is the use of stations off the street and of pleasing architectural appearance. With one exception these are placed on street corners and they all contain stairways, toilet facilities and space for the sale of tickets and handling of traffic. The plans for the buildings were approved by the Art Jury of Philadelphia. The typical station illustrations give an idea of the appearance of all, although they are by no means alike.

The station platforms are of reinforced concrete, supported on lattice trusses of the Warren type. Construction joints are placed in the slabs over each transverse girder to prevent cracking.

The platforms are 12 ft. wide for some distance on either side of the covered passageway leading to the station and then narrow down to 10 ft. at the end. Provision has been made for future construction of 8-ft. wide platform extensions to accommodate ten-car trains, 550 ft. long.

The roofs, either of wood and slag or asbestos board, are supported on steel framework carried by steel posts with cantilever arms. These posts are attached to the outside platform girders with crossframes between the girders to resist the overturning moment.



THIS MAP SHOWS THE ROUTE OF THE FRANKFORD "L" AND ITS RELATION TO THE MARKET STREET LINE, THE PROPOSED BROAD STREET SUBWAY AND THE NEWLY BUILT BUSTLETON SURFACE LINE, ALSO CITY-OWNED

The platforms are inclosed by a steel-plate railing with cast-iron posts attached to the top flange of the supporting girders, except at one point where a reinforced-concrete railing was used with good effect. The space between top of railing and latticed struts under the roof is closed with wire-glazed steel sash.

PROVISION FOR STORAGE AND INSPECTION

In view of the expected operation of the new line by the P.R.T. no provision was made for maintenance shops. However, at the Frankford end a large yard was provided where the cars can be stored when out of service, inspected, cleaned and repaired, or where trains can be made up.

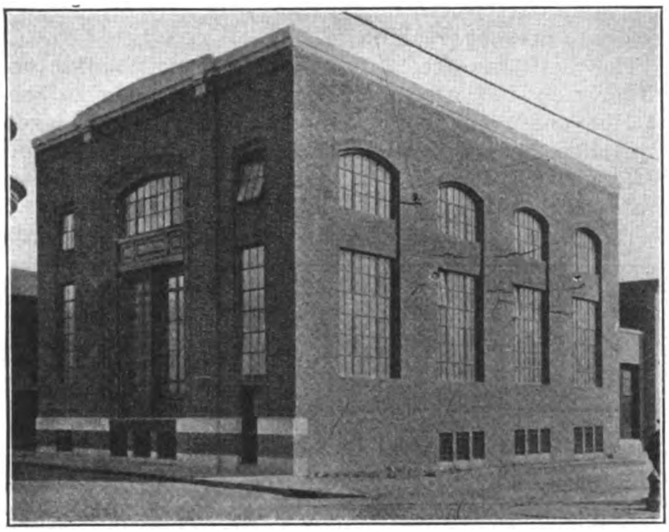
At this point an inspection building was constructed along Penn Street, 435 ft. long and 51 ft. wide. It contains three tracks, of seven cars capacity each, with a pit under each track extending the length of the shop. Space is provided in the building for offices, an oil room, a tool room and a small shop with tools and benches where minor repairs can be made.

Two electrically operated traveling cranes, each of 10 tons capacity, serve the entire length of the building. Provision for heating the building is made by a forced circulation system, in which the air warmed by passing over steam coils is distributed through ducts by motor-operated fans.

The building connects with two sets of ladder track, by means of which cars can be readily shifted from shop to yard and vice versa.

CONTACT RAIL IS OF UNDER-RUNNING TYPE

The conductor rail is of the under-running, double-head-section type, weighing 70 lb. per yard. Creosoted wood beams, spaced about 11 ft. apart on the top flange of the center girder, are used to support the conductor rail, which is suspended from the beams by steel hangers and porcelain insulators. At crossovers, curves and in the yard the rail is hung on special brackets of cast iron fastened to long ties.



SUBSTATION ARCHITECTURE IS SIMPLE BUT DIGNIFIED

The conductor rail is divided into three feeder sections, and each section, in turn, is divided into lengths of about 1,000 ft. with 3-ft. gaps to allow for expansion.

The joints in the conductor rail are bonded with two 500,000-circ.mil stranded copper compression bonds, and feed connections, expansion gaps, offsets and gaps at crossovers or special trackwork are bridged with 1,500,000-circ.mil rubber-insulated lead-covered cable attached to the rail by three compression bonds. Feed cable connections are made in the same manner.

At the gaps between the feeder sections pneumatically operated circuit breakers are placed, by means of which the current can be fed to any section of rail from the adjoining rail section in case of failure of any of the feed cables. These circuit breakers are operated electrically from the substation nearest the gaps. In normal operation each section is fed independently, but under peak load, with all of the breakers closed, the current can flow freely to the point where the demand is greatest.

One rail of each track and the top flange angles of the three lines of longitudinal girders are bonded with copper bonds having gas-welded terminals. One No. 0000 bond was used on each rail joint and two 500,000-circ.mil bonds were used for each connection on the girders. Adjacent to each substation six 2,000,000-circ.mil standard copper, weatherproof cables were attached to the structure by gas-welded bonds and were carried underground to the negative pit of the substation and there connected to the negative bus. Ground connections are also made to the lead sheath of the cables in the manholes in front of the substations.

BRIEF RÉSUMÉ OF OTHER FEATURES

In this article no attempt has been made to cover the Frankford Elevated line in detail, attention being given mainly to the structural features of the track-supporting structure, with an attempt to show the relation of the new line to the general transportation system, present and prospective, of Philadelphia.

Two articles regarding the cars have appeared in previous issues of this paper, namely, those for Dec. 17, 1921, page 1063, and for April 22, 1922, page 676. An early article will deal with the signal system. The cars are 55 ft. long, 8 ft. 10 in. wide, and 12 ft. 1 in. high from top of rail to top of roof. They are built of steel plates and shapes, reinforced by steel forgings and castings. Each car has eight doors (six side doors and two end doors) and fourteen windows. It seats fifty-one passengers and can comfortably carry 175. Each car is driven by two motors mounted on one truck, each motor being rated at 125 hp. at 600 volts. Helical cut gears of heat-treated forged steel are used in the interest of quietness.

The block signal system was installed by the Union Switch & Signal Company. The signal and interlocking system is controlled electrically and operated by compressed-air mechanism. Typical signal views are given in the illustrations, and in an article to follow the signaling problem as visualized and solved here will be covered in some detail.

Mention was made at the beginning of this article that the Frankford Elevated project was inaugurated by Mr. Taylor. It was carried out, as described, by his successor, William S. Twining. Mr. Twining was assisted by George T. Atkinson, who has the title Assistant Director of the Department of City Transit; Henry H. Quimby, chief engineer, and a large technical staff.

P. R. T. Gets City-Owned Surface Line Free for Five Years

SIMULTANEOUSLY with the turning over by the city of Philadelphia of the Frankford Elevated line to the Philadelphia Rapid Transit Company for operation, the city also leased to the P. R. T. a new 6-mile surface line, connecting Frankford and Bustleton. This comprises double track in the terminal towns and single track with turnouts between. This line was built and equipped, ready for operation, with five standard Birney cars, made by the J. G. Brill Company, and it was leased without payment of rental for a period of five years in order to help in developing a promising residential part of the city.

In the well-settled parts of Frankford and Bustleton, permanent track with 9-in. girder rail and granite block paving was laid. The balance of the road, being largely in undeveloped territory, was constructed less permanently, although substantially. Here the track is laid with 80-lb. T-rail, in crushed slag ballast. A signal system of the Nachod C-D type was installed to control the operation of cars on the single-track sections of the line.

A snow plow and 175 sections of snow fence, each 8 ft. long, were also provided as equipment for snow fighting, which is made necessary by the exposed location of this line.

The original appropriation for the Bustleton surface line by the City Councils was $1,200,000, which was intended to pay for a 10-mile double-track line. Later studies made by the Department of City Transit showed that this sum would not be sufficient for the purpose intended. The plan was therefore modified as stated above, so that the actual expenditures to Oct. 15, 1922, amounted to slightly more than $567,000, with a few contract payments still to be made.

The Crisis of the German Transporting Business

By Dr. Leopold Lion
Berlin, Germany

THE great fall in German exchange has not been without its effects on German electric railways. The decrease in the value of the mark has increased the price of all necessities of life without giving to the great majority of the public correspondingly increased buying power.

The crisis of the German railway companies is shown clearly by the fact that during the last few months twenty out of 218 existing electric tramways, or about 10 per cent, had to close down entirely and discharge their employees, and that all the other companies had to make cuts in their service of from 20 to 30 per cent. A recent compilation shows that there were tramways in 218 towns in Germany and that their length, added to that of the rapid transit city lines, was about 3,500 miles. The expenses of these systems up to Aug. 22 had increased (in marks) to about 124 times those of 1914; on Oct. 1 they were 270 times as much, and by the end of October they were about 500 times the amounts spent in peace-time. Specifically, rails are 800 times and ties 1,000 times as dear as during 1914. Meanwhile the tramway fares have been increased about 175 or 200 times the amount of 1914. Thus in Berlin, where the fare paid in 1914 was 10 pfennigs, it is now 20 marks or 200 times as much. The depreciation of the money, however, is 1,000 times, so that a fare of 20 marks does not cover the expenses. But even this price apparently exceeds the buying power of the public and in consequence in Berlin the number of passengers has greatly decreased. All this shows that the railway companies are not able to raise their fares in strict conformity with their expenses, the public not being able to pay the higher fares. The result is that while travel on railways and tramways is almost prohibitively costly for Germans, foreigners from countries with a better exchange can make trips de luxe for ridiculous amounts. Thus the trip from Berlin to Cologne, 360 miles and ten hours, costs by express second class (there still exist a third and a fourth class) but 650 marks or about 15 cents! From Berlin to Munich (410 miles) the second-class fare is 736 marks or not quite 20 cents, whereas the fare before the war was 20 marks gold or about $5. Even the doubling and tripling of the fares decided upon for Nov. 1 and Dec. 1 will be insufficient to cover the expenses of the railway departments. But if higher fares were charged there would be a complete stoppage of traffic, as the population would be unable to pay.

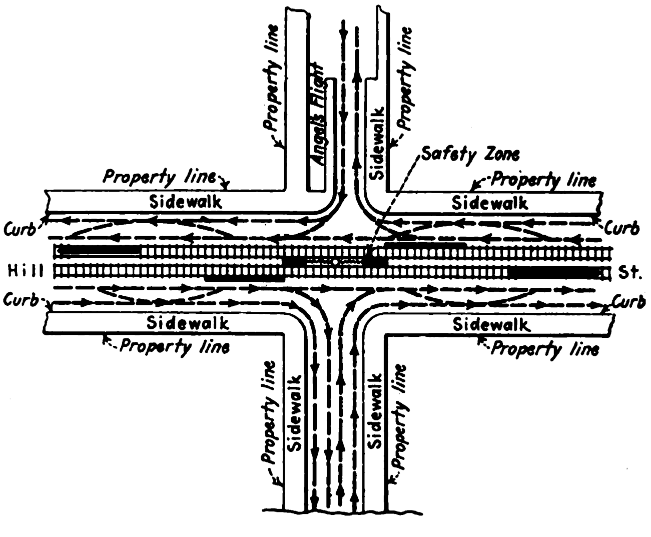
This crisis in the affairs of the transportation companies led to the holding of an extraordinary general meeting in Berlin on Oct. 20 of the Verein Deutscher Strassenbahnen, Kleinbahnen und Privateisenbahnen E. V., the German street and interurban railway association. The president, Dr. Wussow, formerly managing director of the Berlin Tramways, declared that the condition of the properties has been brought about by nothing but the economic condition of Germany and could be relieved only by (1) a reduction of the national reparations to the extent of possible fulfillment and (2) a considerable increase in home production. Neither of these two conditions having been fulfilled during the last months, the depreciation of the German mark must proceed. This means that tramways and interurban lines having disastrously low fares and high expenses must soon close down. One reason that they are unable to increase their fares to accord with their expenses is because they have to meet in many places the low fares charged by the government railroads and postal department buses. A resolution was passed asking that this competition be withdrawn and that the railways be relieved of the requirement to keep unprofitable branches in operation.

Los Angeles Relieves Traffic Congestion

FOR the purpose of determining the effectiveness of one-way vehicular traffic, as well as to relieve congestion at Third and Hill Streets in Los Angeles, Calif., a trial test of one-way traffic was recently made by the Los Angeles Traffic Commission.

The car tracks on Hill Street are jointly used by the Pacific Electric and the Los Angeles railway. There is an average headway of one car every thirty seconds during the daytime. This street intersection has long been considered as one of the most congested in the city and many efforts have been made to relieve it.

Under the new scheme east and westbound traffic across Third on Hill Street will be entirely eliminated from 7 a.m. to 7 p.m. Traffic emerging from the Second Street highway tunnel will necessarily be deflected by a right-hand turn south on Hill Street to Third Street, where entrance to the tunnel will be gained by a right-hand turn. A continuous flow of traffic will result. Further relief will come from the fact that the crossings at Broadway, Spring and Third Streets will be relieved of a large portion of the present east and westbound traffic.



Traffic System at Third and Hill Streets, Los Angeles.

Traffic on Second and Fourth Streets will be increased directly in proportion to the volume of traffic shifted from Third Street. However, each of these streets will only receive half of that now using Third Street. The use of Fourth Street for traffic bound east of Main Street will be better for the autoist, as an awkward turn at Third and Main Streets will be eliminated. The city is now constructing a tunnel from Hill Street westerly known as the Second Street tunnel. This will be used for both highway and street car service and will assist conditions, but as this tunnel will not be in service for more than a year it is necessary to relieve present conditions.

Special traffic officers will be placed at Third and Hill Streets to care for the movement and safety of pedestrian traffic. In the center of Hill Street, running parallel with the car tracks, a chain barrier will be placed with signs on either side reading "Turn to Right."

Electrification of Stave Lake Railway

THE Stave Lake Railway, a steam line 6 miles in length, running from Ruskin, B. C., a point on the main line of the Canadian Pacific Railway 31 miles east of Vancouver, to Stave Falls, is now being electrified by the British Columbia Electric Railway Company, Ltd., according to information supplied by W. G. Murrin, assistant general manager British Columbia Electric Railway, Vancouver, B.C.

This short line of railway was taken over by the electric company in April, 1921, when it assumed control of the Western Canada Power Company and its operations. The line was originally constructed by the power company to care for the transportation of supplies and material for construction of its power plant at Stave Falls, as well as for the carriage of forest products from this territory to Ruskin, which forest products previous to the construction of the power plant were floated down the Stave River into the Fraser River at Ruskin.

A 600-kw. motor-generator set is being installed at Stave Falls and will supply direct current to the trolley feeder at 500 volts. The cost of the work will be in the neighborhood of $60,000.

The object of making this expenditure at this time is to reduce the high operating and maintenance costs of running two 42-ton Shay steam locomotives, by substituting therefor one 46-ton Westinghouse locomotive which can be spared from existing interurban equipment of the electric railway company. The principal economies which will result are the following:

1. Saving of coal purchases, $12,000.
2. Saving of crews' time watering and coaling locomotives, $1,600.
3. Greater speed and power from electric locomotive over gradients reaching 5½ per cent.
4. Maintenance costs of electric locomotive are decidedly lower than steam locomotives.

Another new feature introduced on this short line of railway since it was taken over by the British Columbia Electric Railway Company is the equipping of a General Motors Company gasoline-propelled motor truck with standard railway wheels and car couplers front and rear end. This vehicle, operated by one man during the greater portion of the year, cares for the passenger, mail and express service of the line, and handles all the less-than-carload freight shipments. In addition it also performs certain switching operations along the line. It will continue to be operated, after electrification is complete, for the same service it is now performing, on account of the economy due to operation by one man.

Eastern Massachusetts Condition Improving

Extensive Betterment of Track, New Light-Weight Double-Truck Cars, a Pension System and Insurance Are Some of the Features

ARTHUR G. WADLEIGH, chairman of public trustees, Eastern Massachusetts Street Railway, has announced that the company contemplates no further discontinuances of service and will abandon no more tracks. Mr. Wadleigh's own words are: "The gloom peak lies behind us; we see only bright clouds ahead." The earnings are now 6 per cent on the investment and the receipts have reached the point which is considered almost normal. So far in November the company is several thousand dollars ahead of the corresponding month of last year.

During the last two years, particularly during 1922, the company has been conducting a very extensive program of rehabilitation, particularly of track. About $1,500,000 has been spent for this purpose alone in 1922, up to Oct. 1, and by the close of 1922 the sum will probably run up to $1,750,000. Some statistics for the calendar year of 1921 and for the first nine months of 1922, or for the period up to Oct. 1, follow:

SOME STATISTICS ON THE WORK OF TRACK REHABILITATION

	1922	1921
Feet of track rebuilt	139,000	59,000
Feet of track overhauled	278,000	270,000
Ties installed	105,000	70,000
Pieces of special trackwork installed	355	275
Joints welded	38,000	35,000
Surface welds installed	34,000	19,500
Feet of corrugations removed	163,000	0
Rail joints vertically bent	23,000	31,000

A striking figure of the tabulation given above is the large amount of corrugations ground out. The company finds that this work costs about 9½ cents per foot of rail, or about $1,000 a mile of single track. This figure includes all operating expenses and interest and amortization of the equipment extending over four years. The extensive amount of joint welding carried on during the past two years is also notable. Altogether the company has welded rail joints in 1921 and 1922 on 117 miles of track laid in paved street and on 197 mlies of exposed track.

The total amount of track operated by the company consists of 337 miles of track in paved street and 316 miles of exposed track.

Twenty-five new light-weight one-man double-truck cars have recently been put in operation for city service in two of the principal cities. They have proved very popular with the traveling public and many commendations have been received over their introduction. They have also proved popular with the men. One-man car operation is now practically universal on the lines of the company.

Coincident with the improved equipment and track, the company has been introducing methods for improving the condition of its trainmen and other employees. During the past year a pension plan for the benefit of men seventy years of age and over and with twenty or more years in service has been installed. The company has also extended its group insurance to include all employees, the amount of such insurance ranging from $800 to a maximum of $2,200 after ten years of service; officers and their staff up to $3,000 after ten years of service. The cost of this insurance is paid entirely by the company.

State Commissioners Discuss Regulatory Problems at Detroit Meeting

The Subjects of Electric Railway Interest Discussed Included Bus Transportation, Municipal Ownership and Depreciation—Utility Representatives Addressed the Convention by Invitation

INCREASED problems of regulation and of responsibility for continued service of public utilities to the public which are now borne by public service commissions were responsible for the large attendance at the recent convention of the National Association of Railway and Utilities Commissioners at Detroit. The convention was held last week and was the thirty-fourth which this association has had. Abstracts of the following committee reports were presented in last week's issue of this paper: Motor vehicle transportation, public ownership and operation, safety of operation of public utilities companies, public utility rates, railway service accommodation and claims, statistics and accounts of railway companies, car service and demurrage, safety of railroad operation and railroad rates.

MAYOR COUZENS AN M. O. ADVOCATE

In welcoming the commissioners to Detroit, Mayor Couzens took the opportunity to present his thinking on municipal ownership. Municipal ownership is on trial, he said. Further, it is on trial in Detroit. He said the commissioners would have to keep their eyes on Detroit to see how the largest experiment in this direction is going to work out. He referred to it as a "so-called" experiment, but pointed out that from his viewpoint it is not an experiment. Instead, it is a definite policy which is growing and will continue to grow. He told the commissioners that they could bring about municipal ownership quickest and in the most sane way by insisting that the utilities eliminate graft, interlocking relationships, unreasonable salaries and other expenses, because once men who control the utilities have these prerogatives eliminated they are not so anxious to run the utilities; they are perfectly willing in a great many cases that the municipality or other political division take over the activities. Another way to secure municipal ownership is to permit the utility men to continue robbing the public, and by that means cause an uprising at the fees and charges that the public have to pay for service.

At another point in his speech, Mayor Couzens said that he did not think there is any sane man who does not recognize that capital has to have a fair return. There is no public officer, who is not a demagogue and who is not talking exclusively for votes, who will question the right of a man to a proper return on the savings he has created from legitimate endeavor. This is the foundation of capital and its big undertakings. Continuing, the Mayor said that there are many tricks in determining the amount upon which a fair earning is to be allowed. Bankers and lawyers work in all kinds of languages, all kinds of accounts and conditions, and then ask the people to pay a return upon that. He said he thought that rates based on a cost-less-depreciation valuation, in many cases, are ridiculous. The real cost, if the real cost has been honestly found, and if obsolescence and depreciation have been taken care of, is all that any company has a right to recover on.

ADDRESSES AND COMMITTEE REPORTS COVER MANY SUBJECTS

Carl D. Jackson's address as president of the association followed Mayor Couzens's talk. President Jackson's address is given elsewhere in these pages. The address of Chairman McChord of the Interstate Commerce Commission on the relation of state to federal regulation was a feature of the afternoon session on Tuesday.

The report of the committee on express rates indicated the tendency of opinion of the commissions toward the ultimate elimination of express companies and the transfer of their service to the railroads. It was thought by the commissioners that two agencies were unnecessary in the same transaction and that if express business were taken over by the railroads, it would encourage store-door delivery of all railway freight and express business.

In the discussion on the report of the motor vehicle transportation committee Mr. Kuykendall of Washington, chairman of the committee, went into detail on practices in Washington. It was brought out that bus schedules are thoroughly enforced and some motor vehicle lines run on better schedules or keep to their schedules better than do some railroads. Differences between summer and winter schedules are allowed on account of certain seasonal transportation requirements. Some certificates have been granted to motor vehicle lines paralleling railroads and others have been denied, the judgment being based upon whether the railroad is giving satisfactory service or not. The whole purpose is to co-ordinate the various services to give the best possible service to the community with the least possible damage to existing systems.

There was a marked tendency to support the requirement of having to get certificates of public convenience and necessity before motor vehicle lines could be operated and the executive committee was requested to draw up a proposed law for submission to the various commissions, to be discussed at the next convention of the association, for suggestion to legislatures in the various states.

Almost one whole session was devoted to the telephone question. H. B. Thayer, president of the American Telephone & Telegraph Company, dwelt on the three classes of service that company furnishes—community, state and interstate—which subject the system to three kinds of control—municipal, state and national. Mr. Thayer pointed out that a national universal service could not be provided by a large number of uncorrelated local units. He also showed the advantage of the research facilities of the company in developing better service to the community. Fred B. McKinnon, president United States Independent Telephone Association, pointed out the advantages to the public of maintaining competition—not duplication. Mr. McKinnon supported his argument by saying that all true measure of value of service and much incentive to progress would be lost if the independent group were eliminated. Mr. McKinnon emphasized the fact that the success of independent companies lies in their local character and personality. He also urged that rates be based on service rendered and not alone on valuation.

Chairman Clyde M. Reed of the Kansas Public Utilities Commission strongly supported the maintenance of the independent telephone group as tending to bring about a healthy condition for telephone service generally.

DISCUSSION OF DEPRECIATION

An extended discussion of depreciation resulted from raising the question of telephone depreciation as apparently delegated to the Interstate Commerce Commission for determination by the transportation act. In so far as the discussion affected other utilities, it was brought out that most commissions favor a depreciation reserve, such reserve to be so set up as to provide for a sum equal to the cost, less scrap value, of a given piece of property at the time of its retirement, provided, however, that excessive depreciation reserves be not allowed to accumulate owing to error in figuring the life of property.

The report of the committee on valuation had to do almost entirely with the problems of valuation of the national railroad systems. The commissioners took definite action to request Congress to insist that the Interstate Commerce Commission find values of the railroads by states as well as by systems and also that these valuations be kept up to date.

UTILITY REPRESENTATIVES HEARD

Public utilities had their opportunity on Thursday morning when by invitation addresses were given by Frank W. Smith, president of the National Electric Light Association; M. H. Aylesworth, executive manager of the National Electric Light Association; Martin J. Insull, president of the Middle West Utilities Company, and Henry L. Doherty of Henry L. Doherty & Company, New York City. Mr. Doherty's address is abstracted at length elsewhere in these pages. Mr. Smith showed that executives of the company as well as public service commissions are charged with responsibility. Public service corporation directors are not a little group of men who own the enterprise and run it in a selfish way.

He said that the utility is a great human institution, a vital part of the life and welfare of thousands of men and women who are as much a part of the public as are any leaders of public utility. Mr. Smith maintained that the prime responsibility to this public rested on the boards of directors, with public service commissions acting to represent the public and give final advice on utility action. The great mass of questions arising in public utility operation and management are decided soundly and fairly in the interest of all concerned by the directorate of the utility.

According to Mr. Smith, if private ownership and operation of public utilities is to succeed and endure, public regulation must succeed and command a generous measure of public confidence. If public regulation is to endure, private ownership and operation of the utilities must ever be alert to conform its policies to the American spirit of fair play and the American desire for the best in public service. If private ownership departs from this course or if public regulation fails to achieve its intended purpose, our industries and our governmental institutions will be at the mercy of men whose views are alien to American traditions.

PLEA FOR SOUND SECURITIES

M. H. Aylesworth showed the extent and advantages of public ownership of utility securities and defined true public ownership as that where a substantial percentage of people in the community served own a financial interest in the utility company, register their complaints and protest against imperfect service with their own managing employees, share in the earnings and have a direct voice in shaping the policies.

In view of the favorable public attitude toward utility securities and their widespread purchase by customers and employees, Mr. Aylesworth asked the commissioners to see to it that only stocks of unquestioned merit and stability, backed by good value and good management, be made available for customer-ownership campaigns. This, he maintained, is necessary in order to safeguard the priceless public support which electric public utilities now enjoy, and it is manifestly in the public interest.

ADVANTAGES OF HOLDING COMPANIES

Martin J. Insull, Chicago, called attention to the enormous amount of money necessary in the development of the public utilities. He showed how holding or investment companies assisted by raising money on their own securities to purchase junior securities of operating companies. He pointed out how by the large aggregate purchasing power of such groups of utilities under holding companies machinery and supplies can be bought at lowest market prices. He also pointed out that in times of financial stress the investment company can provide money to tide over this on account of the spread of risk and of the higher credit rating of these holding companies.

AT THE BANQUET

At the banquet on Thursday evening Carl D. Jackson, retiring president, received as a token of respect from his colleagues a set of platinum and pearl shirt studs and cuff links. The toastmaster, James Schermerhorn, who spoke with no little wit and humor, told of Detroit's experiment with municipal ownership, saying that all the people were led to believe that when once they had municipal ownership their troubles would be ended, but that at the recent election they found out that after all they still had to spend five million dollars more for extensions, to build a subway, to have the interurban cars stop at the city limits and to shift the paving charges from the Department of Street Railways to the general city expenses, and they were not therefore so sure that their troubles had ended. "But," said Mr. Schermerhorn, "this is an age of experimentation, and if we live through it we shall at least know that we were a part of the experiment."

Mr. Jackson said that the commissioners were all interested in watching Detroit. "For Detroit," he said, "may solve what we as commissioners have not yet been able to do—to make money transporting people at less than cost."

The principal address of the evening was made by H. H. Emmons, now president of the Detroit Board of Commerce, who was an officer in the air service during the war. He urged upon the commissioners, as men influential in widely separated localities, that they use their influence to develop landing fields and other facilities which would tend to encourage civilian aviation. Mr. Emmons pointed out that this would be a service of national loyalty and thereby provide, at no cost to the government, ample aviation protection in case of future war.

RESOLUTIONS PASSED

The last session of the convention was concerned chiefly with consideration of resolutions recommended to it by the executive committee. Many of these had to do with railroad regulation. Two of these suggested an amendment of the Esch-Cummins act so that rights and duties of state commissions will be more clearly defined, particularly with reference to rates and distribution of cars, and so that the Interstate Commerce Commission will be compelled to make valuations of railroads by states as well as by systems and to keep these valuations up to date.

Of particular interest to railway men, however, were two other resolutions, one supporting the indeterminate permit and the other urging uniformity in regulatory laws of the several states.

The first of these, after reciting existing limitations to the possibility of uniform treatment of the utilities on the part of the commissions and the difficulty met by utilities in financing themselves on limited-term franchises, and after stating that the principle of the indeterminate permit goes far toward solving these difficulties, provided ample safeguards be made for the protection of both the public and the investors in the case of the determination of such permits, includes the following clauses:

"Now, therefore, be it resolved, That it is the sense of the National Association of Railway and Utilities Commissioners that the principle of the indeterminate permit is economic and sound and should be adopted in the legislation of the various states relating to public utilities;

"And resolved further, That this association do, and it does hereby, urge the legislatures of the various states which have not as yet adopted the principle of the indeterminate permit to enact legislation recognizing and putting such principle into effect."

The second resolution authorizes a committee of the association "to consider carefully the various forms and practices of utility regulation and report from time to time to this association conclusions and recommendations for a desirable uniform system of public utility regulatory law."

The American Electric Railway Association was represented at the convention by James W. Welsh, executive secretary; C. L. Henry, chairman of the national relations committee, and J. P. Barnes and W. H. Maltbie of the valuation committee.

Officers for the ensuing year were elected as follows: President, Dwight N. Lewis, member Iowa Railroad Commission; first vice-president, Alexander Forward, member Virginia State Corporation Commission; second vice-president, H. G. Taylor, chairman Nebraska State Railway Commission; secretary, J. B. Walker, secretary New York Transit Commission, and assistant secretary, J. H. Corbitt, secretary Tennessee Railroad and Public Utilities Commission.

The next convention of the association will be held at Miami, Fla., Dec. 4, 1923.

Address of President Jackson Before Utilities Commissioners' Convention*

Government Ownership, the Limited Term Franchise and Tax-Exempt Securities Condemned—Need for Uniform Utility Laws and Advantages of Customer Ownership and Non-Par Value Stock Discussed

BY D. C. JACKSON
Chairman Wisconsin Railroad Commission

THERE is no organization more completely representing the sentiments of the several states and the local needs and problems of the country than the National Association of Railway and Utilities Commissioners. It is therefore fitting that this body should take cognizance of present tendencies, not only where they directly affect our own activities but where they tend to subvert the fundamental policies of our government and adversely affect the welfare of the coming generation. I do not think I exaggerate when I express the belief that if it were not for the activities of this organization the states would find themselves stripped of local control in fields where regulation can be successfully administered only by those intimately acquainted with local problems and conditions.

This organization has taken no narrow or partisan view of these great questions. It has approved the exercise of federal authority to the extent necessary for the efficient exercise of undoubted national rights. It is my candid belief that any temporary advantage to the utilities from an undue extension of federal interference with local control and regulation would in the end be far more than offset by disadvantages of concrete and perhaps disastrous nature. Regulation cannot be successfully carried on out of contact with those people who are interested in regulation, and public relations, the basis of all future prosperity in the public utility field, will not be helped by centralized and distant administrative regulation.

In a way this centralizing tendency is the outgrowth of unrest. We are inclined to forget that the fathers laid down certain principles recognizing our dual form of government and safeguarding local government and control in the states, at the same time encouraging that free play for individualism which has created in the people of this country the greatest capacity for initiative, responsibility and progress found anywhere in the world. Out of this spirit of unrest, and the everlasting preaching by some of discontent with whatever is, has come the agitation for government control, such as has just been passed through in the State of California. On the whole, the movement for municipal ownership seems to have largely abated. In fact, a marked tendency in the opposite direction can be observed in several places. The present form of agitation is far more important and borders on socialism or communism. The endeavor to bring about Federal government ownership of vast utility properties can only be looked upon as the entering wedge for the socialization of all property.

By use of the initiative the people in California have just been required to vote upon a state bond issue (an initial issue) of $500,000,000 to acquire water power and electrical business in that state or elsewhere, but so far as I can ascertain there was no call for any such general measure or policy. As a matter of fact the electric companies of the United States are making great progress with water-power development and are expending vast sums to bring home the use of power heretofore wasted. Forty-one per cent of all hydro-electric development in the world has taken place in the United States, although but 15 per cent of the water power is within our boundaries. The greatest hydro-electric development in the world is now taking place in California. These developments have been brought about not by government or by municipalities, but by the ingenuity, initiative and courage of individuals. Private ownership has done this and given California about the lowest electric rates on earth, and yet agitators have attempted to apply the dead hand of government ownership to one of the most worthy, public-spirited and successful enterprises in the world. California has passed unscathed through this ordeal and has emphatically repudiated this socialistic propaganda. Practically the same verdict has been given in Wisconsin, where a constitutional amendment to authorize increased municipal indebtedness for the acquisition of public utilities was also turned down.

This association and its members can do much to bring accurate information to the public. Where agitators point to resident rates anywhere in America approaching 2½ cents per kilowatt-hour, the people should be told the truth, known to every public utility regulator, that any such residence rate merely represents service at a loss for political purposes.

NEED FOR UNIFORMITY OF GOVERNMENT UTILITY LAWS

The necessity for regulation of utilities is no longer, I believe, an open question, and its universal establishment throughout the states seems only a matter of time. Is it not desirable, in fact imperative, that every effort be made to bring about gradually a uniformity in the laws in the several states and the laws in the states where utility regulation may soon be established? It will not be a disadvantage in the meetings of our association to find that we are all talking the same language. A matter of this kind means careful study and I earnestly recommend the appointment of a standing or special committee of this organization to go into the matter fully. It seems to me our association can do a service along this line of prime public importance.

Most utility laws recognize the economic necessity for monopoly in the utility field, with power to require adequate service at reasonable rates. I do not know anything more difficult to regulate than competitive service under cut-throat competition, involving the waste of effort, time, material and wealth that necessarily follows. Nor do I know of any instances in which wasteful competition is encouraged where regulatory problems are not either most difficult and complex, or unsolvable in a satisfactory manner. Competition in the utility field generates public unrest and dissatisfaction with the utilities and the regulatory commission. Good public relations and mutual understanding between the utility and its patron become most difficult to maintain, and yet good public relations are in the end the controlling factor in regulation. It is sufficient to say that successful regulation will be founded on the elimination of this competitive theory of bygone days. First class service at reasonable rates is based on economics, not on waste.

This principle is recognized in the laws of thirty-three states where certificates of convenience and necessity must be secured from commissions before competition can become effective, but control of competition is lacking in fifteen states, in some of which no public utility regulatory laws exist. We have far from outgrown many of the practices of former days. A glaring example of this is found in the franchise provisions of various states and the varying franchise conditions within the states themselves. A limited term franchise is a suspended sentence or threat. It is the outgrowth of the old speculative idea. It is directly responsible for many of the problems which come to us under regulation. A limited term franchise is notice that at some future date the municipality or state may see fit to treat the legitimate investment in a public utility on the junk value basis. Such possibilities discourage incentives for improvements, extensions and good service, and at the same time increase the cost of all financing. Theoretically and perhaps legally, to some extent at least, regulatory bodies would be justified in imposing rates sufficient to amortize a large part of the investment over the period of the limited franchise. Under any circumstances, the additional burden on the utility must be borne by the users of service unless the property is to be confiscated.

There is no more equitable treatment to be found than in the provisions of the indeterminate permit. On the one hand it offers that necessary stimulus for continued uninterrupted and adequate service at the lowest reasonable cost, and on the other hand it reserves to the public all rights necessary for its future protection. Regulation under limited franchises is regulation under a club. It is divided regulation. One party is enjoined to require the best service at the most reasonable rate and strictly supervise all the activities of the utilities. Another independent, changing political body retains the power to destroy the utility.

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*Abstract of address presented before the National Association of Railway and Utilities Commissioners, Detroit, Mich., Nov. 14 to 17, 1922.

A cursory examination of the provisions in the various states shows widely varying conditions. In six states the indeterminate permit form of franchise prevails. In some others the limitation is fixed by constitution. In many states the statutory limitation is different for different classes of utilities. In other states the grant may be and often is perpetual without the public protective features of the indeterminate permit. In some cases the franchises are exclusive. In other cases they expressly permit competition. The terms in some states are limited to twenty and twenty-five years; in others to various periods, running as long as ninety-nine years. Such chaotic conditions do not lend themselves to just, stable and effective public regulation in the public interest.

As utility laws are modified from time to time, and adopted in states where regulations do not now prevail, this association is in a position to urge the adoption of the indeterminate permit form of franchise and encourage the desirability of establishing uniformity on sound principles.

GOOD PUBLIC RELATIONS THE KEY TO SUCCESS

It is my opinion that under regulation there has been a great improvement in the matter of public relations between the utilities and the public served. Every man privileged to serve in a regulatory capacity has come to understand thoroughly how essential good public relations are. It means everything to the public utility and its capacity for service at reasonable rates. Both the utility and the public are gainers thereby. Ought we not on our part, therefore, to stimulate this mutual understanding and make known generally those simple truths that are to us perhaps the A B C of regulatory problems?

There grew up in years gone by the idea that public utilities were always owned by somebody else, generally covered by the indefinite term "Wall Street." The actual fact, of course, is that most public utilities, and always the largest interest in all of them, are actually owned directly or indirectly by the people themselves. The misconception is easily accounted for. Often the securities of a public utility in some Eastern state are owned by people in some Western state, and most of the securities of some Western utility may be the property of Eastern residents. Again, large blocks of such securities are owned by insurance companies, trust companies or savings banks. Few policy holders or depositors take the trouble to see how their premiums, savings or deposits are invested. So the public has come to think of the utility it deals with as being owned by foreign or distant interests. For several years just past a determined effort has been made to overcome this situation and to bring home the ownership directly to the patrons or consumers of the utility. It is my belief that this organization should emphatically encourage this movement. It means improved public relations, better understanding of our problems by the people served, and furthermore it means close scrutiny of the efficiency of management by the owners of the property. It also brings the problems of financing directly home to the people.

WAYS OF FINANCING DISCUSSED

There is a growing recognition throughout the country of the value of non-par value stock as a means of financing. As a matter of fact, par value stock is par value only in name after any company has started in business. The value of the stock is fixed by the value of the capital represented by it and by the amount of the earnings both present and prospective. To acquire a rigid par value for all future issues of stock regardless of the value of the stock has often made financing difficult where the stock is not selling in the market for par. Elasticity should be possible in financing of this nature. Non-par value misleads nobody. It is a frank statement of the actual fact that the value does not depend on the dollar sign on the certificate. The power to issue non-par value stock will make financing possible on more just terms to all concerned than is possible under a rigid par value system. The matter is of great importance and I earnestly recommend the serious consideration of it by the association.

A half century or more ago liberal laws were enacted in most states recognizing secured steam railroad bonds as proper investments for trust funds and savings banks. As yet, in only twelve states has effective action been taken giving equal recognition to the conservative issues of electric, gas and telephone companies. The situation with respect to the securities of electric railways is somewhat better in some states. It may be said that the restrictions governing the issue of utility securities are as closely and carefully drawn as those governing railroad corporations. In fact, with the extension of commission jurisdiction over utility security issues, it may be justly said that restrictions in a large number of states and the supervision exercised by regulatory bodies over such issues have given the securities of these public utilities a sounder basis than formerly existed even in regard to railroad securities. There is no reason whatever why this discrimination against the sound securities of electric plants, telephone and electric railway issues should not be abolished. Yet in thirty-one states there appears to be an entire absence of statutory authorization to savings banks for investment in such securities. In two other states there is authorization for the securities of electric railways. New York state has not yet given the matter due consideration and it may be named with the other thirty-three states. Massachusetts has provisions covering street railways and telephones. You will see at once, therefore, that the situation is wholly unsatisfactory. Statutes enacted to meet the conditions of half a century ago should give way to non-discriminatory provisions recognizing the public interests in utility investments and placing utilities on a fair competitive basis in the money market. This is a matter of importance to all commissions having jurisdiction over utilities.

TAX-EXEMPT SECURITIES A MENACE

A matter of far-reaching importance which affects all business and includes all securities subject to regulation is that of tax-exempt securities, issued principally by states and municipalities. This practice has driven a large class of investors wholly into the tax-exempt field. This effect is demonstrated not only by statistics placed before congress but by reports of most of the important banking houses. Where the former average sale of securities was in lots of $10,000 to $15,000, reports available show sales in average lots of about $3,000. This, of course, shows not only the absence of a large class of borrowers from the market, but clearly indicates increased cost of financing. This tax-exempt privilege is being used to further stimulate the propaganda for government ownership. The favorable interest rates on tax-exempt state securities are compared with the necessarily increased rates on securities that are not tax exempt, and no reference is made to the fact that the taxpayers of the state are penalized in loss of taxes for a larger amount than they save in loss of interest rates. If the evil of tax exemption stopped here it would be important enough for your consideration, but the evil of tax exemption goes much further. It violates the ability principle of taxation and unfairly discriminates between taxpayers. It discourages new enterprises. It creates social unrest. It is responsible for a tax-exemption privilege class. It discourages thrift and enterprise by unduly taxing every constructive and successful endeavor in the industrial field. It throws an undue proportion of taxation on tangible property. Ultimately it will increase the burden of the farming communities, bringing heavy taxes on farm land and on all other real estate. It encourages extravagance in government agencies and piles up an enormous debt burden to be met by our children and our children's children. This matter concerns this organization, as it affects utility and railway financing, but I think it affects all of us in a much larger way in that the continuance of the practice may in the end seriously and vitally affect our institutions and our form of government.

Some Difficulties Under Which Public Utilities Operate*

Experienced Utility Administrator Points Out to Public Utility Commissioners Some of the Problems Under Which the Electric Railway and Other Utilities Are Laboring—He Approves of Regulation for This Line of Business, but Feels that the Utilities Have Not in All Cases Been Justly Treated

By Henry L. Doherty
President Henry L. Doherty & Company,
New York City

The regulation of public utilities by the vesting of power in state commissions has proved to be a great step in advance over regulation either by state legislature or city government. When the public learns to look to its state commission as to what ought to be done, rather than expecting to tell the commission what it should do, then and then only will all of the benefits that are possible through intelligent regulation be realized.

The violent opposition of many public service companies against being placed under state commissions, at one time in evidence, has now largely disappeared. The constructive and progressive public service companies want intelligent regulation, and they do not want to be compelled to fool with politics. However, a large part of the public still seems to think it the duty of the state commissions to give the public service companies hell instead of justice. Too many want service at the lowest cost regardless of whether rates are adequate for the company's needs or not. They fail to realize that inadequate rates in the long run mean higher rates.

It has been only a few years since public utilities were indiscriminately subjected to competition. Finally, the public concluded that it was a sufferer by this competition and resolved that the best service at the lowest rates could only be had by doing away with it. The public said, in substance, however: "We are going to recognize you as a necessary and natural monopoly, but if we do this, we must regulate your service and earnings." The utilities accepted this statement partly because it was right, but largely because there was nothing else to do. Hardly was this work under way before the electric railways of the country were subjected to jitney competition.

Now it is idle to suppose that a rubber-tired vehicle using gasoline for motive power can possibly give as economical service as a street car with steel wheels on steel rails supplied with electric power from a central power plant. This jitney competition is simply a repetition of the old folly of competition with a natural monopoly. It represents one of our serious national wastes, and if it is not stopped by the proper regulatory bodies, it should be made a national issue.

I shall now proceed to point out some of the important matters that I think public service commissions should consider. While these may not be new, they do not seem yet ready for universal acceptance.

Some Fundamentals of the Subject

1. If the public utility business is to command the same efficiency and interest on the part of capital and management as will be secured by other and more profitable lines of business, it will be necessary to adopt some form of profit sharing between customer and company to stimulate effort.

The laws relating to public service commissions should be so broadened that the commissions will have the power to fix an initial rate for a long period in advance, and then to permit the company to earn all it can over what would not be considered a reasonable rate of return, with the provision that these earnings shall be divided between the company and its patrons. Under this plan the management can be "premiumized" out of the company's portion.

2. If the theory of control by state commissions is a correct one, then it is not consistent to have a division of authority between the state commission and the city government or the legislature. In some states part of the cities are under the public service commission, while others are not. Sometimes the gas companies are controlled by the public service commission, but not the street railways. In my opinion the best results would be secured by giving the state commission the widest possible control.

3. In my opinion the taxicab business in many of our American cities ought to be declared a public utility and a monopoly created. Instead of permitting taxicabs simply to "shop" for passengers, they should be compelled really to give service. In most American cities there is an over-supply of taxicabs in congested districts and a perfect vacuum of service in other portions of the city. This is especially true where, if wanted at all, taxicabs are wanted badly, and where they are a necessity, not an extravagance.

In the same category, in our highly congested cities, like New York, I think we should give some thought as to whether the delivery of goods should not be treated as a public utility and regulated as a monopoly.

4. Some of the cost accounting and rate making which today are looked upon as scientifically correct are not even based on facts which are fundamental and in many cases controlling. In the street railway business for example, we have huge expenses which are due entirely to the necessity of standing ready to give service, with no simple way whereby the readiness-to-serve expenses can be apportioned among the beneficiaries. The electric railway business is today where some of the electrical companies were in the pioneer days when they charged a flat sum per month regardless of how much current was used. This "premiumized" waste. A ride is a ride, whether for a block or for 10 miles. Some system of metering must be used. Riding should be based on distance with a fixed loading and unloading charge. That is, a small charge to represent the cost of stopping the car and taking on passengers, and stopping the car and letting the passengers off, plus a fixed charge per unit of distance riding, should be made. The system of uniform charges for street railway rides, to my mind, has not only brought harm to street railway companies but harm to the public as well.

It has heretofore been thought that public utilities should be expected to bear some sort of a tax or other burdens in exchange for the right to use the streets of cities. In my opinion this theory is all wrong, and we must sooner or later completely reverse it. In the old days it was presumed that these taxes or burdens were paid for by the stockholders, but with a regulated monopoly it must be remembered that they are paid by the patrons.

As a business proposition the public could afford to "premiumize" all forms of public utilities by paying a portion of the readiness-to-serve expenses by a property tax.

5. Bond houses have for years talked to their clients about the necessity for a bond earning double its interest rate, or some provision of that character, with a substantial sinking fund. Anything that can be done to educate the bond buyer and the bond houses to the fact that no large ratio of earnings to bond interest is necessary will help greatly in developing the public utilities. The same is true with regard to a sinking fund exclusively of cash. If any sinking fund whatever is demanded, it should be one which could be provided either by cash or by the creation of more property without issuing bonds on it, at the option of the company.

6. There are few classes of business that can submit to public regulation and live. Changed conditions must permit an immediate change of plans. This is not possible when a change in plans can be made only after hearings before a public regulatory body.

Perhaps the greatest damage that has been done by public regulation has been the element of delay and the abandonment of any attempt at certain improvements in the belief that time and trouble would simply be wasted and no good would be accomplished. It will, therefore, never be possible for the so-called public utility companies to embark upon any business not absolutely necessary for furnishing the product they are selling to the public.

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*Abstract of address presented before the National Association of Railway and Utilities Commissioners, Detroit, Mich., Nov. 14 to 17, 1922.

Heavy Traction Report by A.R.E.E. Committee

AT ITS ANNUAL convention, concluded on Nov. 3, and held in Chicago, the Association of Railway Electrical Engineers received among others a comprehensive report on heavy electric traction. The committee on this subject consisted of J. R. Sloan, chief electrician Pennsylvania System, and J. H. Davis, electrical engineer Baltimore & Ohio Railroad. The report commended the action of the American Electric Railway Engineering Association in suggesting some kind of a joint organization to prevent duplication of statistical work. It also appended a revision of the data presented in its 1912 report, checked and corrected by various railroads and revised to include all railroad electrification in North and South America. There were added the corresponding data relative to multiple-unit equipment, for which credit was given to the heavy traction committee of the American Electric Railway Engineering Association.

New York Power Show Making Progress

PRACTICALLY all of the exhibition space for the first National Exposition of Power and Mechanical Engineering, which will open on Dec. 7 at the Grand Central Palace in New York City and extend through Dec. 13, has been leased. Requests for approximately 200,000 tickets have been received by the management. The exposition covers the field of power and mechanical engineering from the moment coal is taken from the ground until power is turned into work in the final machine. Not only will there be representatives of prime movers and steam generating devices, but also exhibits of manufacturers who have devoted their efforts to the solution of the problems involved in burning fuel and making and using power, whatever the industry requiring the heat and power derived.

New York Association to Meet

THE New York Electric Railway Association will meet in New York on Jan. 25, probably at the Commodore Hotel. Definite announcement of the place and program will be made later.

International Association Delegates Inspect Brussels Tramway System

IN CONNECTION with the conventions of the Union Internationale des Tramways et des Chemins de fer d'intérêt local, held in Brussels Oct. 2-7, an inspection was made of the local tramway system. The delegates noted the following facts: The system employs 1,230 single-truck cars, of which 489 are motor cars, 276 are closed trailers, and 465 are open trailers. On these either hand or air brakes are used, and in emergency electric braking on resistance is employed. The rolling stock is stored in six depots, of which the largest has capacity for 340.

The Falk system of cast welding is used for the track joints. The larger part of the contact system is overhead, but some conduit is used. About 75 miles of track is equipped with the overhead system. The conduit, where such is used, is located under one rail with a slot on the inside.

Both poles and rosette attachments to building walls are used for span-wire supports, the latter being preferred. The contact wire employed is of 97 per cent conductivity, two diameters are employed, corresponding to No. 0 and 000 in the American gage. A guard wire of phosphor bronze, slightly smaller than No. 7, A.W.G., is used also.

A.S.T.M. Notes

THE executive committee of the American Society for Testing Materials has voted to hold the 1923 annual meeting at Atlantic City during the latter half of June, provided satisfactory arrangements can be made for the meeting. Two dates of meeting are tentatively under consideration: (1) June 25 to 29, (2) immediately following the meeting of the American Railway Association, Mechanical Division, customarily held about the middle of June.

By the end of the year the society will have issued this year three regular publications, the Year Book, the 1922 supplement to the book of A.S.T.M. standards, and the Proceedings. The first two have already been sent out and the third, a volume of about 1,650 pages, will be ready for distribution in December.

On Oct. 31 the membership of the society was reported to number 3,104.

Special Committee of A.E.S.C. on Wood and Tubular Poles Is Active

THE American Engineering Standards Committee recently appointed a special committee to consider and make recommendations to the A.E.S.C. concerning the application of the American Electric Railway Association for approval as "American Standards" of its specifications for wood poles and tubular poles.

Twenty-one men, representing producers and consumers of both types of poles, as well as the public are on this committee, including C. S. Andrew, representing the Electric Railway Equipment Company, Cincinnati, Ohio; C. R. Harte, American Electric Railway Association, New Haven, Conn.; D. F. Holtman, National Lumber Manufacturers Association, Washington, D. C.; M. G. Lloyd, chief of safety section, Bureau of Standards, Washington, D. C.; A. E. Owen, electrical section of the American Railway Association, Jersey City, N. J.; H. H. Quimby, American Society of Civil Engineers, Philadelphia, Pa.; F. N. Speller, National Tube Company, Pittsburgh, Pa.; J. C. Ware, National Electric Light Association, Newark, N. J.; W. M. Leavitt, Western Red Cedar Association, Spokane, Wash.

At the November meeting of the executive commmittee of the A.E.S.C. the above committee made a progress report, indicating that it is already functioning.

Annual Meeting of A.S.M.E.

THE annual meeting of the American Society of Mechanical Engineers will be held in New York City, Dec. 4 to 7. An elaborate program of papers, reports and entertainment has been provided.

A feature of the meeting will be joint sessions with the American Economic Association, the American Society of Safety Engineers, the American Society of Refrigerating Engineers, and the American Engineering Standards Committee.

H. F. Loree, president Delaware & Hudson Railroad, and E. M. Herr, president Westinghouse Electric & Manufacturing Company, will be among the speakers at an "economic forum."

American Association News

Executive Committee Meeting

THE American Association executive committee met at association headquarters in New York on Nov. 24 with an attendance of nineteen of the twenty-two members and four past-presidents. After reading the minutes the financial report of the executive secretary was presented, an interesting feature of it being that for the first time the receipts from convention exhibits showed a surplus of $317 over expenses. A vote of special thanks to the exhibits and entertainment committees of the convention was passed. In connection with the plan that the association appropriate $10,000 for the work of the committee on welded rail joints and that $10,000 additional be solicited from member companies, it was reported that this $10,000 was already oversubscribed by $100, with more to come.

The committee appointed to recommend a new member of the executive committee to fill the vacancy created by the election of W. H. Sawyer to the fourth vice-presidency, nominated, and the executive committee unanimously elected, C. E. Morgan, vice-president Brooklyn City Railroad.

A report of the finance committee and the report of the auditor for the fiscal year ending Oct. 31, 1922, were made and it was decided to invest $50,000 of the surplus in third 4¼ per cent Liberty bonds.

A report of the meetings and subjects committee was presented by J. N. Shannahan and approved by the executive committee, thus definitely locating the Mid-Year Conference at Washington, D. C. The report is published elsewhere in this issue. A report of the work of the publicity committee presented by F. R. Coates disclosed the effectiveness of the work being done in this direction, special note being made of the very large amount of newspaper space throughout the country devoted to the last annual convention. A notable feature of this was the prominence given particularly to the fact that the railways are keeping their promise to rehabilitate as soon as they get the necessary money.

C. L. Henry reported for the committee on national relations that a test will be made as to whether Section 15-A of the amendment to the Interstate Commerce Commission Act applies to the interurban roads. The test case will be that of the Chicago, North Shore & Milwaukee Railroad which will shortly go before the commission for a hearing. It is hoped that a decision may be secured which will answer the question for all companies.

L. S. Storrs reported for the publications committee that the publication of *Aera* had resulted in a deficit of $5,000 last year and that the prospect for this year was $9,000 deficit if present advertising rates were continued. The committee recommended that beginning with the February issue a 20 per cent increase in all advertising rates be made effective and that the subscription rate to individuals be increased slightly. On this basis it was thought that the paper would very nearly pay its way. The executive committee approved the recommendations of this committee.

Mr. Welsh presented the report of the membership committee, showing members resigned, delinquent and new. A proposal in a letter from W. H. Maltbie to enlarge the scope of the tax committee to include a study of all forms of special taxes, such as paving, snow removal, etc., and thus develop a report analyzing the nature of these special levies and make constructive suggestions for the future guidance of the association, was approved.

A committee on insurance was authorized after it was pointed out that a similar committee of the N.E.L.A. had succeeded in securing a 25 per cent reduction in the rate on power houses and overhead lines. It was thought that a similar opportunity existed for the railways. Action was taken approving membership of the United States Department of Labor in the American Engineering Standards Committee. The standard rules for city operation as revised at the recent convention and approved by the T. & T. executive committee, which embodied slight changes to cover one-man operation, was approved.

A discussion by some of the committee members who had attended the recent convention of the National Association of Public Utilities Commissioners brought out the fact that they were highly impressed with the thinking and direction of work of this body of men, and it was the consensus that railway men would do well to attend this convention in larger numbers.

MID-YEAR DINNER COMMITTEE

President Emmons then announced the mid-year dinner committee as follows: J. H. Hanna, vice-president Capital Traction Company, Washington, D. C., chairman; H. B. Flowers, C. C. Peirce, E. F. Wickwire, C. R. Ellicott, C. E. Morgan, W. H. Heulings and H. L. Brown.

The next meeting of the executive committee will be held at Louisville, Ky., at 2 p.m. on Friday, Jan. 19, following the annual meeting of the Central Electric Railway Association in the same city on Jan. 18 and 19.

Those present were: President C. D. Emmons; vice-presidents, J. N. Shannahan, F. R. Coates and W. H. Sawyer; treasurer, Barron G. Collier; G. T. Seely, L. C. Datz and Wallace Muir, presidents of affiliated associations; H. E. Chubbuck, R. P. Stevens, H. G. Bradlee, J. P. Barnes and C. E. Morgan, operating members; S. M. Curwen, J. G. Barry, A. A. Hale, L. E. Gould, M. B. Lambert representing H. D. Shute and Carl Beck representing C. R. Ellicott, manufacturing members; P. H. Gadsden, C. L. Henry, L. S. Storrs and J. H. Pardee, past presidents. L. H. Palmer and J. H. Hanna were present as guests.

Mid-Year Meeting to Be Held in Washington

AT A MEETING of the subjects and meetings committee of the American Association on Thursday, Nov. 23, the matter of location of the mid-year meeting was fully discussed. Following the request of the executive committee, full consideration was given to the invitation of California. Member companies have been thoroughly canvassed and out of 650 companies 275 responded. While several companies apparently favored California, only 31 railway delegates and 66 manufacturer delegates were listed as sure to go from east of the Mississippi, 14 railway and manufacturer delegates from between the Rockies and the Mississippi and a total of 71 on the Coast.

After a transcontinental telephone conversation between Mr. Emmons, president of the association, and Mr. Alberger, president of the California association, it was unanimously decided that with the number of attendants in prospect, it would not be best to try to carry the mid-year meeting to California this year.

The subjects and meetings committee then recommended to the executive committee the acceptance of the invitation to hold the convention in Washington, D. C., and set the date at Feb. 15 or 16, 1923.

The committee made some progress toward a program. It recommended one principal address at the morning session, and one principal address at the afternoon session, thus leaving ample time for discussion of both subjects. The usual mid-year dinner is planned for the evening with speakers of such prominence and caliber that the dinner will be sure to prove valuable.

Members of the committee present at the meeting were J. N. Shannahan, chairman; Harlow Clark, L. H. Palmer, L. C. Datz, Wallace Muir, and H. V. Bozell.

Connecticut Company Section Opens Season

THE forty-third monthly meeting of the Connecticut Company section, the first of the present season, was a dinner meeting held at Hotel Garde, New Haven, on Nov. 14. The company orchestra furnished music, besides which were other musical and "stunt" entertainment features. The first speaker of the evening was William Arthur, president Arthur Power Saving Recorder Company, who told of his recent European trip. A. L. Donnelly, division engineer The Connecticut Company, followed with some observations as to track and pavement construction in Europe, also based on a recent trip abroad. It was voted to hold the next meeting, the annual one, at Waterbury.

Plea for Support of American Committee on Electrolysis

IN DISCUSSION of that section of the report of the Engineering Association committee on power distribution, relating to a review of the 1921 report of the American Committee on Electrolysis, a paper was presented at the Chicago convention by H. S. Warren, electrical interference engineer American Telephone & Telegraph Company. Space limitations in the report issue of this paper, covering the convention, prevented an extended abstract of Mr. Warren's paper at the time. In view, however, of the approaching inauguration of committee activity on this and allied subjects, an abstract is given below.

It is not necessarily the fact, said Mr. Warren, that the presence of current on underground pipes or cables causes electrolytic corrosion. Whether such injury is occurring depends upon the circumstances under which the current leaves the structure. Wherever current flows directly from the metal structure to earth corrosion occurs.

There is no necessity to suppose that ground return of railway current must be abandoned in order to bring about a practical solution of the electrolysis problem. Where electrolysis conditions are bad, it is usually because there are relatively large potential drops between different points on the railway grounded return. If the potential drops are reduced, as, for example, by the installation of more frequent power-supply stations or a system of insulated return feeders, the stray currents will be largely reduced. Such methods are capable of reducing stray currents sufficiently practically to stop electrolytic injuries.

Many engineers have failed to understand just what is meant by "insulated return feeders." It is important to note that insulated return feeders, as installed for purposes of mitigating electrolysis conditions, involve the insulation of the negative bus at the substation from ground, except as connected thereto by feeders extending from the bus to different points on the rail. These feeders are so proportioned and designed that the drop in potential from bus to rail is substantially the same on all feeders. This means, of course, that the several points where these feeders are connected to the rail have substantially the same potential. It is customary, however, to lay out the feeders so that there will be a slight gradient in potential toward the power-supply station.

Insulated return feeders are open to the objection that they tend to increase energy losses in the return, since they do not admit of the full utilization of the conductivity of the rail. This method, therefore, is not usually as attractive for improving electrolysis conditions as the use of an increased number of power-supply stations. The latter method, thanks to the development of automatic apparatus, can be designed to produce economies in distribution as well as reduced stray earth current.

Continuing, Mr. Warren deplored the fact that the subject of pipe drainage is so highly controversial, that condition having been brought about largely because pipe drainage has often been applied or proposed in situations where the stray currents were unjustifiably large. If the stray currents are first suitably reduced in magnitude by putting the railway return in a condition representing maximum economy from the railway standpoint, the objectionable features incident to drainage are in large measure avoided. It may well be that under such conditions no further measures would be necessary in many cases, and in those cases where some additional measure is necessary, it would remain to be seen whether pipe drainage could be justified, or whether some other method would be preferable.

In the general engineering solution of the electrolysis problem, neither pipe drainage nor any other system of electrolysis mitigation should be employed until the railway return has been put in economic condition. When that has been done, the electrolysis problem in many cases may have practically disappeared. Admittedly to apply drainage to a situation which is not in proper condition for any method of electrolysis mitigation is inexcusably bad. It is illogical, however, to object to its use in proper measure, provided it can be "proved in" as the most economic solution.

Referring to the statement of the committee as to the limited significance of potential difference indications, Mr. Warren pointed out that voltage measurements alone are wholly inadequate to determine the values or even the directions of stray earth currents. For example, a voltage measurement made between a rail and a paralleling underground pipe may show the pipe to be positive to the rail, but this does not prove that current is flowing from the pipe to the earth and thence to the rail, nor does it even prove that current is flowing at all from the pipe to earth at that point. In fact, it does not by itself prove anything of practical value.

In conclusion, Mr. Warren quoted from the report the following: "The nucleus and most encouraging feature of the American committee's report, in so far as it concerns electric railways, is the conclusion to be drawn that in the normal development of the railway systems, including the use of automatically controlled substations, welded joints and a roadbed of comparatively high resistance, electrolysis conditions will be correspondingly improved." He indorsed this sentiment and said that electric railways are fortunate in that the investigations of the American Committee on Electrolysis have brought out this consideration and thereby largely dissipated the old idea that it is enormously and unreasonably expensive for an electric railway to avoid setting up bad electrolysis conditions. It is now seen that if the railways' efforts are properly directed, the improvement of electrolysis conditions is not an expense but is actually a large economy which should be availed of even if injury by electrolysis did not exist.

Interchangeable Mileage or Strip Coupon Tickets for Electric Railways

Messrs. Henry and Earlywine Discuss Their Merits in a Brief Presented to the Interstate Commerce Commission

THE CHAIRMAN of the committee on national relations of the American Electric Railway Association, Charles L. Henry, and L. E. Earlywine, secretary of the Central Electric Railway Association, have prepared a brief for the Interstate Commerce Commission on the subject of the use of interchangeable mileage or strip coupon tickets in connection with steam railroads. The brief forms part of the evidence which the electric railways of the country were asked to submit to the commission in connection with the hearing which it is conducting on interchangeable mileage of some form for the steam railroad, and they were particularly asked whether such mileage should be available for use on interurban electric railways as well as on the steam railroads. The brief discusses this topic from two standpoints, namely, whether a mileage book is desirable, and second, whether a strip coupon ticket is desirable.

In regard to the first question the brief points out that a large proportion of the electric railways are now charging 3 cents a mile for passenger fares, and some of them, the Detroit United Lines, for instance, as low as 2 cents a mile. The steam railroads, of course, are charging 3.6 cents a mile. This would complicate the use of a mileage ticket, and as the representatives of the Commercial Travelers' Association have also admitted that it would not be feasible to issue interchangeable mileage tickets, this subject is not further discussed in the brief.

On the matter of strip coupon tickets, Messrs. Henry and Earlywine say that the interurban electric railways are not averse to joining in the use of interchangeable strip coupon tickets if the commission shall provide rules and regulations therefor which will not cause them loss. On the contrary, they would willingly join in such an arrangement. They realize that the large mass of the public which would use the proposed strip coupon tickets ride and desire to ride upon the lines of the interurban electric railways, and these railways do not want to throw any obstacles in the way of their doing so, provided it can be done without a reduction of fares, which the present financial condition of the interurban electric railways will not permit without injury. However, as there is a margin of 0.6 cent per mile between the present basic fares of the steam railroads and the ordinary basic fares of the interurban electric railways, Messrs. Henry and Earlywine express a belief that a satisfactory plan for using interchangeable strip coupon tickets can be worked out without calling for any fare reduction on the electric lines.

For instance, they say, suppose that a passenger purchased the strip coupon ticket at 15 per cent discount from 3.6 cents per mile and desired to make a trip on three different roads, 50 miles on each road, the first a steam railroad whose basic fare is 3.6 cents per mile, the second an interurban electric railway whose basic fare is 3 cents per mile, and the third on an interurban electric railway whose basic fare is 2 cents per mile. On the first road the conductor would detach coupons to the amount of the regular basic fare of the steam railroad or $1.80 face value. If the book was sold at a discount of 15 per cent, this would make the net fare $1.53. On the second (the 3-cent fare road) the conductor would detach $1.77 face value of the coupon, which, reduced by 15 per cent, makes $1.50 or the regular basic fare on that road. On the third (the 2-cent fare road) the conductor would detach coupons to the amount of $1.18 face value, which reduced by 15 per cent, the discount at which the ticket was sold, makes $1, the basic fare of that road. A chart is attached to the brief showing the application of the plan suggested at different rates of discount on the sale of strip coupon tickets.

In conclusion, Messrs. Henry and Earlywine suggest that the tickets be sold in denominations as small as $25, and say that the way suggested seems the only one by which the proposed strip coupon ticket could be used by interurban electric railways without real financial loss to them.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Submits Report

R. M. Feustel Values Ottawa Property—Suggests Extensions and Additions—Fares an Issue

The report of Robert M. Feustel, consulting engineer, dealing with valuation, proposed extensions and equipment additions to the Ottawa (Ont.) Electric Railway System, has been submitted and approved by the civic committee. The program extending over a period of five years includes the construction of 18 miles of extensions, the abandoning of 1 mile of the present lines running through sections which would be covered by the new routes, purchase of additional rolling stock and the erection of extra car-housing accommodations. The work involves an expenditure of $1,517,690. A definite program of construction for each of the five years has been laid down, with the heaviest work being planned for the first year.

CONFERENCES HELD SINCE FEBRUARY

The negotiations between the Ottawa Electric Railway and the committee dates back to Feb. 20 last, when the City Council appointed a special committee consisting of the Mayor, members of the Board of Control and others to confer with the railway on terms for a new extended franchise agreement. After the first meeting the city sought permission to have access to the company's books and decided to seek an expert to find out the amount invested by the company in its different properties. Robert Feustel of Fort Wayne, Ind., was selected.

He began his work in May and presented his report early in October. In his analysis he employed the books and records of the company since 1895. He reported that the investment in the property down to the date of his report, including allowance for engineering and interest during construction, was approximately $3,978,000 and that an allowance of between $75,000 and $100,000 for working capital and stores should be added. In round figures he reported the historical investment to date as $4,075,000, with a return of 8 per cent.

MAKES FIVE YEAR FORECAST

Mr. Feustel, in dealing with the valuation of the plant and the returns to the company, made a comparison between the financial statement for 1921 and a forecast of the result of operations after each year's extensions during the five year construction program.

For 1921 these figures are given:

Passenger revenue. $1,820,983; other revenue, $18,934; total operating revenue, $1,839,907; operating expenses, $1,374,911. This left a balance of $464,996. Charges against this were taxes, etc., $45,704; depreciation reserve, $120,000, and income taxes, $34,204; leaving net for interest and dividends, $265,000.

The forecast for the first year's operation of the construction program follows:

Passenger revenue, $1,910,470; other revenue, $19,000; total revenue, $1,929,470; operating expenses, $1,929,470; leaving a balance of $567,020. Charges against this are placed at: Taxes, etc., $53,160; depreciation reserve, $140,000; income taxes, $34,965; leaving net for interest and dividends of $338,895. To this is added $70,715, saving by elimination of limited and Sunday tickets, and $32,945, saving by partial use of one-man cars, making an estimated net for interest and dividends of $442,555.

The estimate of revenue continues to increase from year to year, until for the fifth year of the construction program the estimate is:

Passenger revenue, $2,173,655; other revenue, $19,000; total revenue, $2,192,655; operating expenses, $1,573,955; balance, $618,700. Charges against this balance are estimated at: Taxes, etc., $58,045; depreciation reserve, $168,000; income taxes, $28,985; leaving net for interest and dividends, $363,670. To this is added $80,455 estimated saving by eliminating limited and Sunday tickets, and $112,075 estimated saving by partial operation of one-man cars, leaving $556,200 on interest and dividends.

On the subject of fares Mr. Feustel said that he considered it probable that, based upon the past experience of the company, by the elimination of the workmen's tickets and Sunday tickets the company could operate on a straight 5-cent fare and earn 8 per cent on the historical cost plus the cost of the additional expenditures which he suggested. He added that this would mean the continuation of the present operating methods with no abnormal conditions interfering. However, on this matter of fares the company and the city have failed to agree. The company has refused to agree to a fixed schedule for twenty years, but has submitted a plan providing for a fluctuating fare with an 8 per cent return.

The committee's conclusions will probably not be ready until about Dec. 1.

A dispatch from Montreal on Nov. 22 said that the company has just offered to sell its entire system to the city for $4,500,000, or about $400,000 more than the historic cost as found by Mr. Feustel.

May Have Electric Line

A charter has been applied for by business men of Lansdowne, Pa., to operate an electric railway line to be known as the Lansdowne Street Railway. The application shows that the company proposes to operate cars north on Owen Avenue to Essex Avenue, to Wycombe Avenue, to Marshall Road in Upper Darby township, east along Marshall Road to a new street in Stonehurst and along Walnut Street to Sixty-ninth Street.

Strike Called

Linemen and Substation Operators of Cincinnati Property Sought 25 per Cent Wage Increase

Following a notification of only one hour and a half, the overhead linemen and substation operators, some forty men, employed by the Cincinnati (Ohio) Traction Company went on strike at midnight, Nov. 15. T. H. Schoepf, vice-president and chief engineer of the traction company, said that the men going out violated their contract, which, he said, is an anti-strike pact and provides for settlement of differences by arbitration, if they fail to do so by agreement. Colonel Schoepf and electrical superintendents and other electrical supervisors were up all night Nov. 15 attending to the emergency repairs made necessary as a result of the strike.

Colonel Schoepf said the contract between Local No. 101, International Brotherhood of Electrical Workers, and the traction company was entered into on Nov. 15, 1921. It provided that if either side wanted any changes in the contract notice must be given to the other side within thirty days of midnight Nov. 15 each year. Then, if the side could not agree, each side was to select an arbitrator and the two arbitrators were to choose a third, or failing to do so within ten days the State Industrial Commission of Ohio was to be requested to name the third arbitrator.

This year each side notified the other that it wanted changes in the contract. The traction company asked for a reduction of 4 per cent in the wage scale, which ranged from 44 cents an hour for helpers of emergency linemen to 78 cents for foremen of linemen. The men requested an increase of 25 per cent. The men selected a committee. This committee had conferences with Colonel Schoepf, who made two concessions, totaling an increase of 3 cents an hour over the old wages. These were rejected by the men, who asked that further negotiations be postponed until the arrival of one of their international officers.

However, the men notified the traction company at 10:30 o'clock on the night of Nov. 15 that they had held a meeting and had decided to strike at midnight. After the men left their posts, Colonel Schoepf called on William Jerome Kuertz, Street Railway Commissioner, and Charles Tudor, Safety Director, to ask for protection for the company's substations. Mr. Tudor has detailed two policemen to guard each one of the company's substations during the strike.

Franchise Negotiations Ended

Tentative Agreement in Winnipeg Ready to Go Before Council—Terms Are Favorable

The referendum to give the Winnipeg (Man.) Electric Railway an extension of its franchise for ten years will likely be voted upon by the ratepayers some time in January.

Negotiations between a committee of the City Council and the company have been in progress for some months and culminated on Nov. 3 in the submission to the Council of an agreement which stabilizes relations between the city and the company and clears up all outstanding disputes. This agreement is only a tentative one, but there is not much doubt that it will be accepted by the City Council and submitted to the ratepayers for their approval.

FARE SCHEDULE AN IMPORTANT CONCESSION

The request of the company which led up to the formation of this agreement was expressed in the terms that the city defer exercising its option to purchase the railway from 1927 to 1937. The company points out that if this is granted, and it is now exceedingly likely that such will be the case, it will be able to issue a fifteen-year security, which will enable it to raise the necessary capital to make extensions and improvements to the service. As one of the concessions, the company has agreed to the fare schedule shown in the accompanying table.

	To expire Aug. 1, 1923	To expire Aug. 1, 1924	To expire Aug. 1, 1925	To expire Aug. 1, 1926
Cash—weekdays	7 cents	7 cents	7 cents	6 cents
Cash Sundays	5 cents	5 cents	5 cents	5 cents
White tickets	4 for 25 cents	5 for 30 cents	5 for 30 cents	5 for 25 cents
Blue tickets	None	None	18 for $1	....
Red tickets	5 for 25 cents	5 for 25 cents	5 for 25 cents	6 for 25 cents
Good weekdays only, 6 to 8 a.m. and 5 to 6:30 p.m.				
Children under 16 years of age	8 for 25 cents	8 for 25 cents	8 for 25 cents	8 for 25 cents

Some of the outstanding points in the agreement are as follows:

The company has agreed to fix a definite value of the property on which it is allowed a fair return.

Before the agreement goes into effect, the company must pay the city all its outstanding obligations, amounting to approximately $1,000,000, being composed of taxes, paving charges and damage to water mains by electrolysis.

Some of these amounts were disputed by the company, but this agreement on the part of the company clears up long standing controversies. The company will pay the money into a trust fund which will not only pay the above items but will provide a cash working capital toward the other items in the agreement involving the expenditure of money by the company.

The company has agreed to a definite progressive scheme for placing wires underground within the business section of the city. This will greatly improve the appearance of the city, removing many unsightly poles and the overhead network of wires. This is regarded by the technical men in the company's employ as an immense advantage to the city. It involves the expenditure of a large sum of money, and only by such agreement could this advantage be obtained.

The agreement specifically provides for certain extensions of seven lines. The list of extensions is subject to such changes as may be mutually agreed upon, the whole program to be completed within three years. As to future extensions, the company agrees to carry them out upon receipt of proper notice from the city engineer.

Subject to the rights of the municipalities affected, the company has agreed to sell to the city, in the event of the city purchasing the company's system in 1937, its property and franchise rights in the municipalities adjacent to the city, if the city should so want them. This will enable the city to deal with the transportation question of Greater Winnipeg as a whole in 1937 if it should so desire, the purchase price to be fixed on the valuation of only the physical property.

The agreement provides that in default of the company carrying out the major provisions of the contract, the city can declare the franchise of the company at an end and purchase the system, or the city may have a representative appointed to remedy the then existing default at the expense of the company. Other penalties are provided in case the company should default in carrying out the minor provisions of the contract.

MODERN EQUIPMENT PROMISED

By the agreement, the city is given more supervision over maintenance and repair of rails, roadbed, etc., and has it within its power to see to it that any renewal or new construction is of the most modern design. The agreement provides that the existing track and roadbed shall always be capable of carrying the most modern rolling stock.

The object of this provision is that the system will be kept in such condition that in the event of the city taking it over in 1937 it will not be necessary to spend abnormal sums of money in rehabilitation or in modernizing the track and roadbed of the company.

Definite responsibility in the matter of electrolysis is placed on the company, and the latter is to pay to the city immediately $35,868 for damages to underground structures alleged to be due to electrolysis. The company is to pay for all future damage within sixty days of its being ascertained.

The company is to continue to take necessary steps to eliminate electrolysis, and to obtain the results provided for in the recommendations of Professor Ganz.

The company agrees to bear a share of the cost of building any subways through which car lines will be laid.

These are the main considerations in the franchise agreement. The issue in Winnipeg has been referred to previously in the *Electric Railway Journal.*

Must Show Authority for Operation

Application for permission to file a petition in quo warranto to compel the Dayton & Western Traction Company to show by what warrant of authority it is maintaining its right-of-way through the village of New Lebanon, Ohio, was made in the Court of Appeals in Dayton, Ohio, on Nov. 18, by Prosecuting Attorney Haveth E. Mau. The action was brought in the name of the State of Ohio at the instigation of John Hinkle, member of the board of trustees of New Lebanon.

The franchise by which the traction company was permitted to operate its cars through the village expired March 22, 1922. Valentine Winters, Dayton, president of the road, negotiated with the village officials for a new franchise, to which the village would not agree unless Winters promised to lower the company's tracks in New Lebanon and to pave between them. This the company declined to do and was refused a franchise.

The company then announced its intention of building a track around the village, but this was never done and the cars have continued to operate through New Lebanon.

The petition which the prosecutor requests he be permitted to file demands that the company be ousted from the village unless it can show authority for its use of the streets.

While the company was negotiating with the New Lebanon officials, county commissioners granted the road a fifty-year franchise to operate in the county outside the municipalities.

Lost Articles Would Provide Many Comforts

In the annual report of the Liverpool Corporation Tramways the number of articles left on the cars or lost property totalled 28,970 articles during 1921, compared with 28,342 in 1920, or an increase of 628. The lost property included practically everything the human mind could think of and anything the human frame could be devoid of. There were three typewriters, two sewing machines, one skeleton (human), seven crutches and 1,445 knives, keys and locks. Unlucky "13" appeared in the role of false teeth against twelve the year before. The number of live birds and animals was decreased from eighteen in 1920 to five in 1921. The number of unclaimed articles was 8,911. The loose cash and cash found in purses amounted to £989.

Transit Work May Stop

Mayor of Cincinnati Requests Cessation of Work on Loop—Commission Disapproves and Has Authority to Proceed

The present financial condition of Cincinnati and the views of the voters as expressed at the late election demand that work be stopped on the rapid transit loop. This bombshell was exploded by Mayor George P. Carrel of that city at a called meeting of the Rapid Transit Commission on Nov. 17. There were present the heads of all the city departments and members of the Rapid Transit Commission.

Mayor Carrel said that the additional $500,000 bond issue seemed to be contrary to the present policy of the city to retrench in its expenditures within the limits the voters asked for at the last election. He asked to defer further work on the rapid transit system until a time when the city was in better finances.

The Rapid Transit Commissioners recently authorized an issue of $500,000 for further work on the subway. Most of this money was to be used in purchasing property from St. Bernard to Oakley to allow continuance of the subway system.

The Cincinnati Sinking Fund agreed to take the bonds and the money is ready to be turned over to the Rapid Transit Commission as soon as Mayor Carrel signs the bonds as required by law.

COMMISSIONERS DISAGREE WITH MAYOR

The commissioners could not see the matter in the same light as the city officials and there followed the voicing of a considerable difference of opinion. The conference ended without decision, the commissioners agreeing to compile figures showing that the completion of the system was necessary and that the interest charges on the increased sinking fund would not embarrass the city's finances.

When the commissioners protested against the Mayor's request, Charles Hornberger, Director of Public Service, presented the city's views and said that the vote at the last election against the extra city tax levy involving increased city expenditures indicated the opinion of the people against anything but strict economy.

The Rapid Transit Commission has the authority under the city charter to proceed with the work regardless of the intervention of city officials. Approximately $4,000,000 has been spent on the rapid transit system since work was begun in 1919. Two miles of the subway proper have been constructed and 4 miles of surface track are now under construction.

There are several thousand dollars left in the Rapid Transit Commission's coffers. If it is decided to comply with the Mayor's request it is probable that the loop will be continued to the Spring Grove Cemetery, at which point the Ohio Traction Company, Dayton division, will be invited to operate its cars into the city. This can be done with the money now on hand regardless of the $300,000 bond issue.

The proposed interurban line from Indianapolis to Cincinnati, of which the Connersville - Cincinnati stretch remains to be completed, is expected to run into the loop system over the Ohio Traction line and will augment the rolling-stock.

The interest on the money borrowed by the Rapid Transit Commission is not paid by the city, but comes out of an extra .50 mills tax specified by the 1916 law, which is placed on the tax duplicate every year, yields about $380,000 and goes to pay interest charges. The annual interest on the $4,000,000 worth of bonds now issued—the money used in construction work—is $240,000. The interest rate on the new $500,000 issue is 5¾ per cent.

Under the powers of the law that created the Rapid Transit Commission the commission has the right to order Mayor Carrel to sign the bonds and bring a mandamus suit against him to compel his signature.

Paving Charge Rescinded in New Franchise

The city of Belleville, Ill., granted on Nov. 20 a twenty-year franchise to the East St. Louis & Suburban Railway. This company has been operating without a franchise in Belleville since Sept. 1, 1919, on which date the old franchise expired.

When the franchise first expired the city authorities seriously discussed bringing injunction, or seeking by other means to prevent the company operating without a franchise, but upon further deliberation decided that the city needed the railway service to continue even if agreement could not be reached regarding the franchise.

At the time the franchise expired the city asked to have many extensions built and also asked the company to agree in a new franchise to many things which the company felt it could not afford. The company also took the ground that the franchise should relieve the car riders of unjust burdens such as paving.

The franchise as passed on Nov. 20 exempts the company from paving between the lines on the so-called city lines. It contains no set fare or service conditions, but fares and service are to be under the jurisdiction of the Illinois Commerce Commission, the courts, or other duly constituted authorities. The company agrees to make in the future only such extensions as will pay a fair rate upon the investment after operating expenses and proper depreciation have been deducted. The company makes no other promises in the franchise, but now that agreement has been arrived at with the city it is expected that the company will start at once toward improving track conditions which it has been unwilling to do in the past, awaiting an agreement regarding future rights.

All during the period of negotiations there were many conferences and many discussions, but no friction.

City Wins Case Against Dallas Railway

The city of Highland Park, a suburb of the city of Dallas, Tex., has won its case on appeal wherein it sought to compel the Dallas (Tex.) Railway to repair its tracks on Beverley Drive so that the city could proceed with the laying of pavement on this street. Pat Edwards, attorney for Highland Park, said his municipality is prepared to fight the case all the way to the Supreme Court if necessary to compel the traction company to repair its tracks and take care of its part of the pavement on the streets where the railway company operates.

Petition for a writ of mandatory injunction against the Dallas Railway to compel it to repair its tracks was filed by the city of Highland Park in the Sixty-eighth District Court in October. Judge J. E. Gilbert, presiding, declined to issue the writ, and the case was taken on appeal to the Fifth Court of Civil Appeals at Dallas. The Appellate Court granted the mandatory injunction as prayed for, and the traction company then asked for a rehearing. This was denied.

The rails of the Dallas Railway are elevated several inches above the level of the street pavement, and the city of Highland Park seeks to compel the company to lower its track so that the pavement will be smooth.

Rentals Will Be Subject for Arbitration

Clarence J. Wilcox, the corporation counsel of Detroit, Mich., has announced that arbitration proceedings will soon be started on the question of the Detroit United Railway's rentals for the use of city tracks by interurban cars.

A month ago, the city sent a communication to the Detroit United Railway, according to Wilcox, asking that arrangements be made for starting arbitration proceedings to fix the rental rate early in November. Recently Elliot G. Stevenson, president of the Detroit United Railway, again was requested to nominate that company's arbitrator.

The delay is occasioned, according to Mr. Wilcox, by the desire of the Detroit United Railway to include in the discussion differences between the city and the company relative to supply items and car parts.

No rental moneys have been received by the city from the Detroit United Railway, the city in its monthly street railway financial statements setting up an estimated credit of $80,000 monthly. According to City Controller Steffens, this credit was arrived at by using the interurban rental figures of Toledo, which are 36 cents per car mile for motor cars and 24 cents per mile for trailers.

In Mr. Steffens' opinion, this $80,000 credit item is low, and it is his belief that a board of arbitration will fix for Detroit a higher rental rate than is in vogue in Toledo.

Financial and Corporate

Opposes Sale of Municipal Line

The Board of Public Utilities of Los Angeles has encountered considerable opposition in its investigations of the merits for recommending the granting of a freight franchise to the Pacific Electric Railway over the municipal line of the city on San Pedro Street, over which line the Pacific Electric holds a franchise for operation of passenger trains only. There is particular opposition in regard to an allegation that the Pacific Electric Railway was negotiating with the city to purchase the municipal line on San Pedro Street.

The matter of the railway's application for a freight franchise was reviewed in the *Electric Railway Journal*, issue of Oct. 7.

The Los Angeles City Harbor Commission has entered the discussion and has found itself divided on the issue. The president of the Harbor Commission has offered a resolution opposing the sale of the city-owned line, while the other commissioners have disagreed with his stand. The president's resolution declared the sale of the tracks would give the Southern Pacific interests a monopoly, and would bar other railroads from the harbor. The tracks should be retained, he believed, as the start for a belt railway. The opposing commissioners declared the city was getting no revenue from the tracks and they should be sold to some one who could put them to use.

The Pacific Electric Railway has been using the line, which was built in 1913 at a cost of $250,000 to the city. It runs between Aliso and Ninth Streets on San Pedro Street. Postponement on action on the track sale matter means, the commissioners explained, that the commission would look into the question thoroughly before doing anything.

A statement was issued by D. W. Pontius, vice-president and general manager of the Pacific Electric Railway, on Nov. 14 concerning the suggested sale of the San Pedro Street line to the Pacific Electric Railway.

Mr. Pontius stated that the present operating agreement with the city is satisfactory and at no time has the railway suggested that the city sell the line to the Pacific Electric.

Public Service of New Jersey Increases Common Dividend Rate

The directors of the Public Service Corporation of New Jersey announced on Nov. 22 the declaration of a quarterly dividend of $2 a share on the common stock, placing it on an $8 annual basis. The previous quarterly payments have been $1.50, or $6 annually, the disbursement having been increased from $1 quarterly in March, 1922. The regular quarterly dividend of $2 a share also was declared on the preferred stock. All disbursements are payable Dec. 30 to stock of record Dec. 15.

Thomas N. McCarter, president of the company, stated that the directors also had voted on a voluntary reduction in the electric light and retail power rate, effective with December sales. He stated the action would result in a saving of at least $1,600,000 annually to the customers served.

Two changes were decided upon in the capitalization of the company. Mr. McCarter described them as follows:

> At present the authorized issue of preferred stock is $50,000,000 at par, carrying 8 per cent cumulative dividend, of which approximately $18,500,000 is outstanding. This stock is redeemable at 110 per cent of its par value, but as this tends to keep down the price of the issue to the redemption figure, the stockholders will be asked to waive this provision.
>
> The directors of the company also felt that there would be times hereafter when it would be practicable for the corporation to sell 7 per cent preferred stock and have therefore decided to recommend to the stockholders for approval the alteration of the company's charter so that the $50,000,000 of authorized preferred stock shall hereafter consist of $25,000,000 of 8 per cent preferred stock and $25,000,000 of 7 per cent preferred stock.

The company reported operating revenues of subsidiary companies for October, 1922, amounting to $7,025,012, an increase of $480,539 over October, 1921. The net increase in surplus before dividends was $590,693, an increase of $98,887 over October, 1921, and for the first twelve months ended Oct. 31, 1922, the net increase in surplus before dividends was $5,416,693, an increase of $2,477,619, as compared with the twelve months ended Oct. 31, 1921.

Identity of Purchasers Disclosed

F. L. Dame, Edwin Gruhl, James F. Fogarty and Robert Sealy, all connected with the North American Company, New York, N. Y., and L. E. Kilmarx and others are the principals of a syndicate which has purchased 27,500 shares of the common stock of the Washington Railway & Electric Company, Washington, D. C. As noted in the *Electric Railway Journal* for Nov. 11, the purchase was negotiated through Crane, Parris & Company, investment bankers, during the week ended Nov. 4 and created lively comment in financial circles at that time.

So far as Messrs Dame, Gruhl, Fogarty and Sealy are concerned the purchase was made by them as individuals for investment and not in the interests of the North American Company. The stock taken over had been pledged as collateral for a loan and the prices paid by Crane, Parris & Company for it, while not made public, is said to have been sufficient to pay the noteholders both principal and accrued interest on their investment.

Deficit Reported in Albany

According to the third quarterly report the United Traction Company, Albany, N. Y., suffered a net corporate loss for the period from July to September inclusive of $56,353. The loss for the corresponding period a year ago was $476,318. The net operating revenues showed a profit of $119,261 and the operating expenses advanced more than $29,600 over the same quarter in 1921.

In the third quarter this year 10,103,995 fares were collected, compared with 3,540,995 in the same 1921 quarter.

The net corporate loss to date for this year is $106,726, bringing the accumulated deficit of the company to $3,308,051. While the company has operated at a net corporate loss of $106,726 for the first nine months of this year, last year, due to the strike, its net loss for the same quarter was $2,040,442.

To date this year 32,329,507 passengers have been carried, which compares very favorably with five years ago, when a peak was reached for the first nine months with 36,122,382 passengers carried. A total of 24,284,094 more passengers were carried up to Sept. 20 this year than last year.

Order Issued on Discontinuance

Service on three branch lines of the Indiana, Columbus & Eastern Traction Company in Ohio will be discontinued at midnight on Dec. 31, 1922, under an order issued by the State Public Utilities Commission on Nov. 17. The order was issued on application of the company, which produced evidence to show that it was losing money on operations on all three of the lines. The branches on which service is to be stopped are the New Carlisle-Carlisle Junction, Columbus-Orient and Lima-Defiance branches.

Application to discontinue service on the three lines was filed more than a year ago by the company with the State Utilities Commission. The first of this year, however, the commission instructed the company to continue service on the branch lines for at least six months more, after which the commission would consider a renewal of the application should the company care to file it. In September, 1922, J. H. McClure, receiver of the company, filed a renewed application, at the same time submitting evidence to show that the three lines had been operated at a loss during 1922.

Officials of the company say that automobile ownership by suburbanites, coupled with motor bus competition, led to the loss.

Line Sold

The Maumee Valley Railways & Light Company, operating between Toledo and Perrysburg, Ohio, was sold on Nov. 15 to M. M. Miller, president of the Home Savings Bank of Toledo. The price was $50,000. The company had been in receiver's hands for more than a year.

Early Publication of New York Commission Reports Expected

When the reorganized Public Service Commission in New York State went into office in 1921, it found statistical reports in arrears for 1918, 1919 and 1920 in the first district and for 1919 and 1920 in the up-state district.

During the past year the commission up state has published the back reports and expects to have ready for distribution by the middle of January, 1923, reports covering full statistical data from all of the service corporations over which it exercises supervision and which are required to report to it, for the year 1921. Thereafter it aims to print and distribute all reports within one year after the companies file their statements with it.

It takes about a year to collect, correct and put into final form for the printer annual reports of public service corporations. Many corporations are late in filing and after the statements are filed the accounting department of the commission checks them over carefully for errors either in the manner of making out the reports or of calculations.

This early distribution of up-to-date reports will be of incalculable value to municipalities and corporations and will in many instances save a trip to Albany and exhaustive searches of records. Under the new system the accounting department after January, 1923, will be caught up with its work on reports at all times and will be able to devote a considerable amount of time to the detailed examination of the returns of corporations which they have not previously been able to do. In restoring order to these commission activities not a little credit is due to H. M. Ingram, who was appointed to the newly-created position of director of information early in 1922.

Line May Be Junked

Deed to the properties of the Springfield Terminal Railway, operating the Springfield, Troy & Piqua Railway, was passed to the Shoenthal Company of Columbus, Ohio, in the latter city by Receiver George Whysall on Nov. 17. The company recently purchased the traction properties for $87,000 with approval of the sale by the Federal District Court.

Officials of the Shoenthal Company announced that they would wait a reasonable length of time for offers from persons who might desire to operate the traction line, but that if no such offers were received within the near future, the road would be junked. The company holds the value of the line as junk to exceed $100,000.

Reports covering revenues and operating expenses of the traction line for the months of July, August and September, 1922, were filed by the receiver in Federal District Court at Cincinnati on Nov. 18. The reports disclose a deficiency of $213 for July, $89 for August and a surplus of $201 for September. The receiver reported a total deficit of $709 for the period from Jan. 1, 1922, to Sept. 30.

R. P. Stevens and Associates Purchase Williams Interest in Republic Company

Eastman, Dillon & Company, New York, N. Y.; R. P. Stevens and John T. Harrington of Youngstown, Ohio, have purchased from Harrison Williams and associates their interests in the Republic Railway & Light Company, which, through its subsidiaries, Pennsylvania-Ohio Electric and the Pennsylvania-Ohio Power & Light, owns and controls the entire electric light, power, local and interurban electric railway business in the industrial district between Pittsburgh and Cleveland. The territory served comprises about 600 square miles with a population of more than 300,000.

At a meeting on Nov. 22 Herbert L. Dillon, Henry L. Bogert, Jr., and Walter H. Nash of New York, and John T. Harrington and John R. Rowland of Youngstown were elected directors of the company to succeed Harrison Williams, R. E. Breed, F. L. Dame, Edwin Gruhl and Robert Lindsay as members of the board. No changes either in management or policy are contemplated.

Financial News Notes

Seeks Dissolution.—The Point Loma Railroad, San Diego, Calif., has made application to the Superior Court for voluntary dissolution. The property of the company has been taken over by the San Diego Electric Railway.

Amount of Accumulated Dividend Due Reduced.—The Duluth-Superior Traction Company, Duluth, Minn., has reduced the amount of accumulated dividends on its preferred stock to $3 through the declaration of a dividend of $3 on account of accumulations on that issue since the last quarterly payment of $1 on April 1, 1921. The disbursement will be made on Jan. 2 next to stockholders of Dec. 15.

Appoints Receiver for Insolvent Road.—George Raelsley, Mount Bethel, Pa., has been appointed receiver for the Bangor & Portland Traction Company, Bangor, Pa., on application for attorneys for the Easton Trust Company, trustee for the Bangor & Portland Traction Company and the Bangor Trust Company bondholders, who have a mortgage on the property of the company. In the application for a receiver it is stated that the road at the present time is insolvent.

Bonds on Sale.—A syndicate composed of Hemphill, Noyes & Company, Stroud & Company, Inc., Coffin & Burr, Inc., and Otis & Company is offering $3,000,000 of Tide Water Power Company's first lien and refunding mortgage series "A" sinking fund 6 per cent gold bonds. The bonds are offered at 96 and interest to yield 6.35 per cent. The bonds are dated Oct. 2, 1922, and are due Oct. 1, 1942. The Tide Water Power Company does all the electric light and power, gas and railway business in Wilmington, N. C., and suburbs. The company also furnishes through a subsidiary all the electric light and power in St. Petersburg and Clearwater, Fla.

Conspectus of Indexes for Nov., 1922

Compiled for Publication in this Paper
by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	Nov. 1922 **6.98**	Oct. 1922 **7.00**	Nov. 1921 **7.21**	May 1921 **7.24**	**4.84**
Street Railway Materials*	Oct. 1922 **177**	Sept. 1922 **181**	Oct. 1921 **156**	Sept. 1920 **247**	**100**
Street Railway Wages*	Nov. 1922 **208**	Oct. 1922 **208**	Nov. 1921 **214**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	Oct. 31 1922 **6.90**	Sept. 30 1922 **6.69**	Oct. 31 1921 **4.29**	Apr. 30 1917 **12.18**	**5.91**
U.S. Bank Clearings Outside N. Y. City (Billions)	Oct. 1922 **14.69**	Sept. 1922 **12.82**	Oct. 1921 **12.25**	March 1920 **18.54**	Av. Mo. 1913 **6.12**
Business Failures	Oct. 1922	Sept. 1922	Oct. 1921	Jan. 1922	Av. Mo. 1913
Number	**1,600**	**1,469**	**1,809**	**2,722**	**1,213**
Liabilities (millions)	**36.94**	**31.92**	**48.37**	**105.7**	**24.84**

	Latest	Month Ago	Year Ago	Peak	1913
Eng. News-Record Construction costs	Nov. 1922 **188.6**	Oct. 1922 **188.6**	Nov. 1921 **166.3**	June 1920 **27.38**	**100**
U.S. Bur. Lab. Stat. Wholesale Commodities	Oct. 1922 **154**	Sept. 1922 **153**	Oct. 1921 **142**	May 1920 **247**	**100**
Bradstreet's Wholesale Commodities	Nov. 1 1922 **13.35**	Oct. 1 1922 **12.50**	Nov. 1 1921 **11.35**	Feb. 1 1920 **20.87**	**9.21**
Dun's Wholesale Commodities	Nov. 1 1922 **182.3**	Oct. 1 1922 **175.6**	Nov. 1 1921 **163.7**	May 1 1920 **263.3**	**120.9**
U.S. Bur. Lab. Stat. Retail food	Oct. 1922 **143**	Sept. 1922 **140**	Oct. 1921 **153**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	Oct. 1922 **157.1**	Sept. 1922 **155.6**	Oct. 1921 **163.7**	July 1920 **204.5**	(1914) **100**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Traffic and Transportation

New Chicago Bus Franchise

Commission Discusses Permanence, Financial and Operating Ability and Competition in Decision

The Illinois Commerce Commission on Nov. 21 granted to the Chicago Motor Bus Company a certificate of convenience and necessity, giving it the right to operate a bus service over certain boulevards on the south side of the city in addition to the present operation on the north side. In the course of its decision the commission said there was "involved not only the demand on the part of the public for a certain service to be rendered by a public utility but also whether or not the applicant had the experience, ability and stability to become a permanent part of the transportation service in the community involved." It was pointed out that in all public and private enterprises transportation service is one of the cogent influences involved, but that it cannot be held to be a public convenience that some inadequate or ill-advised transportation service for a particular district be authorized when it is apparent that such service would be only temporary.

SURFACE AND "L" LINES ESSENTIAL

The commission said that considerable evidence was introduced as to the inadequacy of service of the surface and elevated lines in certain portions of the South Side, but continued:

> Nevertheless the Surface Lines are an existing transportation utility and extensive development has taken place on the south side of Chicago depending upon the continued service heretofore rendered by said company. In the consideration of motor bus transportation, the commission should be cognizant of the fact that it would not be considered to be the public convenience and necessity of either the whole people of Chicago or those persons immediately depending upon the surface or elevated lines for transportation that bus lines should be instituted which would either seriously impair the service of present lines of transportation or would ultimately destroy this service entirely. The witnesses in this case were unanimous in that while they criticised the service of the surface and elevated lines severely, yet none of them desired that the car service be entirely eliminated. Mr. Richie, a witness for the Chicago Motor Bus Company, indicated by his evidence that bus service is rather a classified service supplementary to the service ordinarily rendered by street cars, and in addition affords more recreational advantages to many persons and families who might not otherwise be able to enjoy the pleasures and benefits of the park system in Chicago.

Discussing the place of the bus with respect to the entire transportation scheme in Chicago, the commission declared it must keep the institution of bus line transportation in mind but such service should be unified in the main artery in Michigan Avenue, so that ultimately there may be a through bus service from the south to the north side of the city of Chicago. The bus service should also be so distributed and controlled that it will be permanent in the communities which it shall serve and readily unified in any general transportation scheme, which ultimately may be necessary.

One of the considerations mentioned by the commission in granting the certificate to the Chicago Motor Bus Company rather than the Depot Motor Bus Lines or the Chicago Stage Company, which had made similar applications, was that the first named had drafted for its enterprise "experienced and talented managers and engineers." Special mention was made of the ability, research and experience that had been employed by this company in solving the Chicago motor bus problem.

FINANCIAL STRENGTH CONSIDERED

The Commerce Commission also took note of the relative financial strength of the three applicants and noted that the Chicago Motor Bus Company had interested sufficient capital to carry out successfully a permanent motor bus enterprise, while the Depot Motor Bus Lines was said to be lacking in ability and financial stability. Another point mentioned with respect to the Depot Motor Bus Lines was that the routes over which it had applied for the right to operate would cause it to come "in immediate competition with present transportation service to a much greater degree than those routes proposed by the Chicago Motor Bus Company."

No Telling Results of Weekly Pass Plan

In September, 1922, the Pacific Electric Railway undertook to try out a weekly pass plan for its local lines in Pomona and Riverside, Calif. The plan provided for the sale of "weekly passes" for local lines at the rate of $1 a week, the purchaser being privileged to use his pass as often as desired during the seven days period on local lines and without restriction as to individual use.

Up to Oct. 10 the results were somewhat disappointing, the number of persons in the cities named being very small who availed themselves of this privilege. At this time it was anticipated that unless the demand for the tickets became greater their sale would have to be discontinued.

On Nov. 10, after summarizing the result for the month of October, the company was unable to predict the final outcome or results, yet early indications are that revenue from this new class of service, which heretofore has been entirely insufficient to pay operating expenses on these particular car lines, may be somewhat increased.

Travel on the Riverside local lines increased 7 per cent, with approximately 2 per cent increase in revenues, while in Pomona travel increase was shown to be 15 per cent with no increase in revenue.

Transportation Issue Aroused Saginaw

Unprecedented Vote in Michigan City on Nov. 7 on Car Question—Recount Under Way

Although the franchise calling for street car-bus transportation for Saginaw failed to carry unofficially by fifteen votes, which would have given the proposition a 60 per cent majority, there is every evidence that the people of that city have awakened to the need of street cars with proper bus extensions and feeders, and are not at all satisfied with motor bus transportation which they have had exclusively since Aug. 10, 1921.

The election of Nov. 7 made history for Saginaw. With one exception, and that was the general election of 1920 when throughout the United States there was the greatest vote cast, Saginaw had its second largest election. No local proposition in the history of the city every attracted the votes the franchise did. The total vote was 10,534 for the franchise and 7,047 against. No municipal proposition was ever given the affirmative vote that the franchise received.

There has never been such an absolute opposite expression from the electors, who since 1907, when the state constitution was adopted fixing the percentages as 60-40 for all franchises and bond issues, have consistently refused to grant a contract to a public utility corporation.

These propositions have even failed to secure simple majorities. This franchise was submitted by initiatory petitions signed by 10,000 citizens, 6,000 more than required. An educational campaign was carried on in every voting precinct. Even the chronic "No" districts were converted to an extent, and friends of street cars believe that if a new measure is presented, with certain revisions from the one recently rejected, there is little question of its adoption.

At the present time the Council is conducting a recount acting on petitions of both sides in the campaign. As all members of the Council publicly opposed the franchise it is believed as a result of their rulings on certain ballots the Supreme Court will be the agency that will finally determine the result of the election.

With half of the vote canvassed, 75 "No" ballots have been counted where the electors placed a cross in the "o" of the word "No" and not in the square before the word. These ballots friends of the franchise insist are illegal, and were backed by the city attorney, but the canvassers disregarded his opinion, and it went so far that Mayor Mercer accused the city attorney of favoring an attorney for the franchise when just prior to his opinion, two "Yes" votes had been thrown out on his ruling. The city attorney resigned his post when his honesty was questioned, but since then has withdrawn his resignation, the Mayor having publicly retracted his statement.

Request for Half Fares for Oakland School Children

The city of Oakland, Calif., petitioned the Railroad Commission on Nov. 16 for an order requiring the San Francisco-Oakland Terminal Railways to establish half fares for school children in that city. The city alleges that the company has refused to grant half fare for school children as requested by the Council, although it is alleged such fares have been put in effect by the company in Richmond and Alameda. It is claimed there is no valid reason for this distinction which is asserted to be an illegal discrimination. A check made by the Board of Education of Oakland is set forth showing that 3,616 pupils use the street cars daily, 3,338 occasionally and it is estimated that if half fare rates were granted 5,800 students would use the car service. The net revenues of the company, it is declared would be increased by the granting of half fares.

Operation of One-Man Cars Within Three Months

The City Council of Augusta, Ga., has unanimously passed the amendment to Ordinance 104, whereby the Augusta-Aiken Railway & Electric Corporation will be allowed to operate one-man cars in the city without having to flag the crossings of steam railroads. Section 3 of the amendment requires the driver or operator of the one-man car to bring his car to a full stop not less than 15 ft. from the near rail of the steam railroad crossing. Further, that the operator shall not proceed with his car across the crossing until "he is fully satisfied by careful observation that no locomotive engine or engine and cars are approaching such crossing from either direction." General Manager Banghart announced some time ago that following an official notice of the Council's action he would try to have the one-man cars in the city within three months.

Service on Interurban Lines Resumed

For the first time since May 1, when its employees walked out following a lockout, the Steubenville, East Liverpool & Beaver Valley Traction Company on Nov. 21 resumed service on its interurban lines between the Pennsylvania-Ohio state line and the Pittsburgh & Lake Erie station at Beaver, Pa. The resumption of operations on this line was marked by a complete absence of disorder. The first car, operated by an imported crew, carried two members of the Pennsylvania state constabulary, General Manager C. A. Smith and other officials.

The company has established a carhouse at Industry, Pa., and the cars are being operated out of it. The company announces that everything is in standard running condition and that full provisions have been made for car repairs at the Industry carhouse.

As the first car was on its way to the state line, hundreds of pedestrians looked on, but no attempt whatever was made to impede its progress. No passengers boarded the first car. About thirty state constables were stationed at strategic points.

Outside carmen are operating the interurban cars and no positions were accepted by members of Division 52, the company's employees before the tie commenced. The majority of these former employees are operating buses in the East End, Liverpool. They will make no comment on the company's action, stating that they will remain steadfast in their policy of complete non-interference.

The situation in East Liverpool practically remains unchanged. Members of the City Council met the day the company resumed its interurban operations and discussed the situation, but declined to indicate that any action would be taken before the hearing in court on the injunction which is now pending against the traction company.

Transportation News Notes

One-Man Idea Given Up.—The Washington-Virginia Railway, Washington, D. C., has decided against the operation of one-man cars on its system between Alexandria and Washington.

Opposes Bus Application.—The Philadelphia (Pa.) Rapid Transit Company recently opposed an application made by Wilbur F. Menke for the right to operate two buses between Bridge Street, Frankford, and Byberry. Representatives of the railway said that there were ample facilities to reach the elevated line.

Cannot Grant Request.—The request of employees of the Bethlehem Steel Company that the Harrisburg (Pa.) Railways reduce its fare 1 cent has been turned down. The traction company said in its refusal that such step was impossible in view of present conditions and that it could not afford to operate on less than a 6-cent rate.

Claims Excessive Freight Rates.—The Eastern Texas Electric Company, Beaumont, Tex., has filed suit in the Eightieth District Court for $24,274 for alleged excessive freight rates for transporting oil shipments from Port Arthur to Beaumont. The claim involves 38,331,695 lb. of oil shipped in the year 1920.

Railway Hauls Sugar.—The newly electrified railroad, the Cuban Electric, plays an important part in the sugar-producing industry. It carries trains of cars loaded with sugar cane on the north Cuban coast, 30 miles east of Havana. Besides hauling cane to the mills, three-car passenger trains are run for the accommodation of the traveling public of Havana and Matanzas and intervening territory.

May Substitute Bus for Trolley.—The Northumberland County Railway, Sunbury, Pa., is considering petitioning the Public Service Commission for permission to abandon its line to Hamilton, a suburb of Sunbury, and substitute a motor bus line. The poor service conditions, which cannot be remedied because of the enormous expense that is encountered in maintaining the line, will necessitate a cessation of operation. The fare on the trolley is 7 cents.

Extends Eight-Cent Fare.—The Missouri Public Service Commission at Jefferson City, Mo., has entered an order extending the present 8-cent fare of the Kansas City (Mo.) Railways for six months from Nov. 18. No one appeared to oppose. John P. Pew, city counselor, said that the city did not oppose the granting of the extension, because it is believed that the present fare is necessary to sustain the company.

City Dictates Car Stops.—Has the city in Indiana a right to say where a street car shall stop to discharge or take on passengers? The city of East Chicago, Ind., believes it has. Recently the City Council there passed an ordinance to prevent street cars from stopping on Forsythe Avenue between the Wabash Railroad tracks and Chicago Avenues. Violation of the ordinance was made a penal offense. The police have arrested the crew of a Hammond, Whiting & East Chicago Railway car for violating the ordinance. The company will make it a test case.

More One-Man Cars in Milwaukee.—The Railroad Commission of Wisconsin has permitted the Milwaukee Northern Railway to operate one-man cars on its Milwaukee city line which runs from Fifth and Wells Streets in the heart of the business district to Twentieth Street and Atkinson Avenue on the north side. The company must make changes in its cars in accordance with plans approved by the commission for installation of safety devices. In considering a Milwaukee city ordinance of 1914 requiring two men on all street cars, the commission pointed out that it believed the ordinance to be unreasonable in so far as it applied to this particular case.

Arranging for Electric Express Business.—Arrangements have been concluded for the rapid delivery or receipt of shipments in Philadelphia sent from or to any point on the Morristown and Reading divisions of the Reading Transit & Light Company, Reading, Pa., and connecting electric railway lines. An important increase in the electric express business of the Reading Transit & Light Company is expected to follow these arrangements. Under the new arrangement shipments are accepted for or received from Front and Market Streets, Philadelphia, where a large, efficient and convenient terminal is used by the Public Service Transportation Company. The latter company and the Reading Transit & Light Company now interchange shipments at Wissahickon, and the advantages of through billing at freight rates is proving popular.

Personal Mention

Editor Will Help in Coal Investigation

The Federal Coal Commission has called upon C. E. Lesher, editor of *Coal Age*, a McGraw-Hill publication, to organize the investigation division and to direct the engineering phases of its work. He will act as a special adviser serving as a consultant on statistical and engineering problems. Production cost problems will be investigated by David L. Wing, formerly of the Federal Trade Commission and of the Department of Commerce.

The appointment of Mr. Lesher and Mr. Wing expresses the plan of the commission to put the actual work of fact finding into the hands of a few men who thoroughly understand this problem of coal which is constantly harassing industry and the householder.

The commissioners expect to obtain much of their information from the outstanding men engaged in coal production, distribution, wholesaling and retailing, but a vast amount of data must be collected by a technical staff. Direction must be given to the collection and interpretation of the facts and figures gathered, and for this work the commission has selected Mr. Lesher and Mr. Wing.

In organizing the investigation division for the commission, Mr. Lesher will have to do with (1) production (including all phases of mining coal, except the labor element); (2) transportation in its effect on the coal industry; (3) distribution of the product.

Mr. Mitten for Mayor

Thomas E. Mitten, president of the Philadelphia Rapid Transit Company, has been asked by the Republican women of Pennsylvania if he will consent to run for Mayor. The organization is headed by Mrs. George Horace Lorimer. It boasts a membership which includes virtually all women in this city prominent in Republican politics. The Philadelphia *Ledger* unfolds the story as follows:

In "hunting about for a good man to be the next Mayor," Mrs. Lorimer requested Mrs. Rudolph Blankenburg, honorary president of the organization, to ascertain Mr. Mitten's views of the matter and tell him that many persons in this city would like to see him run in the next mayoralty race. Furthermore, he was requested to say whether or not he would consent to be boomed for the office.

In reply to Mrs. Blankenburg, Mr. Mitten stated that he was too busy at this time to enter politics and that he couldn't consider the matter for some time.

"But Mr. Mitten didn't say that he wouldn't consider the matter," said Mrs. Lorimer, after learning of Mr. Mitten's reply. "The organization which I head feels it is important to place its support squarely behind a worthy candidate. We want to be ready to assist such a man. Many of us feel that Mr. Mitten could do a great deal for Philadelphia. That is why he was asked to consent to enter the race."

Iowan Heads Utility Commissioners

Dwight N. Lewis Chosen at Detroit as President of National Association of Railway and Utilities Commissioners

Dwight N. Lewis was elected president of the National Association of Railway and Utilities Commissioners at the meeting of the members of the association in Detroit during the week ended Nov. 18. A lawyer by profession, Mr. Lewis entered the employ of the commission of which he is now a member twenty-five years ago when he was the whole office force in charge of its accounting, secretarial work, rate work and reporting. He went into training as a commissioner right then and gradually advanced to secretary and later to counsel for the commission, which position he held for six years. He was then appointed to fill out an unexpired term and was elected in 1918 to a four-year term. He has just been re-elected for another four-year term by a majority of 200,000, one of the largest Republican votes ever given in that state.

D. N. LEWIS

Mr. Lewis is noted for his thorough and consistent work as an Iowa commissioner. Not only does he stand high in the estimate of Iowans, but also in the estimate of every public service commissioner in the United States. For twenty-three years he has been a member of the national association and has done an immense amount of committee work and all the other things which go to make association activities useful. The election of Mr. Lewis at Detroit to the presidency of the association for the ensuing year was one of the most popular which that association has had.

Mr. Lewis is a native Iowan. He was graduated from the Drake University Law School at Des Moines, Iowa. His ideal as a public service commissioner is so to regulate the utilities that they may be permitted to grow to serve the public adequately.

Another Railway Man Makes the Grade

Some few weeks ago it was said in these columns in recording the accomplishments of W. B. Yereance that railway men did not usually succeed in "Making the Grade" in the sense that the New York *Globe* uses the phrase. It was explained then that this was probably so because in railroad life the opportunity seldom presented itself for spectacular or quick success. And just as though it desired to prove that this is not entirely true or taking to heart the fact that it had been chided for its seeming neglect of railway men, the *Globe* in its issue of Nov. 21 nominated a railway man to its gallery of notables.

Now there are many local railroad men fairly well known to New Yorkers, but the *Globe* picked a street railway man. He was none other than Frank Hedley. As for romance and accomplishment, there are perhaps few other careers that offer such possibilities as his. Mr. Hedley comes from a family of railroaders. His great uncle had a great deal to do with perfecting the first locomotive. In fact as between William Hedley, for that was the great-uncle's name, and George Stephenson there appears to have been almost the same parallel in applying new theories that happened in the case of Darwin and Wallace in their biological discoveries.

From such surroundings did Mr. Hedley spring. The rungs of the ladder on which he climbed from machinists' helper to head of the Interborough Rapid Transit Company are too well known to railway men to be repeated now. To them his philosophy is of greater interest. In the *Globe* Mr. Hedley says: "The best way to make a living is to be able to produce; convince the other fellow that you know how to do it—then make him pay you well for it."

A. W. Thompson Elected Pennsylvania Director

Arthur W. Thompson, Pittsburgh, was elected a director of the Pennsylvania Railroad on Nov. 22 to succeed the late Thomas De Witt Cuyler. Mr. Thompson is president of the Philadelphia Company and the Pittsburgh Railways. He was vice-president in charge of operation and traffic of the Baltimore & Ohio Railroad before becoming head of the Philadelphia Company.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Does It Pay to Use Home-Made Repair Parts in Signals

The User Cannot Expect the Manufacturer to Be Responsible for Results Unless Worn Parts Are Replaced with Standard Duplicates

By Carl P. Nachod
President Nachod Signal Company, Inc., Louisville, Ky.

Manufacturers of block signals for electric railways have successively improved their designs, both by using materials of recent development (and this especially as regards insulation) and incorporating the results of experience as revealed by a close following-up of actual service conditions; as well as by embodying the ofttimes valuable suggestions of users. Thus modern equipment contains all improvements that tend to simplify operation, reduce maintenance cost and contribute to safety.

Normal Wear Very Slight

During their service electric railway signals depreciate little by normal wear, but are subject to occasional high voltages, as from lightning or other surges, which often result in the destruction of insulation. Also accidents to the signal line wires, such as grounding, or crossing with other high-voltage wires, cause roasting out and destruction of magnets and resistors, so that repairs eventually have to be made.

The subject of maintenance is fundamental and of prime importance to the railway, which should use the proper materials and most efficient system to insure economical results. Many railways carry a sufficient stock of the manufacturer's spare parts, for they realize that primarily they are operators, and not manufacturers, and have found it to their advantage to recognize such a dividing line for the general good of the industry. Railways sometimes claim that by making their own repair parts they do so at a lower cost, but it will generally be found that their accounting systems do not take into consideration the proper allocation of the overhead charges that should be made.

Home-Made Parts Costly

The ultimate cost of home-made parts is higher in most cases for at least one reason, namely, that the quality is not up to the standards of the manufacturers. They are indeed best fitted to produce reliable and interchangeable renewal parts. They have skilled and specialized workmen and trained engineering and inspection organizations to insure that only the best and most suitable materials are used, and that all important details are complied with during manufacture to produce renewal parts of first quality that go into the old location without any fitting. It is also true that when the railway makes its spare parts these are literal copies of the original design. Progressive manufacturers, on the other hand, through their research and the work of their design engineers, continually improve their product by the use of the most suitable materials, and improved and up-to-date shop equipment. These improvements are, of course, not incorporated in the home-made parts. Probably one most valuable benefit of all is forfeited in that the railway loses personal touch with the manufacturer. It consequently does not get the full co-operation and assistance from his expert service department. By using the manufacturer's parts, however, railway operators put themselves in a position to receive suggestions as to improved methods of operation, testing and location of troubles and defects. All of this results in decreased expense and improved operation.

Cases of False Economy Cited

A few cases from the writer's experience will serve to show the false economy of using home-made parts.

A brass rod on a magnet plunger broke after some eight years of service in a certain signal, and the railway replaced it with a home-made part, the dimensions of which were not sufficiently accurate. As a consequence, the signal failed intermittently, perhaps once or twice a week, and more than two weeks time on the part of an employee was required to watch the signal, catch such a failure and disconnect to find the affected parts. Not only was the good service and reputation of the signal affected adversely thereby, but the cost of the man's time to discover the trouble must have been hundreds of times the total cost of the part referred to.

In another case one of our users had replaced with Chinese copies one of the patented elements in our signal system, but the steel used in the part had not the proper temper and would not hold its shape, while the inferior insulation broke down in the presence of moisture.

Another user made some parts, simplifying them by leaving out what seemed to him useless openings, but after he had assembled these in the signal it was discovered that he had destroyed accessibility, and there was no way to reach certain assemblies in the relay unit.

The manufacturer is interested at all times to have the railway obtain the best service from his apparatus. To that end he is willing to give all available instruction not only in the form of printed manuals or by sending an expert to confer with the maintainer and to inspect the actual signals by visits in the field with him, but even in training the maintainer at the manufacturer's shops. The latter course is greatly to be recommended, and has produced remarkable results in low maintenance. The writer has found that without this training the continuous and unnecessary destruction of parts due to a wrong diagnosis of an existing trouble is considerable, and furthermore the ordering of spare parts is not intelligently done.

If the maintainer would exercise as much zeal in analyzing and recognizing the conditions that cause damage and keeping them away from his installations as he does to make his own parts a great deal would be accomplished.

Post Office Department Co-operates With Business Houses

The use of antiquated and antedated mailing lists by business concerns sending out advertising matter and circular letters is resulting in serious economic waste, the Post Office Department averred recently.

Besides the delays undergone by the postal machinery in handling and re-handling vast quantities of this class of mail, which is incorrectly addressed in most instances, the loss suffered by the mail order houses and other large users of mail runs into thousands of dollars annually.

In an effort to put an end to this tremendous waste of energy and time instructions were issued to postmasters throughout the country to co-operate with business concerns in correcting and revising their mailing lists. A charge of 60 cents an hour may be made for this service, according to the order issued by Postmaster-General Work.

Metal, Coal and Material Prices

	Nov. 21, 1922
Metals—New York	
Copper, electrolytic, cents per lb	13.90
Copper wire base, cents per lb	15.625
Lead, cents per lb	7.10
Zinc, cents per lb	7.50
Tin, Straits, cents per lb	36.625
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8 00
Somerset mine run, Boston, net tons	4.125
Pittsburgh mine run, Pittsburgh, net tons	3.37
Franklin, Ill., screenings, Chicago, net tons	2.625
Central, Ill., screenings, Chicago, net tons	1.87
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	6.50
Weatherproof wire base, N.Y., cents per lb.	16 00
Cement, Chicago net prices, without bags	$2 20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	90 00
White lead, (100-lb. keg), N.Y., cents per lb.	12 125
Turpentine, (bbl. lots), N.Y., per gal.	$1.59

Rolling Stock

Elmira Water, Light & Railroad Company, Elmira, N. Y., is placing an order for four new safety cars similar to the eighteen now in use on the lines in Elmira.

St. Petersburg, Fla.—Voters of St. Petersburg will decide on Dec. 5 whether they approve a bond issuance of $30,000 for the purchase of cars for the local municipal railway.

New York & Queens County Railroad, New York, N. Y., suffered the loss of three trolley cars and a tower repair wagon in a recent fire at the Woodside carhouse. The loss was estimated at $10,000, all covered by insurance.

New York, New Haven & Hartford Railroad, New York, N. Y., has increased its contract for five electric locomotives with the Westinghouse Electric & Manufacturing Company until a total of twelve locomotives are now covered by the contract. When the twelve new locomotives are put into service there will be 117 Baldwin Westinghouse freight, passenger and switcher type locomotives in operation on this road. The original order was referred to in the *Electric Railway Journal*, issue of Oct. 14.

Track and Roadway

Savannah Electric & Power Company, Savannah, Ga., will soon start work on constructing the track and necessary overhead equipment south on Ott Street from Anderson to Thirty-fourth and thence on Thirty-fourth Street to the present line on Waters Road.

Capital Traction Company, Washington, D. C., has started work on its extension over the new Georgetown bridge. The job will not be completed before spring and will cost $160,000. This extension will make possible the first through car route from Rosslyn, Va., to Washington.

Boise Valley Traction Company, Boise, Idaho, has completed the new belt line. Two blocks of track have been laid on Brumback Street between Eighth and Tenth Streets. The light rail on Ridenbaugh Street, over which the Boise Street Car Company will route its cars, has been replaced by heavier stock taken up from Tenth Street.

Southern Pacific Company, San Francisco, Calif., has received permission from the Railroad Commission to construct a track at grade across east Twenty-fifth Street and across Alameda Street and to relocate two of its tracks at grade across East Twenty-fifth Street in the city of Vernon. The company was also granted permission to construct a spur track at grade across Beck Street in Oakland.

New York, N. Y.—The Transit Commission has awarded the contract for constructing the column foundation for part of the Flushing extension of the Corona branch of the Queensboro Subway to the Gustin-Morris Contracting Corporation of Long Island City. Its bid of $91,613 was the lowest. The commission also announced the awarding of a contract for concreting voids under the platform of the Eighth Street station of the Broadway subway, New York, to Edwards & Flood, Inc., lowest bidders, at $1,236.

Power Houses, Shops and Buildings

Savannah Electric & Power Company, Savannah, Ga., has begun work on the repairing and reinforcing of the bulkhead and wharf at the Riverside power station. The contract for this work was awarded to David Power, contractor.

Union Traction Company of Indiana, Anderson, Ind., has announced that it will enlarge its central power plant at Anderson to provide sufficient power to operate all its electric car lines, of about 460 miles. Additional high-tension feed lines will carry power to substations at Muncie, Union City, Bluffton, Peru, Indianapolis, Logansport, Wabash, Warsaw, Newcastle and smaller towns.

New York, New Haven & Hartford Railroad, New York, N. Y., will install a new turbine-generator in its Cos Cob station, to take care of an increased load due to the placing in service of twelve new high-speed passenger locomotives. Both the locomotives and the turbine-generator are being constructed by the Westinghouse Electric & Manufacturing Company. The new turbine-generator is a 9,000-kw., single-phase, 25-cycle unit. The turbine is designed to carry 12,500 kw. and the generator to take these peaks for a period of five minutes. In the order received by the Westinghouse Company for this apparatus is also included switching equipment for control of the turbine-generator exciter.

Trade Notes

American Mason Safety Tread Company, New York, N. Y., announces that J. W. Scott, formerly sales manager of its New York office, has severed his connection with the company. The management of the office is now under the direction of A. T. Dulfer.

Nic Le Grand, Inc., Rock Island, Ill., announces that it is the representative of the Burry Railway Supply Company for Hartman ball bearing center plates and roller side bearings. Nic Le Grand covers the states of Kentucky, Indiana, Illinois, Wisconsin, Michigan, Missouri, Iowa and Nebraska.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., will supply the West Penn Power Company with two 30,000-kw. turbo-generators with surface condensers for installation in its Springdale plant. It is expected that the equipment covered in the contract will be ready and installed in December, 1923.

Clark-Williams Engineering Company, Bridgeport, Conn., has recently been incorporated to manufacture and deal in poles, railway, structures and other equipment for the support of wires, rails and overhead structures. The capital stock of the concern is $10,000, and the officers are: Roland G. Williams, president; Arthur L. Clark, Bridgeport, treasurer.

C. F. Bulotti Machinery Company, San Francisco, Calif., has moved into its new storeroom at 67-71 Main Street. The new location is in the heart of the machine tool district and gives ample room for display as well as office facilities and immediate shop repair work. This firm has made rapid progress within the last year and is now recognized as one of the leading machine tool houses in central California.

The Norwalk Iron Works Company, South Norwalk, Conn., pioneer builders of compressors, manufacturing air and gas compressors for all purposes and also refrigerating machinery, has just opened a Chicago office. It is located at 627 West Washington Boulevard and is in charge of L. R. Bremser, who for thirteen years was associated with the Gardner Governor Company. He is thoroughly familiar with all angles of the compressor business.

New Advertising Literature

Roller-Smith Company, New York, N. Y., has issued Bulletin No. B-20, describing in detail its phone and loud speakers.

The Sterling Varnish Company, Pittsburgh, Pa., has published a forty-eight-page booklet with accounts of its insulating varnishes, impregnating compounds and baking enamels. Diagrams and descriptive matter tell about vacuum pressure impregnation in general.

Columbia Machine Works, Brooklyn, N. Y., has issued a beautiful thirty-one-page illustrated booklet. This is the first catalog of the kind this company has published. The first page gives a little history of the company referring to the Columbia Service to railways.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has reprinted an article on the "Advantages of Railroad Electrification" by R. J. O'Brien of its heavy traction department that appeared recently in the technical press. The publication is known as reprint No. 128. In answer to the question, "Why electrify?" and "What are the advantages of electrification?" statistics and data acquired from actual operating records on both steam and electric roads serve as a means of comparing the two methods of operation. These statistics touch on fuel consumption, maintenance costs, schedules possible under existing modes of transportation, and other subjects of importance. The feasibility of electric operation in tunnels, on heavy mountain grades, in congested freight yards, or in heavy interurban traffic is also clearly set forth.

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Some Real Progress Is Being Made in Standardization

PRESIDENT L. C. DATZ of the Engineering Association has placed standardization at the head of the list of important activities of that organization for the coming year. This is a wise thing to do, particularly in view of the fact that during 1923 those standards which are put up to the American Engineering Standard Committee for ratification can be approved by a much simpler procedure than will be possible later.

But the situation regarding A. E. S. C. procedure is of minor importance compared with that of standardization itself. There must be a consistent and persistent effort to standardize everything inherently standardizable, in the interest of ultimate economy. This is especially necessary now, because there is an increasing "urge to invention" strongly manifest all along the line. This urge is a natural accompaniment of the revival of electric railway activity and should in no way be discouraged. At the same time it needs to be directed along a safe and sane course, otherwise it will result in dissipation of effort and increased costs.

Every time a new device or design comes out, it looks as if the present standards were getting a setback. This is not necessarily so, because in competition each new idea must show its superiority to the cumulative wisdom of the past in its particular field. Hence the present condition of flux in details and even principles of car design, track structure, etc., need not blind any one to the substantial progress that has been made in standardization from year to year. It will be necessary, however, patiently to examine the merits of each proposed advance, and carefully to modify present codes to conform them to modern thought and practice. President Datz and his constituency will have earned the plaudits of the industry if next fall, at the convention, they can show that they have accomplished this.

Bus Men Have Organized a National Association

IT IS but a year ago that the American Electric Railway Association debated and decided against taking bus companies into membership. Prior to that action this paper had urged the wisdom of admitting well-established bus companies to the sobering counsels of the association and commented that if bus men were barred from membership they would sooner or later form an organization of their own, which, having none of the benefits of the experience of the electric railway men, and because of the cold-shoulder attitude of the railway men, would probably tend toward the competitive and belligerent line of endeavor. The association reorganization committee and many individual members also urged that bus companies be admitted.

Week before last the National Motor Transport Association was formed. What the future strength and attitude of this association will be is yet a matter of conjecture, but it wouldn't be hard to guess the kind of thinking a majority of the bus members will get behind. Of course there is some real reason for a separate association of the kind of transportation companies that employ buses, but this could have been very largely satisfied by a friendly and progressive offering on the part of the railway association, such as the formation of an active bus section or even an affiliated association. The bus people would then have been "in the family," where they could have been more quickly taught the true economies of transportation and also the advantages to all concerned of co-ordinated rather than competitive systems. As things are, the same end must ultimately obtain, because it is the only economically sound basis, and because the commissions are going to direct co-ordination. But the process will be slower and the damage to the railways greater. Perhaps much good could be done even yet if the railway association were to take the initiative in establishing friendly relations with the new bus association and in endeavoring to work with the latter to reconcile interests.

Sound Commission Thinking Improves Railway Outlook

THAT the obvious injustice of permitting bus operation to come into destructive and uncontrolled competition with the closely regulated electric railway is not going to prevail becomes daily more certain as commission decisions on the subject accumulate. Within the last two weeks two utilities commissions have spoken very clearly on this important matter. The Illinois Commerce Commission, in granting a certificate for a large bus undertaking in Chicago, was careful that the operation of buses should be confined to routes that would provide a needed service and not jeopardize the earnings of the street railway, on which the transportation of the city must primarily depend. During the present week the commission of the District of Columbia declined to grant even a small extension to the routes served by the Washington Rapid Transit Company, on the ground that the bus operation already permitted had so eaten into the revenues of the Washington Railway & Electric Company as to take the cream of the business, whereas bus operation should be authorized only where it will create a new traffic of its own without materially affecting that of existing rail routes. The commission explains the granting of the certificate for the initial bus operation in the capital city by saying that, at the time, the traction company was unable to handle the business in the rush hours and that the service was really inadequate. But this condition has changed and the commission seems fully aware that the service is at present of a competitive nature and for that reason does not improve the local transportation situation.

At the recent convention of the national association of utilities commissioners there was a remarkable unanimity of opinion as to the place of the bus in the scheme of transportation. There was general agreement that taxes must be more equitably distributed as between railway and bus and that certificates should be granted to bus companies only where the operation would be permanent and not in competition with a rail line that was already giving adequate transportation service.

So the competitive situation is steadily improving and there would seem to be little to fear where the utilities commission has jurisdiction over the buses. Unfortunately there are only twenty-one states where the commission does have jurisdiction now, but the bus line is a utility and the tendency is distinctly to put it under the commission. Where railway men can do their most effective work is to push the revision of the state utilities act so that the commission's authority will comprise regulation of all common carriers to the same extent that it does the railway.

But legislative processes are a little slow sometimes. Meanwhile, bus competition unregulated and destructively competitive is going on and something ought to be done right now. The answer is for the railway to get into the bus business itself in self-defense, if for no better reason. Is it anything but just plain common sense to invest a few thousand dollars in buses to protect an investment of several millions in the railway? Or is it better just to sit by, lamenting the great unfairness of it all and damning the bus fellow who is pirating the business, while waiting for the traction funeral?

There Must Be Some Way to Control the Vehicle-Collision Situation

THE alarming increase in annual numbers of collisions between cars and vehicles on many properties necessitates prompt and vigorous action by municipalities and electric railways, as well as vehicle owners and drivers. At the recent meeting of the T. & T. Association committee on accident prevention this topic was considered as the most pressing one now before the railway operator.

It appears that as soon as one source of danger in car operation is eliminated another takes its place. Years ago street vehicle and pedestrian traffic presented operating difficulties which were largely overcome through the use of the air brake, through improvement in traffic rules and through skill in car manipulation. Then came boarding and alighting accidents, now under control due to the widespread use of folding steps and inclosed platforms. Next comes the phenomenal spread in the use of the automobile, frequently operated by drivers with indifferent training, and the furious driving of the taxicabs, to the chauffeurs of which applies the statement of the watchman, recorded in Kings II, chap. IX.: "The driving is like the driving of Jehu the son of Nimshi; for he driveth furiously." No wonder the transportation superintendent and the claims attorney spend much energy in racking their brains for ways to get cars through the traffic with less loss of life, limb and property.

There is not going to be found any royal road to accident mitigation. It is coming by way of attention to detail and by arousing some kind of a spirit of co-operation The responsibility of the management of electric railways is to see that neither motorman nor vehicle driver has any excuse for a smash between a car and an automobile.

Washington a Good Place for a Midyear Meeting

EVERY one able to have gone to San Francisco for a midyear meeting next spring will regret that that city was not selected at the meeting of the executive committee last week. Nevertheless the choice of Washington was a wise one. Only thirty-one railway delegates living east of the Mississippi River had agreed to go to San Francisco, and this with the smaller number who could have attended from west of the Mississippi was admittedly insufficient for a representative meeting. The fact is that the spring is a very busy time on most railway properties, and while the thought of a trip to California is alluring, not many can arrange to take the two or three weeks necessary, or at least to decide definitely three months in advance that they can get away by a certain date.

Washington not only has the advantage of being near at hand for the great majority of the membership but will make a good convention city for many reasons. A trip to Washington can often be combined with other business, and the growing interest of electric railways in national government affairs makes the selection of Washington particularly appropriate.

The last convention which the association held in Washington was on Jan. 29, 1915, and was one of the most largely attended in the history of the association. One of the speakers was President Wilson, who, in an address of more than 4,000 words, impressed upon the delegates his interest in the success of the electric railway as an important social and economic force in every community. The sympathy expressed in this speech was later shown in more tangible form by the appointment of the Federal Electric Railways Commission, which was instructed to investigate the condition of the electric railways, at that time admittedly serious, and recommend a remedy.

Since the 1915 meeting the relations of the electric railways with the federal government have become even closer than they were at that time—nearly eight years ago. This is particularly true in connection with such branches of the government as the Interstate Commerce Commission on the question of rates, the Department of the Treasury on the matter of federal income taxes, the Department of Commerce, particularly as the latter is represented in its statistical department and the Bureau of Standards, and the Department of Labor as regards its studies on the cost of living and labor statistics in general. In addition, of course, the electric railway industry is often very closely affected by Congressional action. In fact, so much is this the case that during the past few years the committee on national relations of the association has kept a representative in Washington through whom testimony on bills in Congress affecting electric railway operation may be presented to the appropriate Congressional committee.

This means that a meeting at Washington will accomplish two results, outside of those which would be obtained if the meeting were held elsewhere. One of these is that it will draw the attention of the delegates to affairs at Washington to a greater extent and awaken their interest in the very important work of the committee on national relations. The second is the converse of that just mentioned and is that the attendance of a large body of important railway men in Washington will help to establish the importance of the industry in the minds of many members in Congress and other representatives of the national government.

Keep Ahead of the Procession

Anticipate the Desires of the Public—Speed, Comfort, Cleanliness and Courtesy Necessary—A High Class of Platform Men Needed—Lighter Equipment a Certainty—The Bus a Transportation Tool

An Interview with

C. D. Emmons

President American Electric Railway Association
President United Railways & Electric Company, Baltimore, Md.

By Harold V. Bozell
Consulting Editor *Electric Railway Journal*

"KEEP ahead of the procession—lead not only by your own ideas, but see what the other fellow is doing that is good and fit the good things together. But most important, find out what the right thing to do is and do it just a little before it may be expected of you." The foregoing quotation might well epitomize the leading idea which Mr. Emmons, the new president of the American Electric Railway Association and president of one of the most progressive electric railway properties in the United States, expressed recently in a most interesting visit I had with him to discuss the outstanding electric railway problems of today and to get his ideas, as a leader of the industry, as to what the railways could most advantageously do. We have all of us been saying for some time that the industry is coming back—the saying is getting trite, truthful though it may be. But Mr. Emmons points out that the industry must know how to take advantage of this returning prosperity and that the degree with which the "come-back" is accomplished depends upon those who are operating the railways today.

"We have to tackle the problem of keeping public good will with this coming back," said Mr. Emmons. "We must put ourselves out a little to keep ahead of the procession, so that the public may know we are progressive and ever on the alert to provide the very best transportation to suit the community's needs.

"There are lots of fine ideas floating around—each one of us is thinking out new things and we are exchanging information at conventions and through the technical press. Managers must see that their companies get the benefit from ideas which have already been given to them and to their men on the properties. No man can do his duty by his company if he does not apply practices which he has learned are to the advantage of both the public and the company."

Those who know Mr. Emmons know that he is what he is because he has lived and acted according to the precepts which he outlined as above. Every step up that he has taken has been because some one has recognized that he was doing the job he had so well that there must be greater possibilities in him; every step he has taken has been without any pull or due to influential acquaintanceship.

There is another point which ought to be mentioned in connection with Mr. Emmons' becoming president of the association, and that is that this practically marks the coming of the third generation in the electric railway industry. Previous presidents in the association will not misunderstand this statement, which originated, I believe, with the veteran reporter T. E. Crossman, whom the association presented with a monogrammed fob at Chicago in commemoration of the fact that that convention was the fortieth consecutive railway convention that Mr. Crossman had reported. Two twenty-year periods had passed, Mr. Crossman pointed out, and this is the first year of the third twenty-year period. The first generation consisted of the men who were leaders of the industry at the start—men who are executives of the early street railways when the association began its life. The second generation consisted of executives who had started as younger men during the administration of the first generation. Now, the third generation takes hold—men who entered an industry which was already in full swing and who have risen to executive positions on account of their progressive ability. Mr. Emmons marks the first of these men to become the head of the industry for an administrative year.

But to return for a little more analysis of what Mr. Emmons means by keeping ahead of the procession. "Take transportation service furnished, for example. The man behind the procession will wait for traffic to increase 5 per cent before he increases his mileage even 2 per cent. There is a lag in furnishing service, which is noticeable to the community. When one is ahead of the procession he knows it is coming, or at least he can keep his car mileage abreast of the traffic and maintain a satisfied public. Furthermore, keep on good terms with the public through real service, through courtesy, and almost above all through the handling of complaints."

I found out that Mr. Emmons lives up to what he preaches on the question of complaints. Records of the company show that it was not so long ago that complaints averaged eighteen to twenty per day in the offices of the United Railways in Baltimore, whereas the records for October, 1922, showed eighty-three complaints for the whole month, and at the same time there were more than eighty-three commendatory letters of the service and courtesy on the Baltimore lines.

"Courteous employees and clean cars—I wish we could keep our own cleaner than we actually do—go a long way in keeping public good will. *Dirt grates on the public.*

"And we must study intensively this question of greater speed. Not only is greater speed a question of more car-miles per car-hour, but it is a very important question in the selling of transportation for people to want to get where they are going as quickly as possible. The question today of speeding up cars is of course very difficult on account of automobile occupancy of the streets, and yet I hate to object to the automobile because it is popular. We must find our solution in spite of the automobile or, more properly put, in co-operation with the automobile and with the traffic authorities of the city.

"Then, too, there is quite a revolution in reducing the weight of cars. We all overdid the question of heavy cars in the earlier days. Our equipment was too heavy, and as a consequence at times our speed was too low or we had to carry excessive motor equipment. Today the industry is showing progress in reducing the weight of cars, and the manufacturers have assisted materially in producing light-weight cars and also light-weight equipment to replace the heavier equipment. All this results in lower operating costs and faster, more comfortable service.

"All these things are a part of keeping just a little ahead of what the public may demand—it is first-class operation and first-class public relations which win out and make a property not only a financial success but a success in its service to the community and therefore recognized as an asset to the community.

"Of course there are problems—it is not all easy sailing. And one of the elements which is militating against the most economical street car ride for the car rider is still the burden of paving and its maintenance which is imposed on so many railways. I notice that this question is a very live one in England today as well as in this country. In certain places the community has recognized the situation and has given some relief. It is also interesting to note that as soon as municipalities take over electric railways, in those cases where municipal ownership now exists, the municipal authorities quickly recognize the injustice or the absurdity of loading paving maintenance charges upon car riders. Witness the recent attempt of Mayor Couzens of Detroit to have the Department of Street Railways relieved of the paving charge."

I found Mr. Emmons naturally hesitant to discuss the question of wages of electric railway employees, because this is a subject which it is so easy to misunderstand. His expression on the subject, however, showed the same keen sense of proportion that one has come to expect always from Mr. Emmons. His analysis of the situation is that for a good many years previous to the disturbed economic situation of the past five or six years the wage level of car men was too low as a consequence of the level of the car fare, which was itself too low. The public has come to recognize, in large part, both situations, and so long as car men's wages are at the level, relatively, of wages in other comparable lines, the railways should maintain the wage and also the fare. "I doubt," said Mr. Emmons, "if wages in general industries will go much lower very soon, if ever. Managements of railway properties owe it to their men to maintain wage levels commensurate with character of employment. It is so easy to be misunderstood on this that I would not wish my remarks to be interpreted as meaning that there are no places in which wages of car men should be reduced. I am discussing merely the general philosophy of wage levels and street car fare as compared with general wage levels and economic conditions."

I asked Mr. Emmons what effect he thought there would be on both traffic and necessity for higher fares if there were no further liquidation in general labor. He said he thought that the effect of high wage levels on traffic would not be much, because on the whole there was a higher living level and the cost of other commodities would retain the same relative level. There is this effect, however, and that is that the numerous very cheap automobiles are having an effect on street car traffic—not only as to the actual riding but also upon the problem of getting cars through congested districts. Mr. Emmons sees some very difficult problems to work out with reference to the large numbers of automobiles in downtown districts, in connection with street car traffic. As to the need of higher fares, with the exception of certain places where the political situation has clouded all fare adjustments during the past period, his attitude is that the railways are in duty bound to work the problem out on present increased fares, in those places where fare increases were granted during the adjustment period.

"How about municipal ownership? Will other cities follow Detroit, Seattle and San Francisco, or will they attempt to follow Mayor Hylan's lead and encourage bus competition?"

"I don't think there is much of a tendency toward municipal ownership. There are too many cases both abroad and at home of municipally or government-owned public utilities being made into political footballs, with slow or inefficient operation, and these examples tend on the whole to keep people away from the idea unless it is forced upon them. As to bus competition by municipalities to weaken the railway transportation systems, in the end the people must and will see that the transportation system of a community must be protected for public service. Investors will not put their money into transportation systems unless they see that they are sound and have the community behind them. There is a double responsibility here, of course, on the management and the public, but the public must and will realize also that persons with money to invest will not invest in any enterprise in a community unless there is a dependable transportation system and unless money invested in utilities is recognized and protected. The people can be made to see that those communities which are successful have successful utilities, and all that statement signifies.

"I think neutral agencies, such as the *Electric Railway Journal*, can do much to assist the industry as a whole, whether under private ownership or municipal ownership, to make impartial analyses of the operation of municipally owned systems, because facts, of course, are what we want."

I asked Mr. Emmons if he thought the railway association should continue to exclude municipal railways from membership, and he answered that he was on record as being in favor of having them in the association. He thought that was the best way to work out the answer to the question of municipal ownership. He also thought that bus companies should be admitted. Otherwise they would form an association of their own. This would mean that the bus question would have to be worked out through associations which would tend to be competitive and antagonistic rather than through one transportation association where the problems could be worked out on a co-operative basis. (Since this interview with Mr. Emmons a national bus association has actually been formed, as already noted in these columns, with E. B. Burritt, former secretary of the American Electric Railway Association, as its executive manager.)

Keeping Ahead of the Procession

THERE are lots of fine ideas floating around — managers must see that their properties get the benefit from ideas which have been given to them and to their men.

There is quite a revolution in reducing the weight of cars. . . . This results in lower operating costs and faster, more comfortable service.

We must and can speed up our service.

We must let the employee know that we think something of him as a man. We should do all we can to get high class employees.

Courteous employees and clean cars go a long way in keeping public good will. *Dirt grates on the public.*

Continuing, Mr. Emmons said: "What we do need is the education of communities and public service commissions that there is only room for one transportation facility for one community, and that this transportation facility must be protected against wastage. The railways—and we have tried to do this in Baltimore—can educate the communities in this way by showing the communities that they are ready to supply any necessary bus service in a community. The National Association of Railway & Public Utilities Commissioners can do, and as a matter of fact is doing, a great deal in this direction and the individual state commissions can do much more. In fact it is difficult without the co-operation of the public service commissions to do very much in this line. A railway company which sees the necessity of auxiliary bus lines should be protected, when it installs them, against jitney competition there as well as against rail lines. There are certain places where auxiliary bus lines are warranted, and I think it is unfortunate for the railway in any such locality, as well as for the industry as a whole, if the railway does not recognize this and get there first.

"I think the same philosophy applies to the trackless trolley, which has its place in certain kinds of traffic and under certain situations and, when carried to an electric railway property, will prove, I believe, less expensive to operate than buses, vehicle for vehicle. I don't mean to get into any debate with reference to the place of the trackless trolley and the place of the gasoline bus, realizing that the fixed investment of the trackless trolley is a factor dependent upon the amount of traffic to be handled. But the trackless trolley does have a definite place—or I believe it will be found to have a definite place in local transportation activities."

I ventured to ask Mr. Emmons if he would express an opinion as to the usefulness of or the service rendered by *Bus Transportation*, the co-worker of *Electric Railway Journal*, in trying to solve the problem of the place of the bus.

"I think the effect of *Bus Transportation* has been good—it has been very helpful to all of us, and street railway men, no matter what they think with reference to the bus, get good from it. I think it will materially assist in developing bus transportation in non-railway territory, as well as in working out the problem of the proper relation between bus and railway in territories where the electric railway is already located and is a necessary part of the transportation system."

"What do you see in the way of economies and improvements of service available for use by electric railways now or in the near future," I asked.

"We must and can speed up our service. We must eliminate downtown congestion, possibly by spreading the distance between stops, although of course, this cannot be carried too far. Many stops slow a car down, but at present in many cities the number of stops per mile or the location of stops close together is a matter of legislative requirement by the city. We are beginning to realize that the street car must be made to approximate as nearly as possible to the individual automobile as to speed, convenience and time of travel from one point to another. Don't misunderstand me here—I do not mean the bus. But every individual has in the back of his brain the idea of liking to ride home in a private automobile with all the comforts that that means. Naturally we cannot do this—there isn't room on the streets for automobile transportation, either in individual cars or in buses in most of our cities. But we can speed up our service and I have already touched upon the place of the light car in this.

"I see no immediate wonderful change. It is a constant plugging away and using the best thing here and the best thing there. Every one is watching the weekly pass as to its effect on stimulating riding. In its application, we must be careful about increasing the number of rides and lowering the gross income. The application of the pass is a proposition which must not be bungled. Fares and passes must be applied correctly.

"The problem of the electric railway is to give service as good as possible and as cheap as possible.

"Safety movements can do a great deal of good toward reducing gross expenditures for accidents both to the public and to employees. In Baltimore, for example, we set aside 4 per cent of our earnings for the claims department and damages, and I think safety movements can materially reduce similar sums on our own property and elsewhere.

"Then there is the one-man car, for which I see a very much greater use than it now has. There are many excellent types of one-man cars to fit various conditions and they are surely economical. There is no doubt but that they have saved some properties from financial ruin, as well as saving them in the public grace of their community. I see no reason why every small city should not be a one-man car proposition. And there are of course a good many places in larger cities where one-man car operation is logical. Who knows? What with the advent of turnstile and other devices, we may ultimately reach all one-man operation with even greater transportation speed than we have now."

"What actual gain is going to come from having platform men of larger experience now being employed because of smaller turnover or of higher grade because of more careful means of selection?"

"There is a gain in many ways. There is a gain in having people properly handled by some one who knows his job; there is a real gain in the care of equipment which shows up in reduced maintenance cost per car-mile; there is a real gain in good will to have people who know how to handle the public and there is also a gain in return due to a greater degree of honesty in the handling of fare collected by old and tried employees. There is a gain in the reduced number of accidents, and this is one reason for paying older men more than men new on the property. I think we should do all we can to get high-class employees and to reduce the labor turnover. We must let the employee know that we think something of him as a man. We must realize and let him know that we realize that he has a wife and family who are as dear to him as the manager's family is to him. It is all good common sense—good business, and what ought to be expected in rational human dealing."

"Would you express an opinion on the interurban situation?"

"I have been away from the interurban problems for three years, and of course cannot talk very intimately about them. But I do believe that the interurbans exceeded the city systems in going crazy on car weight. There has been a considerable backing up on this position within the past year or two, and it is going to be a great help to the interurbans to take the position tending toward lighter equipment. There is no doubt a saving in track wear due to the lighter equipment; there is a saving in kilowatt-hour consumption per car-mile, which is not merely theoretical, but which is real and which is more of an item today than it was at former fuel and labor costs; there is a saving on depreciation on the investment (and this is not only per car, but actually per passenger-mile) and then there is a further saving in the one-man interurban car, which I see being used now on some systems."

"How about the zone fare—is it dead as a possibility in this country?"

"You know the English say that the penny is too popular a coin for the railways not to give some sort of a ride for it. But we recognize that the Englishman is a patient person whereas the American public is impatient. The collection of zone fare, according to any scheme so far devised, seems to test the patience of the American public. The zone fare has many advantages in theory but, so far as it has been worked out in this country, it is impractical. It was unfortunate that the Connecticut Company's experiment could not have continued longer, but under the circumstances this apparently was not feasible.* I don't know, maybe some day some one will try it again."

There is one question about which a good deal of discussion has centered in the industry in the past few years and that is the question of valuation and capitalization and rate of return and the relation of these to each other. On this Mr. Emmons pointed out that a good deal of capital was put out a good many years ago at a low rate of interest. In refinancing to make capitalization equal valuation in some cases, a lower capitalization at a higher rate of return could be adjusted to mean the same thing to the investor and perhaps would leave a better taste in the mouth of the public which recognized a fair rate of return for the property as a whole on the valuation allowed. Mr. Emmons said he strongly supported "businesslike valuations, made on the yardstick basis, toward which the valuation committee of the American Electric Railway Association is now working."

"In this subject, as in all other subjects, the railways can impress themselves upon their public by taking the lead in a progressive, substantial and convincing way. There is nothing to be pessimistic about in the railway situation. The transportation requirements of our communities will increase rather than decrease. There are plenty of problems for every electric railway, plenty of opportunities for every electric railway man. My advice in realizing or capitalizing upon these problems is to keep ahead of the procession."

Training School for Trainmen in St. Louis

THE training school for motormen and conductors on the United Railways of St. Louis embodies a number of novel features. Besides the usual instruction for motormen on the operation of the car control and brake system, which is given on a four-motor passenger car and trailer similar to those used in service, the men receive instruction on the need for avoiding accidents, method of making out accident reports, the importance of courtesy and efficiency and similar public policy matters.

After a period of instruction on the road, they return to the instruction room for a review of the most important features of the first instruction and are examined as to their knowledge of the operation of the various parts of the brake and control equipment, method of making emergency stops, with reverse power, etc. They are also asked to estimate the distance required to stop a car with air brake on level drive rail going at a rate of 10 m.p.h. The purpose of this is to assist them in answering questions in accident blanks and in court that relate to speed and distance.

Applicants for the position of conductor, as part of their school work, are encouraged to take some of their practice trip sheets home for study as well as trip sheets properly made out with the exception of being balanced, so that they may balance them and return them when they report in the morning. Another part of their homework consists of 100 subtractions of register readings, in which the most difficult numbers possible are used.

In their schoolroom practice the applicants are required first to pool their money except bills of large denominations, then take turns acting as conductors and as passengers, the passengers all paying their fares with quarters or halves and requiring the acting conductor to issue a transfer with the payment of each fare. Crews are changed every twenty minutes until each conductor has demonstrated his ability to act efficiently in that capacity. At the conclusion of the trial, the money pooled by each applicant is returned to him by the company.

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*For a discussion of the reasons leading up to the abandonment of the zone-fare experiment by the Connecticut Company, see *Electric Railway Journal*, Aug. 7, 1920, page 253.

Review of Transit Commission Valuation

Consulting Engineer Finds Many Errors of Omission and Commission in State Commission's Tentative Valuation of Brooklyn Surface Roads and Questions the Methods Followed

THE results of a valuation of the surface railroads of Brooklyn, conducted under his direction, have just been made public by Francis Blossom, member of the firm of Sanderson & Porter, consulting engineers, New York. The valuation was made, so far as practicable, in conformity with the methods and procedure followed by the valuation bureau of the New York Transit Commission, as reported in the *Electric Railway Journal* for Feb. 25, 1922. Mr. Blossom was assisted in the work by a large staff, among whom he mentions particularly R. S. Buck, Thomas F. Mullaney, J. R. C. Armstrong, Charles A. Remelius and Julius A. Hanna, all long engaged in railway work or the manufacture of railway equipment. The valuation covered the properties of the Nassau Electric Railroad, Coney Island & Brooklyn Railroad, Brooklyn, Queens County & Suburban Railroad, South Brooklyn Railway and lessor companies, Brooklyn Heights Railroad, Coney Island & Gravesend Railway, and Brooklyn City Railroad.

CRITICISMS OF PRINCIPLES

The report first criticises various general principles or methods of the commission's tentative valuation, as contained in its introductory statement. These criticisms in part follow:

The "original cost" valuation described in the report appears to be a mixture of estimated and of actual costs and of many assumptions, indicating that the valuing engineer has presented figures which show what he thought the properties probably cost or should have cost—under conditions he assumes to have existed when he assumes they were created—rather than what they actually did cost, on a recognized accounting basis. The costs and prices prevailing one or two generations ago are not either normal or applicable to present purchase and sale appraisals, and can have no value therein. They might warrant consideration in a rate case to arrive at an "investor's sacrifice" figure of cost. This would necessarily include accrued deficits in fair return, or going value under the New York law, and other direct and indirect costs.

The 1910-1914 reconstruction cost described in the valuation report uses prices which it designates "pre-war prices." These are supposed to be the prices prevailing during such years, but appear to be the extremely low prices of 1914. These also have passed away. While nearer the prices of today than are the original costs of prior years, there is no justification for calling 1910-1914 prices normal except for their own period. They are super-normal judged by many earlier or lower prices, and sub-normal judged by the higher prices which have since prevailed. Neither does a normal exchange value of commodities exist, although the ratio of the average price of rails and mechanical and electrical equipment, etc., to the average of living costs is much less variable than the ratios of prices of single commodities. The gold dollar shows the most extreme variation in value as measured by everything else.

The 1921 reconstruction cost valuation described in the report is based on an inventory stated therein to have been made as of June 30, 1921, and on prices stated in report to be taken in the "period of the first six months of 1921, which was immediately preceding the completion of the inventory, and intended to reflect the then 'present-day prices and conditions.'"

In each of the three above-described bases of negotiation the report states that deduction should be made either for depreciation or for the cost of putting the properties into first-class operating condition. In this connection, the report states under the caption "depreciation," that "in considering the investor it would become necessary to trace the actual investment of the present holders of the securities, and to ascertain whether such investment when made reflected the depreciated condition of the property before any injustice in deducting depreciation from the full valuation of the property could be seriously maintained. Investors in transit properties have changed many times since operation was first commenced, and the price paid in the transfer undoubtedly considered the condition of the property." This is incorrect, for a stockholder succeeds to all rights of a previous stockholder, and the justice or injustice of any method of treating depreciation cannot be affected by a change in the ownership of securities—whether such change is effected by purchase, gift, bequest, exchange or otherwise. Moreover, prices paid for stock are usually dependent on present or prospective earnings.

The report further states that "the straight line basis has been quite uniformly accepted as the most practical means of determining the amount which should be deducted from the value of the property to which depreciation applies." This statement also is incorrect. Such basis has been quite uniformly rejected. This is admitted in testimony given at the hearings held since the report was presented. The reason it is rejected is that the straight line method is illogical. It takes no cognizance of the wear, tear, use, exposure or condition of the property, nor of the amount of the expenditures made thereon for maintenance, repairs, renewals and replacements. On the straight line depreciation theory of the valuation report two pieces of equipment of the same age are given the same depreciation, and the facts as to their real condition are ignored.

Two methods of computing depreciation are used in the report, viz.: (a) Straight line depreciation, based on the proportion that the estimated expired portion of the estimated life (with allowance for estimated salvage or scrap value) bears to the total estimated life (such life being speculative or unknown in many cases) and (b) depreciation determined by the estimated cost in 1921 of placing the properties in first-class operating condition.

The report advocates taking the so-called "original costs," and subtracting therefrom the cost of placing the properties in first-class operating condition at the higher prices of 1921. It includes in the amounts so deducted both its estimated "deferred maintenance" and its estimated "deferred replacements," i.e., in addition to deferred maintenance the report deducts much accrued straight line depreciation. The report then recommends that the amount of residue, ignoring estimated value of the non-operating property, be offered to the owners, in bonds.

The method used in this connection is stated in the valuation report under the caption "conclusions and recommendations," and reads: "It is our conclusion that a fair valuation for the existing property of companies other than that included under Contracts Nos. 1, 2, 3 and 4 and their related certificates would consist in allowing the original cost less the expenditures necessary to put the property in first-class condition." I do not agree with this conclusion. It is difficult to see how it could be reached by business men. Certainly none of those who wrote the report would consider such a method of valuation fair if applied to their own home or property. If the conclusion or rule expressed in the report were generally applied owners might have to part with property for nothing, or pay a buyer for taking it. It penalizes investors who, instead of waiting until 1921, spent their money twenty, thirty or more years ago to serve the public. A cubic yard of excavation or fill work done in 1890 is now as valuable to the public as if done in 1920. Had the conclusion or rule been originally announced that investors in other kinds of property than railroads would get appreciation in value but that owners of public service property would be denied any appreciation of value if and when they sold their property, Brooklynites would probably now be walking or riding in horse cars or buses. This valuation is for the purpose of purchase. For all work, whenever built, it would seem that the owners are entitled to receive its present value.

Herein I deal with basis number three, mentioned above and given in the report, namely, reconstruction cost at 1921 prices, because I do not consider that a valuation arrived at by any other method will meet the tests of current business practice for the purposes of proposed negotiations.

The report states under caption "expenditures necessary to place property in first-class operating condition" that the present-day condition is not necessarily that of June 30, 1921. This statement is particularly true now, as very liberal expenditures on maintenance have been made since the enaction of the transit act, and the values of the properties are now correspondingly increased. The lesser prices of the present day would, by reducing the costs of the work which the report deducts as necessary to put the properties in good condition—show larger values for each of the properties. The report includes in the amount which it so deducts at 1921 prices: (a) An estimated amount to cover the estimated requirements for overcoming deferred maintenance, and (b) a large additional estimated amount to cover its estimates for "deferred replacements" of equipment, i.e., equipment which it assumes should be retired from service.

Moreover, such deferred replacements have been determined by an erroneous method, i.e., by assuming the expenditure of money to place property in first-class condition and then retiring such property. An indication of the magnitude of the amount that the report claims should be allowed for deferred replacements is given by the statement appearing in report for Public Service Commission, First District, New York, for year ending Dec. 31, 1920, on page 88, which gives the then deferred maintenance of the surface lines as follows: Cars—all companies (based on 3,100 cars) $231,159; track and paving, for the six companies considered, $4,295,159.

The deferred maintenance plus deferred replacements for these same companies is estimated for 1921 in valuation report at $11,368,645.

In this connection the valuation report states "it is believed that due consideration should be given to an estimate of the necessary expenditures of this character as a practical means of determining the actual rather than the theoretical depreciation. Life is necessarily affected by the standard of the repairs. Renovation and rehabilitation from time to time will operate to make over and renew and if successively continued may prolong the line in service to an extent difficult to estimate." This statement cancels the preceding statement in the report which says in effect that it is proper to deduct theoretical depreciation based on age. It substantiates the contention made by the companies that, for proper determination of depreciation, findings must not be theoretical but must be based on inspection and on facts.

The Brooklyn surface road properties are now in seasoned condition and require only that enough money be spent on them to enable them to give a quality of service equal to that which the same properties could give if new. To spend more than this amount would be wasteful and extravagant. In arriving at a purchase and sale figure it may be proper to allow a credit, from the value of the property if new, in amount sufficient to put these properties into condition to give first-class service, but it is not proper to deduct the capital cost of new equipment expected to be purchased with the object of increasing the net earnings receivable by the new owners.

Certain general costs, some of which are mentioned in the report, apply to all the Brooklyn surface roads. Such costs include the construction overhead costs and the company overhead costs, whereas, the direct individual property costs for materials and labor are a function of quantities in each case and of their corresponding unit costs. All such general costs are as inevitable and unavoidable as the costs of steel rails or cars. They may be computed either on the basis of material and labor costs or they may be based on reasonable estimates fixed by experience had in the building of similar properties.

The report underestimates the allowances that must be made for costs of land and right of way. Such costs must, as estimated by Mr. Bennington, be taken on the average at not less than 1.60 times the assessed valuation. In the case of the land owned by the Coney Island & Brooklyn Terminal Company, which is a business corporation and not a railroad company, the land is believed by the company to be salable at more than double the assessed valuation. The report does not even include the necessarily incurred costs incidental to the acquisition of the land and right-of-way, nor the costs such as interest and taxes, of carrying the investment in land and right-of-way during construction. This land must, in most cases, be acquired well in advance of the starting of construction. Interest must be thereafter paid on its cost, and taxes are thereafter payable on such property and must be paid if the tax department does its duty.

The report states that easements, private right-of-way, consents and damages, should be limited in all valuations to the original cost shown on the books, and that they have not enhanced by land value increases or rental value increases. This statement is incorrect as would be soon discovered by any company now attempting to obtain such property and rights or to meet the damage claims that would develop. Even after making this reference to and statement regarding such items the report omits to value any of them except private right-of-way.

As to the methods used in making its valuations, the report has assumed that only a portion of the work would be reconstructed by the contract method. This assumption is contrary to customary practice. If the work were so rebuilt, as contemplated in the report, the company costs, including its administrative and engineering costs, would be greater by enough to offset the saving in job overheads and contractor's services which the report erroneously assumes could so be effected.

OMISSIONS

The commission valuation report, Mr. Blossom says, also omits many items of value, such as extra cost of piecemeal construction, many miles of irrevocable and perpetual easements, development costs of physical property and business, advantageous advertising and power contracts and franchises, and much property which is useful in the operation of the lines but not now actually in use, such as that purchased to provide reserve capacity.

OVERHEAD AS DETERMINED IN THE REPORT

Mr. Blossom also criticises the method of determining "overhead" as well as some of the nomenclature used in the commission valuation report. He explains that in the statistical section, which gives unit cost data, the report adds, but only in the case of some items, the amount of 6 per cent for "job overhead," making what is therein called "construction costs." To this it adds, but only in the case of some items, the amount of 10 per cent for "contractor's services," making what is therein called "contract costs." However, in making up the estimates of "contract costs" for electrical and mechanical equipment and rolling stock, the report adds no overhead but uses the manufacturer's bare selling price to the company, stating that this price corresponds to the above-mentioned "contract costs," which, in the case of track and structures, is the amount paid to the contractor for the finished work, ready to operate. In other words, this means that in the report no allowances for job overhead or contractor's services are included in the electrical and mechanical equipment and rolling stock. The report then adds to "contract costs," as made up from the sum of the foregoing items, certain estimated overhead and other charges to the company. It terms these "company overhead charges" and divides them into "expenses during development" and "expenses during construction."

"Cost to reproduce," according to Mr. Blossom, is made up in the commission report from the total of the estimated costs mentioned above, plus the value placed on land, right-of-way and materials and supplies, though in the last three items, the report includes no overhead or carrying costs. On this method of valuation Mr. Blossom says, in part:

> A company or organization reconstructing the Brooklyn surface railroads in 1921 would hove had to pay costs for company overheads in excess of the percentages and amounts allowed in the valuation report of Feb. 15, 1922. A similar statement also applies to the construction overheads. The report depreciates the construction overheads and the company overheads. The company overheads should not be depreciated because the creative engineering, legal and administrative work and the expenses of insurance, taxes, interest and cost of money, once made are permanent and will never be duplicated. Some of the construction overheads will be duplicated when making renewals and

replacements but this statement does not apply to all of the construction overheads or to all of the physical property.

The report appears to allow construction overheads only on track and structures, made up of 6 per cent for "job overhead" and 10 per cent for "contractor's services" (including therein contractor's home office overhead and profit). These, combined, amount to 16.6 per cent, which seems entirely inadequate. My practice in such work is to allow at least 12 per cent for job overhead and to figure it on all (except rolling stock, to which I add 3 per cent) instead of on only a part of the work. The 12 per cent is made up of 4 per cent for contractor's works office costs and 8 per cent for all other items under (a) and (b) of the next following paragraphs. In my opinion this 12 per cent, so figured, should be used in these valuations instead of the 6 per cent as used and figured. The 12 per cent for "job overhead" and the 10 per cent for "contractor's services," combined, amount to 23.2 per cent.

"Contract cost" as defined in report must include the following construction costs: (a) All items listed in report as having been included in "contract cost," (b) express, freight, demurrage, telephone, telegraph, storeroom, storage, yard, automobile hire, cartage, rental, job liability insurance, incidentals, extras, omissions, mistakes, changes, corrections, breakage and waste, rehandling, temporary construction and duplication of work, removal of poor work, removal of obstructions or interferences, excess cost of doing work while maintaining operation, idle or overtime labor, power, heating, lighting for nightwork, failure of sub-contractors and reletting of work, delays, strikes, accidents, weather damage, disasters, miscarriage of shipments, city inspection and permits, bonds, fees, all other uninsurable costs, injuries and damages to persons and property, operation of job shops, construction plant maintenance, trial operation, contractors' works office costs and remuneration for contractors' services, including therein his home office overhead costs.

"Cost to reproduce" as defined in report must include the following company costs: (a) Company overhead costs during construction, such as interest during construction on all expenditures made, taxes during construction, engineering costs, administrative costs, fire insurance; (b) company's costs prior to construction, such as promoter's remuneration for services and expenses, administrative, legal and engineering costs, interest on expenditures made, and taxes on land and right-of-way and on structures; (c) cost of procuring money; and (d) company's costs subsequent to construction, such as working capital, physical property development costs, costs to create the business, and the value of contracts for power, advertising, etc.

Mr. Blossom gives in his report his comments at some length on the various items listed under "cost to reproduce." Speaking first of interest during construction, he points out that this money must often be raised before the work begins and that any organization constructing or reconstructing the Brooklyn surface routes would have had to pay for construction money an annual interest rate of at least 8 per cent, because a lender advancing money for construction would consider the hazards and risks of a loan on an unbuilt project. In 1921 the annual interest rate would have been more than 8 per cent. The interest period must be computed from the time the money is raised until construction is completed and operation begins. The least average interest period would be 2½ years on land, right-of-way and damages, three months on rolling stock, and one year on other property, and it might often be more. Taxes are payable on land and right-of-way after their acquisition, and they are also payable on building structures.

Engineering design and inspection costs would range between 3 per cent and 4 per cent of the full construction costs, including therein the job overhead and the payment for contractor's services. Administrative, legal and office costs during the construction period would range from 2 per cent to 3 per cent of the fair construction costs, including therein the job overhead and the contractor's services. Fire insurance would be not less than 0.4 per cent per year, payable for at least a year on the insurable portions above the foundation of buildings under construction, power plant and substation equipment, and for at least three months on rolling stock. This item would amount to at least 0.05 per cent of the contract costs, exclusive of land and right-of-way.

Discussing the items included under "Company's Costs Prior to Construction," Mr. Blossom declares that the commission report includes nothing for promotion costs, which are always incurred and are unavoidable if creative work of this kind is to be done. Mr. Blossom discusses the other pre-construction costs mentioned in group "b" above and estimates that these 1921 combined pre-construction costs would undoubtedly run from 5 per cent to 10 per cent of the reconstruction costs of the road and that in amount they would total not less than 6 per cent of the contract costs, plus the pre-construction cost of interest on land and right-of-way, consents and damages, and of taxes on land and right-of-way.

On the cost of procuring money, he points out that this cost of financing or of securing construction money is entirely distinct from interest, and that it is underestimated, at least for 1921, in the commission's report. Such allowance must cover all brokerage and underwriting charges, the services and expenses of banking houses and of their security distributing houses, and the expenses of the company, incurred in this connection. Mr. Blossom's experience and that of his firm and of corporations with which he is connected is that the actual cost of public utility money raised by the sale of bonds of profitable going companies would run from 5 per cent to 6 per cent, while the cost of that raised by the sale of junior securities would range from 8 per cent upward. The average cost of so procuring money would certainly exceed 6 per cent and would probably be 7 per cent. These percentages are lower than would be asked for street railway securities, and especially for those of a construction enterprise. Under the conditions in 1921 of the money market, the company credit and the city authorities' attitude, the money might not have been securable even at 10 per cent or 15 per cent. In Mr. Blossom's own Brooklyn valuation figures, he takes 6 per cent as the least percentage that could properly be figured.

COMPARISON OF VALUATIONS

Company	Commission Valuation Report	Mr. Blossom's Revised Values
The Nassau Electric Railroad Company..........	$26,309,070	$34,335,707
The Coney Island and Brooklyn Railroad Company..........	13,296,492	16,815,948
Brooklyn, Queens County & Suburban Railroad Company..........	10,385,975	16,388,409
South Brooklyn Railway Company and Lessor Companies..........	8,307,528	14,322,522
The Brooklyn Heights Railroad Company.......	1,523,521	2,188,909
Coney Island & Gravesend Railway Company...	977,318	1,231,066
The Brooklyn City Railroad Company..........	45,361,243	60,914,216
	$106,161,147	$146,196,777

In discussing the next group (d) of reproduction costs, or that of the company's costs subsequent to construction, he says that the commission's report allows for floating capital as determined by the inventory of material and supplies, but includes no allowance for cash working capital, for physical property development costs, cost of experimentation or changes, nothing for expenditures made to create and develop business, and nothing for the value of power or advertising contracts or for franchise value.

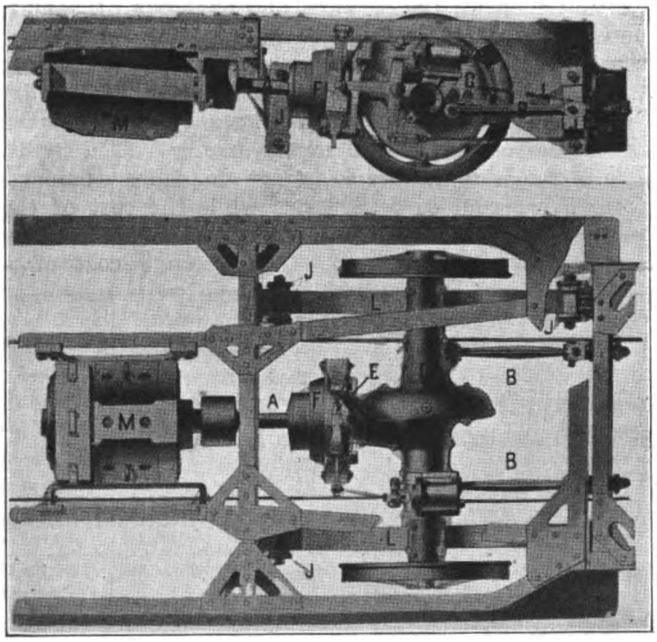
The accompanying table shows the valuations made by the Transit Commission and by Mr. Blossom.

New Light Motor Car for Paris Tramways

Unified System in French Metropolis Is Trying Out a Novel Form of Car Designed to Secure as Far as Possible the Riding Qualities and Inherent Lightness of the Automobile

IMPRESSED by the importance of reducing the weight of tramway cars and decreasing the shocks transmitted to the body, the department of studies and of technical control of the Société des Transports en Commun de la Region Parisienne has designed and constructed a sample car seating forty-nine persons and weighing 12.7 net tons. This is 519 lb. per seat, as compared with 633 lb. for the comparable type of car now in operation in Paris. The new one might be called a truckless car, as the two axles are connected through a flexible spring system to the body underframe, which carries the motors rigidly mounted. The wheelbase is 11 ft. 10 in. The car seats forty-nine passengers, and it is driven by two motors of 45-hp. each, rated on a one-hour basis. The details are shown in the accompanying illustration.

Each motor drives, through a longitudinal shaft, a bevel gear carried on the car axle. The gears are of heat-treated chrome-nickel steel. The gearing is inclosed in an oil-type casing which provides all bearings for the axle. As the gears run in oil they splash oil into the axle bearings, thus furnishing all necessary lubrication at this point.



MOTOR DRIVE AND SPRING SYSTEM OF EXPERIMENTAL CAR NOW BEING TRIED OUT IN PARIS

A—Longitudinal shaft. B—Connecting rods between axles and frame. C—Axle housing. E—Adjusting nut for brake band. F—Brake drum. J—Elastic coupling permitting side play. L—Semi-elliptic laminated springs. M—Motor.

An important feature of the design is the flexible spring suspension, combining both semi-elliptic and helical springs. These are so designed that the deflection is slightly over ⅓ in. per ton of load. The suspension provides also for lateral movement in order to prevent the transmission of sidewise shocks to the car body. To this end the connection from the semi-elliptic spring to the car underframe is made through a hanger which is itself essentially a laminated spring. This hanger, which also incloses a helical spring for vertical flexibility, is permitted a lateral movement of about 0.8 in. between stops. The maximum force tending to restore the hanger to its vertical position is about 6,600 lb. However, the body can be easily oscillated by one man pushing and pulling it sidewise.

Braking of the car is done by means of band brakes acting on drums carried on the longitudinal shafts. These can be operated either by hand or by means of small air-brake cylinders mounted on the axle housings. By this arrangement the total weight of braking equipment has been reduced from between 2,500 and 3,300 lb., as on some of the Paris cars, to less than 900 lb. These two methods of braking can be supplemented by the use of the motors, short circuited or reversed.

COMPARATIVE DATA FOR STANDARD AND EXPERIMENTAL TWO-AXLE CARS IN PARIS

Wheelbase 11 Ft. 10 In.

	Type G Motor Car (Paris System)	New Light Car
Seating capacity	49	49
Total weight, empty, tons	15.5	12.7
Unsuspended weight, tons	3.1[1]	2.1
Weight of truck and equipment, tons	3.0	0
Truck deflection per ton	0.107 in.	0
Total deflection per ton	0.214 in.	0.357 in.
Weight of body, tons	8.2[2]	9.6[3]

[1] Includes that part of the weight of the motor which is supported from the axle.
[2] Complete with underframe and equipment.
[3] Complete with underframe, motors and equipment.

By the use of this new car, G. Vergniole, of the department of studies and technical control of the T.C.R.P. Company, calculates that if all motor cars on this system could be conformed to the new model, an assumption which he says is obviously premature, there would be an annual saving of more than 9,000,000 kw.-hr. The corresponding saving in coal would be 16,500 tons. This indicates the advantage due to a reduction in weight assumed at 2.5 tons, which is much less than would actually be secured.

There is also the advantage of the reduction in unsuspended weight and insufficiently suspended weight, the effect of which is to cause wear and tear on rails, joints, track foundations and rolling stock.

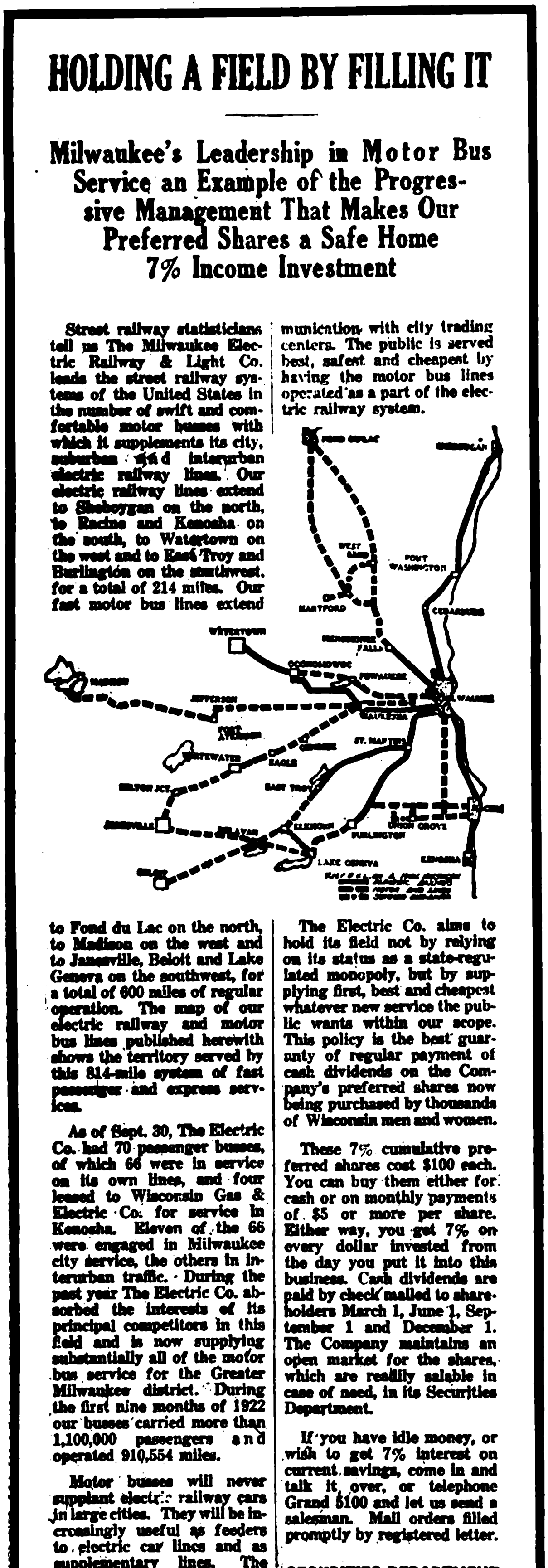
Actual tests of the new car show it to be capable of climbing a grade of 5.3 per cent with a load of more than 13 tons. Starting from rest at the foot of the grade, it reached a speed of 9 m.p.h. on the grade and under the same conditions reached about 5 m.p.h. when drawing an empty train weighing about 25 tons.

Experience with the braking equipment was remarkably satisfactory. The motor car alone was stopped on a downgrade of 2 per cent from a speed of 15 m.p.h. in less than 65 ft. With rheostat braking, arranged to limit the speed to about 6 m.p.h. on a grade of from 3 to 5 per cent, the resistance necessary was shown to be about 6 to 7 ohms.

In concluding his account of the new car, which he covered in an article in *L'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles*, Mr. Vergniole said that tramway construction has followed steam railroad models too far. Automobile construction, involving problems much more complex, has made remarkable progress in the last few years. The tramway conditions are much more nearly analagous to those of the auto-omnibus than they are to those of the railroads. It should be possible through the use of automobile technique, the employment of special steels and light metals, the perfecting of the electrical apparatus and particuarly the development of high-speed, light motors, to permit tramway cars to be built with weights comparable with those of the omnibus. In Paris the weight of tramway cars per seat is from 1.7 to 2.6 times that of a gasoline or electric omnibus.

"Holding a Field by Filling It"

An advertisement of the Milwaukee Electric Railway & Light Company which recently appeared in a Milwaukee paper is reproduced herewith. In the lines is the essence of volumes on how to finance and simultaneously better public relations. Between the lines is a significant story of one effective way of meeting bus competition.



HOLDING A FIELD BY FILLING IT

Milwaukee's Leadership in Motor Bus Service an Example of the Progressive Management That Makes Our Preferred Shares a Safe Home 7% Income Investment

Street railway statisticians tell us The Milwaukee Electric Railway & Light Co. leads the street railway systems of the United States in the number of swift and comfortable motor busses with which it supplements its city, suburban and interurban electric railway lines. Our electric railway lines extend to Sheboygan on the north, to Racine and Kenosha on the south, to Watertown on the west and to East Troy and Burlington on the southwest, for a total of 214 miles. Our fast motor bus lines extend to Fond du Lac on the north, to Madison on the west and to Janesville, Beloit and Lake Geneva on the southwest, for a total of 600 miles of regular operation. The map of our electric railway and motor bus lines published herewith shows the territory served by this 814-mile system of fast passenger and express services.

As of Sept. 30, The Electric Co. had 70 passenger busses, of which 66 were in service on its own lines, and four leased to Wisconsin Gas & Electric Co. for service in Kenosha. Eleven of the 66 were engaged in Milwaukee city service, the others in interurban traffic. During the past year The Electric Co. absorbed the interests of its principal competitors in this field and is now supplying substantially all of the motor bus service for the Greater Milwaukee district. During the first nine months of 1922 our busses carried more than 1,100,000 passengers and operated 910,554 miles.

Motor busses will never supplant electric railway cars in large cities. They will be increasingly useful as feeders to electric car lines and as supplementary lines. The motor bus has a large field, in interurban traffic, in which it will grow and prosper, affording hundreds of small communities, not served or inadequately served by railways, frequent quick communication with city trading centers. The public is served best, safest and cheapest by having the motor bus lines operated as a part of the electric railway system.

The Electric Co. aims to hold its field not by relying on its status as a state-regulated monopoly, but by supplying first, best and cheapest whatever new service the public wants within our scope. This policy is the best guaranty of regular payment of cash dividends on the Company's preferred shares now being purchased by thousands of Wisconsin men and women.

These 7% cumulative preferred shares cost $100 each. You can buy them either for cash or on monthly payments of $5 or more per share. Either way, you get 7% on every dollar invested from the day you put it into this business. Cash dividends are paid by check mailed to shareholders March 1, June 1, September 1 and December 1. The Company maintains an open market for the shares, which are readily salable in case of need, in its Securities Department.

If you have idle money, or wish to get 7% interest on current savings, come in and talk it over, or telephone Grand 5100 and let us send a salesman. Mail orders filled promptly by registered letter.

SECURITIES DEPARTMENT

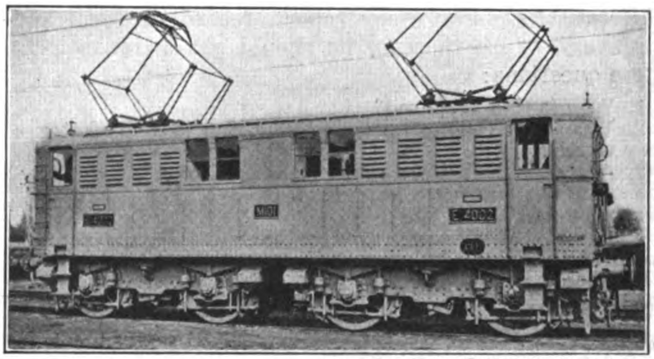
THE MILWAUKEE ELECTRIC
RAILWAY & LIGHT CO.,

Public Service Bldg.,
Milwaukee, Wis.

Midi Locomotive Tests Successful

First of Large Order of 1,500-Volt Direct-Current Locomotives Tested Between Pau and Lourdes on Midi System—Maximum Speed Is 60 M.p.h.

Great interest attaches to the recent track test of the first of the direct-current locomotives destined for use on the Midi Railway in France. The test was made between Pau and Lourdes, the locomotive having been built near Tarbes in southwest France by the French Electric Construction Company (Compagnie des Constructions électriques de France). It will be remembered that the Midi, previous to the war, had made investigations of the single-phase system and had under test several different makes of locomotive of this type.



©Wide World Photos

First Completed 1,500-Volt, 1,000-Hp. Locomotive for Midi Railway

The present locomotive, of which some of the details can be gathered from the accompanying illustration, is for use in freight service, local passenger service and express passenger service on heavy grades. Its weight is about 80 tons, or 20 tons per axle. Each truck carries two motors, capable of developing 250 hp. each continuously, or 350 hp. for one hour. The tractive effort is 16,500 lb. and the maximum speed is 60 m.p.h. The motors drive the axle through double-reduction gears, one set at each end of each motor shaft.

The contactors are operated mechanically through a motor-driven camshaft. The controller and contactor circuits are fed at 120 volts from a motor-generator set supplied from the 1,500-volt line. This set also supplies power for light, heat, compressor motors, etc. The group includes also an exciter generator for use while the locomotive is regenerating.

The main driving motors have forced ventilation, provided by fans, of which there is one for each truck. The fans are driven from the motor-generator set, which is located centrally in the cab on its floor. The motor-compressor groups, of which there are two, are placed at the ends of the cab.

Provision is made so that when several locomotives are used in a train in multiple-unit connection the low-tension circuits of the several groups of motor-generators can be coupled in parallel by means of special switches. The above details are taken from the issue of *le Génie Civil* for Nov. 11, 1922.

Letter to the Editors

On Statistics

FORD, BACON & DAVIS, INC.

NEW YORK, Nov. 27, 1922.

To the Editors:

The *Journal* never contained a truer or more timely word than its editorial paragraph of last week regarding the use and neglect of statistics. A rather extended opportunity for observation would lead one to believe that there is not a street railway office in the land which is not full of valueless figures, with more coming through the mill every day. The operation of a street railway is a big job and a man generally thinks he does well just to keep it running, and he is right. But he ought to set aside an hour some day to plan out an audit of his statistics. For every report, record or form and for every figure thereon, he should get an answer to these questions:

1. Why is this prepared?
2. What deductions can be drawn from it and what are they worth?
3. Are such deductions systematically drawn?
4. Are the figures right; that is, are they what they purport to be?
5. Can the form be improved so that: (a) It will be more useful? (b) It will be cheaper to prepare?
6. Does it pass under the eye of every one who can make good use of it?
7. Is it consistent with all other figures on the same subject?

It would seem that every one might agree that no figure should be prepared without a real purpose, either as a record, or to indicate efficiency and inefficiency, or to prevent inefficiency. It may be that a figure or form has value in one of these particulars, but does it have enough value to warrant the expense of preparing it and the danger of obscuring figures and deductions of undoubted value. The men who must draw the deductions are busy, so that things should come before them in as simple and vivid form as possible.

Drawing deductions from reports is a fine art. I remember a story in the *Journal* some years ago of a superintendent who came into his general manager's office highly elated because "the Smith Street Line hit 40 cents yesterday." This was in the old 5-cent fare days. The general manager said that any superintendent who let a line earn 40 cents gross revenue per car-mile ought to be fired. In the story, the superintendent had no come-back, but he might have retorted that it would depend upon the average length of haul, size of car, comparative travel in the two directions, per cent of transfers, and a few other things. Figures may not lie, but explanations of them sometimes do.

In the stress of operation, reports are often neglected. No one can get the ultimate essence of a report but the man in authority. However, he could get a lot of help down the line if he would sketch out the things he looks for and the meaning to him of the various figures. This would at least stimulate inquiry.

If figures are not right, it were better that they had never been made. Figures may be all right mathematically, and the books may balance, but if a figure is not exactly what it purports to be, it is wrong. Examination of books and records seldom fails to develop many instances of such errors. This is generally due to lack of consultation and co-operation between departments.

To make forms useful, they should answer specific questions which the man responsible for operation is always asking himself. They should throw light on every vital action or condition. In preparing a form, therefore, the man who is in charge of the work should have a large share. Failure to do this often results in the keeping of more or less private records by members of the organization who cannot get what they want through regular channels, or feel that they cannot rely on what they get.

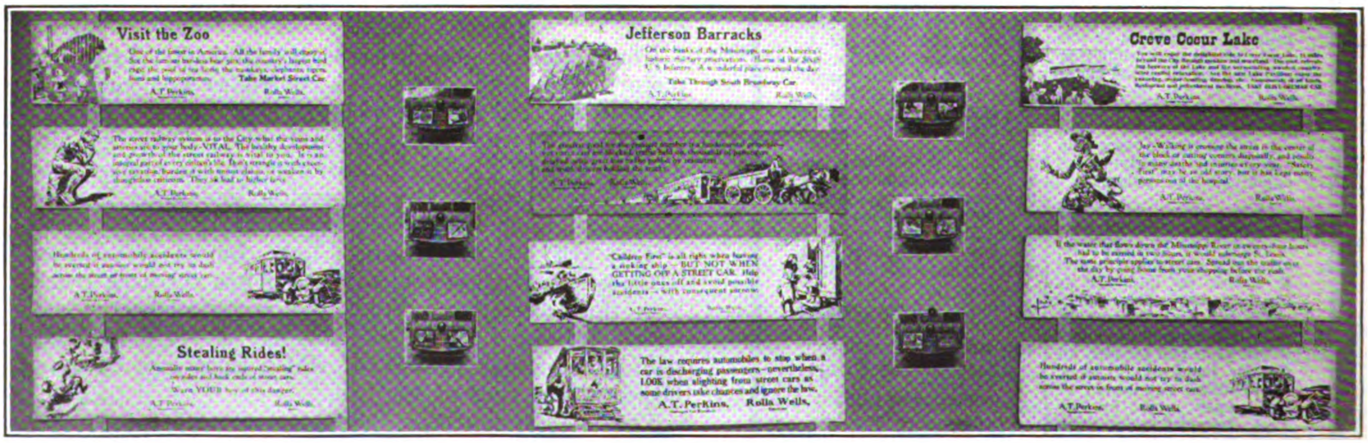
There is certainly a lot of money wasted in preparing statistics by cumbersome methods, duplications and otherwise. Clerk hire is cheap, but nothing short of 100 per cent efficiency is going to save the electric railway industry.

What is needed pretty generally is a good shaking out of dust, some intelligent analysis of cause and effect, and loyal co-operation between the people who use the figures and the people who make them.

If we should clean house, it may be that some of the commissions would see their way clear to simplifying their requirements in the way of statistics.

J. A. EMERY.

How the United Railways of St. Louis Keeps Its Public Informed



TRAFFIC-CREATING POSTERS DISPLAYED BY THE UNITED RAILWAYS, ST. LOUIS, MO., AT THE CHICAGO CONVENTION OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION. THESE HAVE BEEN APPEARING FROM TIME TO TIME ON THE COMPANY'S CARS

Use of One-Man Cars in Europe Spreading*

Operation with Short Cars Has Been Satisfactory and Some Long Cars Will Be Converted—Due to Customs in Europe Some Loading Difficulties Have Been Encountered, But These Are Gradually Being Overcome

BY P. M. NIEUWENHUIS
Manager of the
Arnhem Municipal Tramways

AFTER an extended study of the operation of safety cars in the United States, the writer recommended their trial to the City Council of Arnhem. The motive for the use of these cars in Arnhem was economic. On account of the increase in cost of labor, reduction in working hours, etc., the cost of operation per car-kilometer had increased from 14½ cents (Holland) in 1914 to 51 cents in 1920, although the fare had increased only from 7½ cents to 10 cents on the city lines and from 15 cents to 20 cents per trip on the suburban lines. It is not thought practicable to increase this fare or to make other economies in operation. The former headway in the city was ten minutes, reduced later to seven and a half minutes, and on the suburban lines was from ten to fifteen minutes. It was estimated that the cost of platform labor per car per year with two men, including wages, pensions, substitutes during the permitted vacation with pay for twelve days of the year, accident insurance, etc., was about 6,000 florins a year. The average number of hours worked by the men per day is seven hours and twenty minutes. The existence of a uniform fare on the suburban lines made the introduction of the American system of one-man car particularly easy, especially as during the rush hours a good many passengers ride on passes or commutation tickets, which it was necessary only to show to the operator.

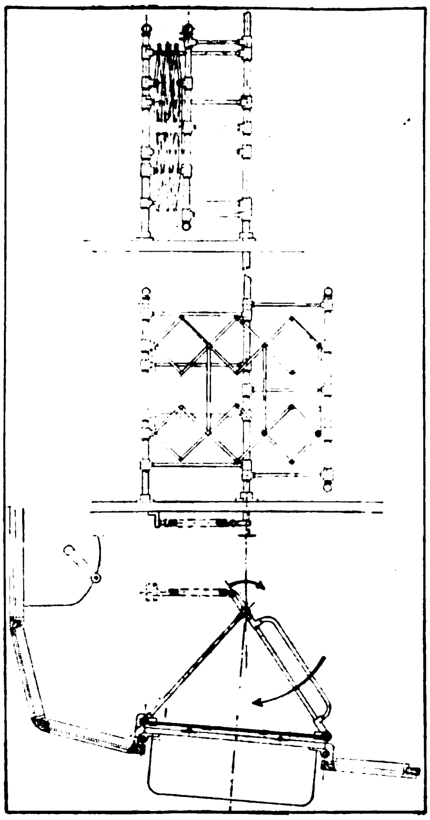
Three one-man safety cars were ordered from a Philadelphia car builder, but the standard design of Birney car had to be somewhat modified because the limit in width was 2.2 meters (7 ft. 2½ in.). These cars had not been received at the time the paper was written. It was also decided to rebuild some existing short cars for one-man operation, though, for reasons of cost, it was considered undesirable to install air brakes and pneumatic equipment for doors and steps, and manual control was used.

The design adopted was based somewhat on that used in Chicago on two-man cars, as observed by the writer.

The car is also supplied with push buttons.

COLLECTION OF FARES

On the one-man cars, of which we now have several, we have only the uniform fare of 10 cents, which entitles a passenger to a transfer. We do not use a fare box, but the operator carries one or two bundles, each consisting of 250 tickets, on which are indicated the date and the hour of issue, and a different color is used for each line. This ticket also serves as a transfer and on the second car is cancelled by having the end torn off. We looked into the subject of fare boxes and transfer issuing machines, but as we needed only a small number of the transfer issuing machines, the builder did not feel that it was worth while to modify his designs to fit the smaller transfer ticket which we wanted to use. As regards the fare box, my own opinion is that the ticket system which we are now using is simpler, but that is a matter of personal opinion only. I realize that fare boxes have been operated for some time with very satisfactory results at Haarlem. Finally we put in a stool for the operator to sit on.



AUTOMATICALLY CLOSING PANTOGRAPH GATE FOR EXIT ON ONE-MAN CARS AT ARNHEM

Having got good results with three rebuilt cars, we decided to change over to one-man operation all of our motor cars of the smaller types, or those with room for eighteen seated passengers and fourteen standing passengers. With these cars we were able to cut down headway in the city from ten minutes to seven and a half minutes, though employing a smaller number of men. In general the service has been entirely satisfactory.

The lines in Arnhem all terminate in a central square (Willemsplein) where the cars stop for a minute or two to permit passengers to change cars, but there has been no appreciable delay at this point, in spite of the large number of people transferring. Operating speeds have not been increased for these cars.

It must be admitted that there has been some delay in loading and some public dissatisfaction therewith. There will be, for instance, a woman returning from the market and carrying as many bundles as a Christmas tree who will mount the platform without the fare in her hand. She will then have to deposit her bundles on the platform, make a search for her pocketbook, which perhaps she can find and perhaps not in the place where she thought it was, then after paying her fare resume possession of her bundles. Then there is the man about town who will jump on the platform and pass quickly to his seat, cigar in mouth (we are in Holland you must remember) and become absorbed in the landscape until the operator touches him on the shoulder and reminds him he has not paid his fare. Then he has to take off his gloves, unbutton his coat, and so on. Fortunately the public is not composed in great part of such individuals.

I arranged with a newspaper man to study the situation, and he reported to me as a result of an inquiry that the public had already become accustomed to the change and he thought that it was a matter of time only that these delays would disappear. Already we are finding that the public is becoming accustomed to having the exact change, and it may be that at least in Holland we can enforce a rule that persons not so supplied will be refused passage.

In the old type two-man cars the public entered by the rear platform and left by the front platform. It is my opinion that only small sized one-man cars, or those capable of carrying from thirty-two to forty passengers, can use the same platform for entering and leaving. As soon as we change our larger cars (which seat twenty-four passengers and have standing room for twenty-five) to one-man operation, the passengers will have to enter by the front platform and leave by the rear.

This will make necessary the use of some device which will prevent passengers entering by the rear platform without paying fare. Two types of apparatus have been designed.

The first drawing shows a form of pantograph gate which takes relatively very little room on the platform, although it permits the rapid exit of passengers. At the same time the entrance of passengers is very difficult. The device consists of a V-shaped pipe framework on the platform with a pantograph barrier extending across the exit opening. The pipe barrier consists of two members, one of which is stationary and the other swings so as to provide the opening exit. The latter member is provided with a handle for the convenience of the passenger when leaving the car, as shown in the plan view. The swinging member, or gate, is normally held in the closed position, as shown in the plan, by means of a spring which operates on a bell crank lever fastened to the bottom of the rotating member underneath the car platform. To open the gate the passenger takes hold of the handle which is latched and swings the gate forward into the position shown at the top in the engraving. This movement folds the pantograph gate out of the way, leaving a passage wide enough for one passenger only. As soon as the passenger gets off the step the gate automatically closes.

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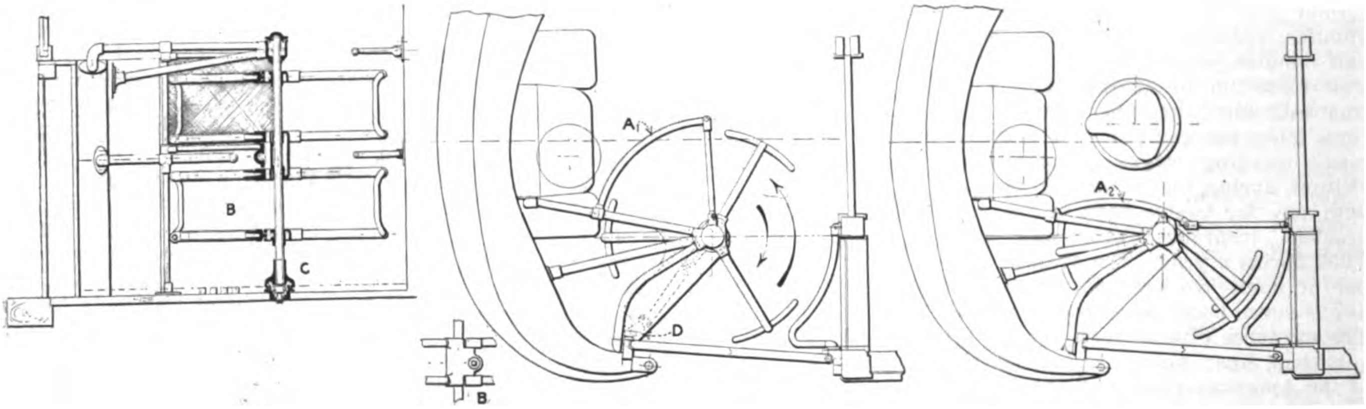
*Abstract of paper read at convention of Union International de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles. Brussels, Oct. 2-6, 1922.

One objection to this gate is that a passenger who is leaving the car by the rear platform may hold the gate open to permit another passenger to get on the car, but this probably would happen very rarely, because by a mirror the motorman can see everything that is going on. However, the company has also designed a different type of barrier in the form of a turnstile for possible use.



Folding Turnstile for Exit on One-Man Cars at Arnhem

The turnstile used is of a three-arm type and a particular feature lies in the fact that one of the arms can be folded in out of the way. This is of advantage at the operating end of the car, as it provides space for the operator which otherwise would be taken up by the turnstile. Another interesting detail is in connection with the pipe framework barriers. When the turnstile is used for the exit of passengers, a bracket arm shown at A_1 in the accompanying drawing projects out and is connected to the center of the turnstile by an arm. At the operating end of the car this arm can be unhooked from the center post and folded into the position shown in A-2. This effectually closes off the opening and at the same time provides additional space for the operator.

Zone Fare Not an Impediment

In introducing his paper Mr. Nieuwenhuis explained that before the adoption of the one-man car in Arnhem, he had made a trip to the United States in February, 1921, where he had made a special study of the one-man safety car. Although a little skeptical as to the conditions which he had read about in the American technical papers, he found on his arrival that he had not been deceived. In this case, Americans, always audacious in their enterprises, had taken the bull by the horns, and by the one-man car had been able practically to reduce the platform costs by half, with the same mileage. To do this in Holland would mean a saving of about 40 francs per motor car day.

Continuing, the speaker said he presumed many railway men would doubt the practicability of introducing the system in their own localities. Public opinion, they would say, would not stand for it, but are the European populations less civilized or less disciplined than those in America? In Arnhem, which has 80,000 inhabitants, and is the center of an agricultural district, the community has accepted the change with good grace. It is possible that in a more industrial locality, more hostility would be shown at first, but in the speaker's opinion everything depends on the way in which the system is introduced to the community and the preliminary educational work done.

Another objection raised to the system is that in most of the European cities the zone system is used; this means the distribution of a large number of fare receipts of different values, and the issuance of these fare receipts takes time and would increase the length of stops. This did not seem an insuperable objection to the speaker, since the fare system if complicated could be simplified. Certainly some effort is worth while to secure such an important saving. Mr. Nieuwenhuis then presented his report, of which an abstract has just been given.

New International Railway Association Organized

AN INTERNATIONAL railway conference was held recently in Paris, where the permanent headquarters of a new organization, the Union Internationale des Chemins de Fer, will be located. The organization has been formed for the purpose of facilitating international trade and traffic, and it includes Germany, as well as Japan and China. The official language will be French, and it is expected that a general meeting of the association will be held every five years.

Canadian Association to Meet in Toronto

SECRETARY D. N. GILL of the Canadian Electric Railway Association has sent to the membership a report of the executive and general meetings held in connection with the American Electric Railway Association convention at Chicago. It was decided to hold the 1923 convention at Toronto some time during the summer. It was suggested also that, as many Canadians are members of the American Electric Railway Association, a general meeting of the Canadian Association should be held each year during the convention of the former.

The secretary reported the appointment of the following permanent committees: On public relations—A. W. McLimont, Winnipeg, chairman; Max A. Pooler, St. John; E. W. Oliver, Toronto; George Kidd, Vancouver, and W. J. Lynch, Quebec. On standards—G. Gordon Gale, Hull, chairman; D. E. Blair, Montreal; E. P. Coleman, Hamilton; C. C. Curtis, Sydney; W. G. Murrin, Vancouver; H. T. Gibbs, Toronto; W. G. Gordon, Toronto, and Hugh Millar, Montreal. On safety—J. F. H. Wyse, Toronto, chairman; R. M. Reade, Quebec; C. C. Curtis, Sydney; W. R. McRae, Toronto; W. H. Darracott, Winnipeg, and James Lightbody, Vancouver.

H. E. Weyman, Levis, was appointed chairman of a committee which is to report on the advisability of representing to the dominion government certain changes in the classification of accounts and also on proper accounting for maintenance and depreciation of electric railway properties.

The secretary announced that the interests of the electric railway industry in Canada at the dominion and provincial capitals are being looked after by the following: Dominion—F. G. Burpee, Ottawa; Ontario—C. L. Wilson, Toronto; Quebec—W. J. Lynch; New Brunswick—J. A. Olive, St. John; Nova Scotia—W. L. Weston, Halifax; Manitoba—Edward Anderson, Winnipeg; Saskatchewan—D. W. Houston, Regina; Alberta—M. Freeman, Lethbridge, and British Columbia—V. Laursen, Vancouver.

Kentucky Association to Meet at University

THE Kentucky Association of Public Utilities has accepted the invitation of President Frank L. McVey of the University of Kentucky to hold its 1922 annual meeting at the university. The meeting will be held, therefore, at Lexington on Dec. 12. The four utility companies operated in Lexington will tender a dinner on the evening of Dec. 11 to the delegates and guests. On Dec. 12 the meeting will convene at 9 a.m. at the Phoenix Hotel, where there will be preliminary exercises. At 11 a.m. the delegates will board special cars of the Kentucky Traction & Terminal Company for transportation to the university, where at 11:30 the meeting will reconvene in joint session with the student body in the chapel.

At the close of the morning session an inspection of the grounds and buildings of the university will be made, followed by a luncheon and further inspection. At 2:30 p.m. the meeting will be held in Mechanical Hall on the campus.

New List of International Tramway Association Officers and Directors

THE Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles has announced the complete list of officers and committee members, as follows: Honorary president, Baron Janssen, vice-governor of the Société Générale de Belgique, Brussels; president, C. de Burlet, Brussels; vice-presidents, H. Géron, Brussels, and G. Pavie, Paris; directors J. F. S. Barth, Christiania; L. Boulle, Paris; H. Caufriez, Brussels; Marquis de Foronda, Barcelona; F. de Lancker, Brussels; W. Gerlicz, Lodz; J. Kessels, Brussels; F. Level, Paris; A. Mariage, Paris; Commander A. Natoli la Mantéa, Palermo; Kai Norregaard, Copenhagen; Ch. Rochat, Geneva; G. Salvadori, Turin; Ch. Thonet, Liége, and J. W. van der Vegt, Rotterdam.

Safety Code Revision Under Way

ON NOV. 2 there was held in New York City a meeting of the sectional committee of the American Engineering Standards Committee to consider possible revision of Section 2 of the National Electrical Safety Code. The proceedings were largely in the nature of organization. Dr. M. G. Lloyd, United States Bureau of Standards, was elected chairman; C. B. Hayden, of the Wisconsin Railroad Commission, vice-chairman, and Roy C. Dwyer, of the Bureau of Standards, secretary. It was decided that an executive committee consisting of these three officers and one representative each of the several interests represented should constitute the working body.

The executive committee will be made up as follows: Officers mentioned, and Thomas Sproule, Newark, N. J., representing National Electric Light Association; K. L. Wilkinson, New York City, American Telephone & Telegraph Company; Charles Rufus Harte, New Haven, Conn., American Electric Railway Association; George Gibbs, New York City, American Railway Association; A. E. Knowlton, Yale University, New Haven, Conn., Public Utilities Commission of Connecticut; R. A. Bloomsburg, New York City, National Association of Mutual Casualty Companies; R. A. Smith, Norfolk, Va., International Association of Municipal Electricians; R. W. E. Moore, East Pittsburgh, Pa., National Safety Council; Charles H. Gantz, Hamilton, Md., United States Department of Labor.

After consideration of a number of suggestions made by the main committee, the sub-committee adjourned to meet in Washington on Nov. 27.

Transit Expert Reviews Situation Abroad

D. L. Turner, of New York Transit Commission on Recent Trip Abroad Was Impressed by the Relation Between Size of Buildings and City Transportation Problems

AT A MEETING of the New York Chapter of the American Association of Engineers, held at the Hotel McAlpin, New York City, on Nov. 14, the speaker was Daniel L. Turner, consulting engineer of the New York Transit Commission. Mr. Turner had recently visited Glasgow, Liverpool, Edinburgh, London, Berlin, Paris, and other cities in Great Britain and on the Continent. He gave statistics of track mileage and the riding habits in a number of cities, together with running comments on his observations of electric railway construction and operating methods, including the allied subject of buses.

Contrasting conditions in New York City with those abroad, he said that the terrific congestion due to the construction of very high buildings, which threatened to make transportation an impossible problem in New York in a few years, is absent in the foreign cities. In the latter, five-story buildings are considered plenty high enough in the business districts, with the result that the traffic offered by the occupants of these buildings is fairly well distributed.

In Liverpool, said Mr. Turner, there is subway and surface transportation, with a few buses, with little belief in the usefulness of the last named. The great development there is in the direction of "arterial ways," which are wide highways with provision for tramways in the center. On these highways the cars can make such good speed as to bring them into the class of rapid transit.

Glasgow, wth 500 miles of single track, is much overbuilt from the tramway standpoint. Frequent service is given, with the result that the traffic at one time exceeded 500 rides per capita per annum. Fares are collected on the zone system, nearly 60 per cent of the passengers paying the minimum fare of 1½ cents. The municipality manufactures its own cars, under individual contracts with the workmen, and paints them different colors for the several routes. The property is in excellent condition and has reduced its indebtedness to $1,500,000, after paying which the city will own the property free of encumbrance. The manager, James Dalrymple, is buying in small lines for the city, and expects to electrify a seven-mile subway which is now operated by cable.

Edinburgh presented little of interest from the transit standpoint, as it is now being changed over from cable operation to the overhead trolley. There was great difficulty in bringing the citizens around to approve this change, but the changeover will soon be complete.

In London Mr. Turner was impressed by the fact that there is no competition between the buses and the rapid-transit lines, which serve different districts. The London County Council operates surface cars but is not permitted in the center of the city, where buses handle all surface traffic. A dozen or more different companies operate the rapid-transit lines. The buses work in well with the general transportation system of the city.

The London buses seem to be almost innumerable, and they follow many routes. It is, however, very easy to get around with their aid, as the routes are convenient and the buses are plainly marked with route signs.

One thing about London transportation is the alacrity with which passengers board and alight from the cars. They are expected to be prompt and not get hurt. Crowds of people desiring transportation are much more amenable to reason and control than in this country. Their reasonableness is shown further in the fact that they do not demand all-night transportation.

On the Continent Mr. Turner found conditions interesting, but with few features of great novelty. In Greater Berlin, which was formed in 1920, there are few rapid-transit facilities in the new sections. Much traffic is handled by the Stadtbahn, which is steam operated. The Ringbahn, a suburban system, carried considerable traffic, but rapid transit is not considered important and involves but 12 per cent of the total traffic. Six-car trains are the maximum. Eighty-five per cent of all traffic in the city is carried on the tramways, buses being very little used. Train operation is common, this plan being preferred to that of providing a large number of places per operating unit by the use of the double-deck plan which is common in England. The zone fare seems to be operating satisfactorily.

American Association News

Committee Appointments for 1922-1923

PRESIDENT C. D. EMMONS of the American Association and the presidents of the affiliated associations have completed their committee appointments for the current association year. These are listed below. These committees have already begun to function, the first meetings having been held in New York City last week.

American Association

Finance

J. H. Pardee, president J. G. White Management Corporation, New York, N. Y., chairman.
R. P. Stevens, New York, N. Y.
J. G. Barry, Schenectady, N. Y.

Policy

Britton I. Budd, president Metropolitan West Side Elevated Railway, Chicago, Ill., chairman.
J. P. Barnes, Louisville, Ky.
H. G. Bradlee, Boston, Mass.
H. E. Chubbuck, Peoria, Ill.
W. H. Sawyer, East St. Louis, Ill.
Paul Shoup, San Francisco, Calif.
H. D. Shute, East Pittsburgh, Pa.
J. J. Stanley, Cleveland, Ohio.
L. S. Storrs, New Haven, Conn.
Robert I. Todd, Indianapolis, Ind.

National Relations

Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman.
W. R. Alberger, Oakland, Calif.
P. S. Arkwright, Atlanta, Ga.
H. G. Bradlee, Boston, Mass.
Arthur W. Brady, Anderson, Ind.
C. D. Cass, Waterloo, Iowa.
F. C. Chambers, Des Moines, Iowa.
B. C. Cobb, New York, N. Y.
S. M. Curwen, Philadelphia, Pa.
J. H. Hanna, Washington, D. C.
T. N. McCarter, Newark, N. J.
John W. Shartel, Oklahoma City, Okla.
H. B. Weatherwax, Albany, N. Y.

Subjects and Meetings

J. N. Shannahan, president Newport News & Hampton Railway, Gas and Electric Company, Hampton, Va., chairman.
W. R. Alberger, Oakland, Calif.
H. V. Bozell, New York, N. Y.
Harlow C. Clark, Newark, N. J.
L. C. Datz, Memphis, Tenn.
C. R. Ellicott, New York, N. Y.
Edwin Gruhl, New York, N. Y.
W. F. Ham, Washington, D. C.
G. H. Harries, Chicago, Ill.
Henry R. Hayes, New York, N. Y.
W. V. Hill, San Francisco, Calif.
J. E. Hutcheson, Montreal, Can.
Wallace Muir, Lexington, Ky.
W. G. Nicholson, Omaha, Neb.
L. H. Palmer, Baltimore, Md.
C. C. Peirce, Boston, Mass.
G. T. Seely, Youngstown, Ohio.

Publicity

Frank R. Coates, president Community Traction Company, Toledo, Ohio, chairman.
Barron Collier, New York, N. Y., vice-chairman.
P. S. Arkwright, Atlanta, Ga.
J. F. Collins, Jackson, Mich.
P. H. Gadsden, Philadelphia, Pa.
L. E. Gould, Chicago, Ill.
F. T. Griffith, Portland, Ore.
A. A. Hale, Boston, Mass.
G. A. Richardson, Philadelphia, Pa.
L. S. Storrs, New Haven, Conn.
Elton S. Wilde, New Bedford, Mass.

Publications

L. S. Storrs, president The Connecticut Company, New Haven, Conn, chairman.
F. G. Buffe, Kansas City, Mo.
Harlow C. Clark, Newark, N. J.
Edwin C. Faber, Aurora, Ill.
P. N. Jones, Pittsburgh, Pa.
M. B. Lambert, East Pittsburgh, Pa.
C. C. Peirce, Boston, Mass.
A. M. Robinson, Philadelphia, Pa.
Martin Schreiber, Camden, N. J.
J. E. Wilkie, Chicago, Ill.

Company and Associate Membership

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
H. H. Adams, Chicago, Ill.
W. R. Alberger, Oakland, Calif.
A. C. Blinn, Akron, Ohio.
Luke C. Bradley, Houston, Tex.
F. D. Burpee, Ottawa, Ont.
T. C. Cherry, Syracuse, N. Y.
Jilson J. Coleman, Scranton, Pa.
L. E. Gould, Chicago, Ill.
Edward M. Graham, Bangor, Me.
A. L. Kempster, New Orleans, La.
George R. Lyman, New York, N. Y.
W. J. Lynch, Quebec, Que.
William H. McGrath, Seattle, Wash.
J. C. McQuiston, East Pittsburgh, Pa.
H. H. Norris, New York, N. Y.
E. M. Walker, Terre Haute, Ind.
E. P. Waller, Schenectady, N. Y.
E. A. West, Denver, Colo.
E. F. Wickwire, Mansfield, Ohio.
J. H. Wilson, Mobile, Ala.

Special Sub-Committee on Canadian Membership

W. J. Lynch, general manager Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, Que., chairman.
F. D. Burpee, Ottawa, Ont.

Company Section and Individual Membership

Martin Schreiber, manager southern division Public Service Railway, Camden, N. J., chairman.
C. P. Billings, Pittsburgh, Pa.
F. G. Buffe, Kansas City, Mo.
F. R. Coates (executive committee member), Toledo, Ohio.
W. J. Flickinger, New Haven, Conn.
J. H. Mallon, Chicago, Ill.
W. G. Murrin, Vancouver, B. C.
A. T. Perkins, St. Louis, Mo.
Harry Reid, Indianapolis, Ind.

Co-operation with State and Sectional Associations

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
Minnie B. W. Baker, Denver, Colo.
F. D. Beardslee, St. Louis, Mo.
John W. Belling, Boston, Mass.
R. M. Booker, Hampton, Va.
R. I. Brown, Little Rock, Ark.
John N. Cadby, Madison, Wis.
L. E. Earlywine, Indianapolis, Ind.
Rex Fowler, Des Moines, Iowa.
D. N. Gill, Hull, Que.
O. D Hall, Oklahoma City, Okla.
W. V. Hill, San Francisco, Calif.
E. F. Kelley, Louisville, Ky.
F. C. Lewis, Framingham, Mass.
A. Bliss McCrum, Charleston, W. Va.
T. T. Parker, Cottonwood Falls, Kan.
R. V. Prather, Springfield, Ill.
J. P. Ross, Birmingham, Ala.
W. F. Stanton, Rochester, N. Y.
Henry M. Stine, Harrisburg, Pa.
E. N. Willis, Dallas, Tex.

Construction and Maintenance of Highways for Motor Vehicles

W. J. Harvie, vice-president Auburn & Syracuse Electric Railroad, Auburn, N. Y., chairman.
C. M. Cheney, Des Moines, Iowa.
W. F. Graves, Montreal, Canada.
Samuel W. Greenland, Fort Wayne, Ind.
E. C. Johnson, Los Angeles, Calif.
E. P. Roundey, Utica, N. Y.
J. N. Shannahan (executive committee member), Hampton, Va.
H. M. Steward, Boston, Mass.

Co-operation of Manufacturers

E. F. Wickwire, secretary the Ohio Brass Company, Mansfield, Ohio, chairman.
R. E. Adreon, St. Louis, Mo.
George A. Barnes, New York, N. Y.
W. D. Blatz, Bridgeport, Conn.
C. R. Ellicott (executive committee member), New York, N. Y.
E. C. Faber, Aurora, Ill.
P. N. Jones, Pittsburgh, Pa.
J. C. McQuiston, East Pittsburgh, Pa.
E. B. Meissner, St. Louis, Mo.
George R. Rowland, New York, N. Y.
P. L. Thompson, New York, N. Y.
E. P. Waller, Schenectady, N. Y.

Education

Edward Dana, general manager Boston Elevated Railway, Boston, Mass., chairman.

Edward J. Blair, Chicago, Ill.
Thomas Conway, Jr., Aurora, Ill.
C. B. Fairchild, Philadelphia, Pa.
M. B. Lambert, East Pittsburgh, Pa.
M. McCants, San Francisco, Calif.
C. E. Morgan, Brooklyn, N. Y.
Henry H. Norris, New York, N. Y.
A. T. Perkins, St. Louis, Mo.
F. R. Phillips, Pittsburgh, Pa.
J. P. Pulliam, Milwaukee, Wis.
J. V. Sullivan, Chicago, Ill.
William Von Phul, New York, N. Y.
H. E. Weeks, Davenport, Iowa.
Thomas S. Wheelwright, Richmond, Va.

Electrolysis

W. J. Harvie, vice-president and general manager Auburn & Syracuse Electric Railroad, Auburn, N. Y., chairman.

James P. Barnes (executive committee member), Louisville, Ky.
L. P. Crecelius, Cleveland, Ohio.
Adrian Hughes, Jr., Baltimore, Md.
M. B. Rosevear, Newark, N. J.
G. W. Van Derzee, Milwaukee, Wis.

National Utility Associations

Randal Morgan, vice-president United Gas Improvement Company, Philadelphia, Pa., chairman.

Britton I. Budd, Chicago, Ill.
Joseph K. Choate, New York, N. Y.
F. R. Coates, Toledo, Ohio.
E. C. Faber, Aurora, Ill.
P. H. Gadsden, Philadelphia, Pa.
L. S. Storrs, New Haven, Conn.
R. I. Todd, Indianapolis, Ind.
J. W. Welsh, New York, N. Y.

Mail Pay

L. H. Palmer, assistant to president United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.

Gordon Campbell, York, Pa.
G. K. Jeffries, Indianapolis, Ind.
R. A. Leussler, Omaha, Neb.
Samuel Riddle, Louisville, Ky.
W. S. Rodger, Highland Park, Mich.
R. P. Stevens (executive committee member), New York, N. Y.
C. L. S. Tingley, Philadelphia, Pa.
H. B. Weatherwax, Albany, N. Y.

Co-operation with the National Safety Council

L. H. Palmer, assistant to president United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.

W. H. Boyce, New Brighton, Pa.
Wallace Muir, Lexington, Ky.

Trackless Transportation

H. B. Flowers, vice-president and general manager United Railways & Electric Company, Baltimore, Md., chairman.

J. H. Alexander, Cleveland, Ohio.
R. E. Danforth, Newark, N. J.
B. J. Fallon, Chicago, Ill.
George Keegan, New York, N. Y.
C. W. Kellogg, Boston, Mass.
T. J. McGill, Minneapolis, Minn.
H. A. Mullett, Milwaukee, Wis.
D. W. Pontius, Los Angeles, Calif.
H. B. Potter, Boston, Mass.
G. T. Seely, Youngstown, Ohio.
Claus Spreckels, San Diego, Calif.
E. A. West, Denver, Colo.

Uniform Motor Vehicle Regulatory Laws

C. D. Cass, general manager Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, chairman.

R. R. Bradley, Chicago, Ill.
A. W. Brady, Anderson, Ind.
H. E. Chubbuck (executive committee member), Peoria, Ill.
David Daly, Keokuk, Iowa.
D. W. Pontius, Los Angeles, Calif.
B. E. Tilton, Syracuse, N. Y.

Mid-Year Dinner

J. H. Hanna, vice-president Capital Traction Company, Washington, D. C., chairman.

H. L. Brown, New York, N. Y.
C. R. Ellicott, New York, N. Y.
H. B. Flowers, Baltimore, Md.
W. F. Ham, Washington, D. C.
W. H. Heulings, Jr., Philadelphia, Pa.
C. E. Morgan, Brooklyn, N. Y.
C. C. Peirce, Boston, Mass.
E. F. Wickwire, Mansfield, Ohio.

Accountants' Association

Engineering-Accounting (joint committee)

H. C. Kimball, auditing department Washington Railway & Electric Company, Washington, D. C., chairman.

J. C. Collins, Rochester, N. Y.
G. F. Dinneen, Holyoke, Mass.
A. W. Grady, Durham, N. C.
Charles H. Lahr, Akron, Ohio.

Relations with Other Associations

M. W. Glover, auditor West Penn Railways, Pittsburgh, Pa., chairman.

L. T. Hixson, Indianapolis, Ind.
I. A. May, New Haven, Conn.
F. H. Sillick, New York, N. Y.
F. E. Webster, Haverhill, Mass.

Committee Representing Accountants' Association at Convention of Railway and Utility Commissioners

Wallace L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa., chairman.

B. W. Fernald, Oakland, Calif.
C. S. Mitchell, Pittsburgh, Pa.

Standard Classification of Accounts

H. L. Wilson, treasurer Boston Elevated Railway, Boston, Mass., chairman.

M. W. Glover, Pittsburgh, Pa.
W. F. Ham, Washington, D. C.
Robert H. Wallis, Fitchburg, Mass.
Percy S. Young, Newark, N. J.

Stores-Accounting

R. A. Weston, special accountant The Connecticut Company, New Haven, Conn., chairman.

C. L. Bartlett, Haverhill, Mass.
Charles J. Bendt, Charleston, S. C.
G. H. Caskey, Hampton, Va.
A. E. Hatton, Pittsburgh, Pa.
J. Scott Pardoe, Philadelphia, Pa.
J. B. Walker, Dallas, Tex.

Claims Association

Automobile Accidents

G. T. Hellmuth, general claim agent Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.

J. G. Bruce, Indianapolis, Ind.
D. M. Finch, Des Moines, Iowa.
F. T. Gatrell, Chicago, Ill.
Carl Young, Milwaukee, Wis.

Resolutions

C. B. Proctor, claim agent Memphis Street Railway, Memphis, Tenn., chairman.

J. S. Harrison, Jacksonville, Fla.
William H. Renaud, New Orleans, La.

Subjects

H. V. Drown, general claim agent Public Service Railway, Newark, N. J., chairman.

Samuel B. Hare, Altoona, Pa.
J. J. Reynolds, Boston, Mass.

Accident Prevention

H. O. Allison, safety engineer Beaver Valley Traction Company, New Brighton, Pa., chairman.

W. G. Fitzpatrick, Detroit, Mich.
F. W. Mulford, Richmond, Va.

Engineering Association

Buildings and Structures

N. E. Drexler, chief engineer Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.

B. R. Brown, Dallas, Tex.
Charles W. Burke, Brooklyn, N. Y.
J. D. Kent, New York, N. Y.
James Link, Knoxville, Tenn.
John R. McKay, Fort Wayne, Ind.
L. L. Newman, Birmingham, Ala.
J. M. Penick, Richmond, Va.
S. J. Steiner, Aurora, Ill.
C. H. Clark (sponsor), Cleveland, Ohio.

Equipment

F. H. Miller, vice-president Louisville Railway, Louisville, Ky., chairman.

Walter S. Adams, Philadelphia, Pa.
Lewis J. Davis, Brooklyn, N. Y.
Charles Gordon, Chicago, Ill.
J. L. Gould, Wilmington, Del.
Stuart Hazlewood, Philadelphia, Pa.
J. M. Hipple, East Pittsburgh, Pa.
Robert Long, Altoona, Pa.
A. J. Miller, Ramapo, N. Y.
M. O'Brien, St. Louis, Mo.
E. D. Priest, Schenectady, N. Y.
Pierre V. C. See, Akron, Ohio.
C. W. Squier, New York, N. Y.
W. G. Stuck, Lexington, Kentucky.
A. Taurman, Birmingham, Ala.
Daniel Durie (sponsor), Connellsville, Pa.

Engineering-Accounting (joint committee)

L. R. Brown, office and field engineer New York State Railways, Rochester, N. Y., chairman.
E. D. Dreyfus, Pittsburgh, Pa.
Herbert Jackson, Washington, D. C.
Charles R. Harte (sponsor), New Haven, Conn.

Heavy Electric Traction

Sidney Withington, electrical engineer New York, New Haven & Hartford Railroad, New Haven, Conn., chairman.
A. H. Armstrong, Schenectady, N. Y.
R. Beeuwkes, Seattle, Wash.
J. M. Bosenbury, Peoria, Ill.
H. W. Cope, East Pittsburgh, Pa.
John C. Davidson, Bluefield, W. Va.
J. H. Davis, Baltimore, Md.
J. V. B. Duer, Altoona, Pa.
E. C. Johnson, Los Angeles, Calif.
Norman Litchfield, New York, N. Y.
A. S. Richey, Worcester, Mass.
C. H. Quereau, New York, N. Y.
L. S. Wells, New York, N. Y.
H. A. Johnson (sponsor), Chicago, Ill.

Power Distribution

M. B. Rosevear, superintendent of distribution Public Service Railway, Newark, N. J., chairman.
J. Walter Allen, Boston, Mass.
Robert L. Allen, Syracuse, N. Y.
S. H. Anderson, Los Angeles, Calif.
L. W. Birch, Mansfield, Ohio.
H. G. Burd, New York, N. Y.
Leslie E. Delf, Fort Worth, Tex.
Ralph W. Eaton, Providence, R. I.
L. F. Griffith, Little Rock, Ark.
H. D. Hawkes, Chicago, Ill.
H. M. Hobart, Schenectady, N. Y.
Adrian Hughes, Jr., Baltimore, Md.
Charles H. Jones, Chicago, Ill.
John Leisenring, Springfield, Ill.
F. McVittie, Rochester, N. Y.
H. S. Murphy, Philadelphia, Pa.
H. A. Pharo, Pittsburgh, Pa.
W. Schaake, East Pittsburgh, Pa.
A. Schlesinger, Indianapolis, Ind.
James Scott, Cleveland, Ohio.
F. J. White, Passaic, N. J.
Charles R. Harte (sponsor), New Haven, Conn.

Power Generation

C. A. Greenidge, chief engineer the J. G. White Management Corporation, New York, N. Y., chairman.
L. D. Bale, Cleveland, Ohio.
W. E. Bryan, St. Louis, Mo.
H. E. Davis, Utica, N. Y.
Frank G. Frost, New Orleans, La.
F. C. Hanker, East Pittsburgh, Pa.
G. H. Kelsay, Cleveland, Ohio.
H. A. Kidder, New York, N. Y.
G. Hall Roosevelt, Schenectady, N. Y.
G. W. Saathoff, New York, N. Y.
Walter C. Slade, Providence, R. I.
A. E. Stierly, Hampton, Va.
R. L. Weber, Kansas City, Mo.
G. W. Welsh, East St. Louis, Ill.
E. H. Scofield, (sponsor), Minneapolis, Minn.

Purchases and Stores

B. J. Yungbluth, supervisor purchases and supplies Philadelphia Rapid Transit Company, Philadelphia, Pa., chairman.
William C. Bell, Richmond, Va.
Jackson P. Dick, Atlanta, Ga.
J. E. Fleming, Washington, D. C.
W. N. Ford, Memphis, Tenn.
Harry H. Lloyd, Indianapolis, Ind.
W. S. Stackpole, Newark, N. J.
W. H. Staub, Baltimore, Md.
R. H. Dalgleish (sponsor), Washington, D. C.

Standards

Martin Schreiber, manager Southern division and chief engineer Public Service Railway, Camden, N. J., chairman.
H. L. Andrews, Schenectady, N. Y.
C. C. Beck, Mansfield, Ohio.
J. A. Brooks, Philadelphia, Pa.
C. H. Clark, Cleveland, Ohio.
W. G. Gove, Brooklyn, N. Y.
C. R. Harte, New Haven, Conn.
E. R. Hill, New York, N. Y.
H. A. Johnson, Chicago, Ill.
C. G. Keen, Philadelphia, Pa.
John Lindall, Boston, Mass.
H. H. Norris, New York, N. Y.
F. R. Phillips, Pittsburgh, Pa.
N. W. Storer, East Pittsburgh, Pa.
N. B. Trist, Pittsburgh, Pa.

Unification of Car Design

H. H. Adams, superintendent shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.
J. A. Brooks, Philadelphia, Pa.
G. L. Kippenberger, St. Louis, Mo.
John Lindall, Boston, Mass.
Victor Willoughby, New York, N. Y.
H. A. Johnson (sponsor), Chicago.

Way Matters

W. F. Graves, chief engineer Montreal Tramways, Montreal, Que., chairman.
C. A. Alden, Steelton, Pa.
V. Angerer, Easton, Pa.
S. Clay Baker, East St. Louis, Ill.
W. R. Dunham, Jr., New Haven, Conn.
E. B. Entwisle, Johnstown, Pa.
G. C. Estill, New Orleans, La.
R. B. Fisher, Harvey, Ill.
Chester F. Gailor, New York, N. Y.
Howard H. George, Newark, N. J.
A. E. Harvey, Kansas City, Mo.
J. H. Haylow, Memphis, Tenn.
E. M. T. Ryder, New York, N. Y.
Francis Tingley, Washington, D. C.
J. B. Tinnon, Joliet, Ill.
George T. Wilson, New York, N. Y.
W. W. Wysor, Baltimore, Md.
R. C. Cram (sponsor), Brooklyn, N. Y.

Specifications for Air Tanks

R. H. Dalgleish, chief engineer the Capital Traction Company, Washington, D. C., chairman.
L. J. Davis, Brooklyn, N. Y.
J. A. Leefer, Wilmerding, Pa.

Automatic Substations

Walter E. Bryan, superintendent of power United Railways of St. Louis, St. Louis, Mo., chairman.
L. D. Bale, Cleveland, Ohio.
C. A. Butcher, East Pittsburgh, Pa.
John M. Drabelle, Cedar Rapids, Iowa.
C. H. Jones, Chicago, Ill.
G. Hall Roosevelt, Schenectady, N. Y.
E. H. Scofield (sponsor), Minneapolis, Minn.

Engineering Manual

R. C. Cram, engineer surface roadway Brooklyn Rapid Transit Company, Brooklyn, N. Y., chairman.
C. R. Harte, New Haven, Conn.
Daniel Durie, Connellsville, Pa.

Wheel Tread and Flange Contours and Rail Head Contours

H. H. Adams, superintendent shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.
C. A. Alden, Steelton, Pa.
V. Angerer, Easton, Pa.
H. Fort Flowers, Findlay, Ohio.
George L. Fowler, New York, N. Y.
J. H. Hanna, Washington, D. C.
J. H. Lucas, Milwaukee, Wis.
A. D. McWhorter, Memphis, Tenn.
J. M. Yount, San Francisco, Calif.
A. J. Miller, Ramapo, N. Y.
J. F. Miller, Pittsburgh, Pa.

Wood Preservation

H. H. George, engineer maintenance of way Public Service Railway, Newark, N. J., chairman.
M. J. Curtin, Boston, Mass.
W. H. Fulweiler, Philadelphia, Pa.
Ernest F. Hartman, New York, N. Y.
E. L. Morier, New York, N. Y.
A. Schlesinger, Indianapolis, Md.
C. A. Smith, Atlanta, Ga.
A. P. Way, Philadelphia, Pa.
R. C. Cram (sponsor), Brooklyn, N.Y.

Transportation and Traffic Association

Accident Prevention

H. B. Potter, assistant general manager Boston Elevated Railway, Boston, Mass., chairman.
M. W. Bridges, Chicago, Ill.
Charles W. Chase, Gary, Ind.
James Harmon, Indianapolis, Ind.
S. B. Irelan, Montgomery, Ala.
A. W. Koehler, Rochester, N. Y.
C. E. Morgan, Brooklyn, N. Y.
R. M. Reade, Quebec, Que.
E. M. Walker, Terre Haute, Ind.
Alba H. Warren, El Paso, Tex.
J. V. Sullivan (sponsor), Chicago, Ill.
W. H. Boyce (sponsor), New Brighton, Pa.

Bus Operation

W. J. Flickinger, assistant to president The Connecticut Company, New Haven, Conn., chairman.
R. R. Anderson, Providence, R. I.
A. C. Blinn, Akron, Ohio.
Walter H. Burke, Boston, Mass.
A. H. Ferrandou, Washington, D. C.
R. N. Graham, Youngstown, Ohio.
J. M. Ives, Danbury, Conn.

H. A. Mullett, Milwaukee, Wis.
L. H. Palmer, Baltimore, Md.
Thomas S. Wheelwright, Richmond, Va.
J. K. Punderford (sponsor), New Haven, Conn.
Edward Dana (sponsor), Boston, Mass.

Merchandising Transportation

Samuel Riddle, vice-president Louisville Railway, Louisville, Ky., chairman.
H. H. Brown, Duluth, Minn.
G. Sabin Brush, Houston, Tex.
Frank L. Butler, Atlanta, Ga.
R. F. Carbutt, New York, N. Y.
John F. Collins, Jackson, Mich.
John A. Dewhurst, Philadelphia, Pa.
Samuel W. Greenland, Fort Wayne, Ind.
M. McCants, San Francisco, Calif.
A. W. McLimont, Winnipeg, Can.
Richard Meriwether, Dallas, Tex.
E. B. Moore, Fairmont, W. Va.
F. D. Norveil, Anderson, Ind.
O. A. Smith, Los Angeles, Calif.
E. C. Thomas, South Berwick, Me.
T. H. Tutwiler, Memphis, Tenn.
W. H. Boyce (sponsor), New Brighton, Pa.
Edward Dana (sponsor), Boston, Mass.

One-Man Car Operation

J. P. Pope, general manager Kentucky Traction & Terminal Company, Lexington, Ky., chairman.
N. W. Bolen, Newark, N. J.
H. C. Decamp, Dayton, Ohio.
J. E. Duffy, Syracuse, N. Y.
A. L. Reynolds, Youngstown, Ohio.
Karl A. Simmon, East Pittsburgh, Pa.
A. Swartz, Toledo, Ohio.
L. G. Van Ness, Cincinnati, Ohio.
W. E. Wood, Houston, Tex.
G. H. Clifford (sponsor), Fort Worth, Tex.
T. C. Cherry (sponsor), Syracuse, N. Y.

Traffic Regulations

H. B. Flowers, second vice-president and general manager the United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
Henry O. Butler, St. Louis, Mo.
F. R. Cogswell, Pittsburgh, Pa.
Frank P. Edinger, Chicago, Ill.
W. H. Maltbie, Baltimore, Md.
Paul E. Wilson, Cleveland, Ohio.

Camden Section Elects Officers

AT THE OCTOBER meeting of the Public Service Railway, Southern Division, company section, the following were elected to serve for the coming year: President, C. V. Wallace; vice-president, W. H. Wright; secretary, George C. Stoll; treasurer, P. O'Connor; directors, Hamilton C. Wonderly and Robert A. McArthur. Martin Schreiber, manager of the division, related some Chicago convention experiences, stating that he noted a spirit of optimism that has been missing at recent conventions.

In the general discussion one speaker referred to the possibility of using water on slippery rails instead of sand. He stated that this is being done in Liverpool, England. The discussion covered a number of practical points in connection with the daily operation of the system.

"Aera" Subscription Price

MENTION was made in the report of the executive committee meeting in last week's issue of this paper that an increase in the subscription rate to *Aera* was planned. Secretary Welsh has called attention to the fact that this is in error, and that no increase in the subscription rate to individuals is now contemplated.

Committee on National Relations Organizes

ANOTHER of the committees to meet early in the association year was that on national relations, of which Charles L. Henry, Indianapolis, Ind., is chairman. This committee met in New York City on Nov. 24 and discussed its work in a general way. No definite program was outlined, but a review of the situation of the electric railways in so far as they are affected by national legislation was taken. Besides the chairman there were present F. C. Chambers, Des Moines, Iowa; B. C. Cobb, New York City; S. M. Curwen, Philadelphia, Pa.; J. H. Hanna, Washington, D. C., and H. B. Weatherwax, Albany, N. Y.

Association Information and Service

THE American Association office announces the following additions to and revision of its service bulletins. These are available to all members of the association in good standing.

Public utility laws—A summary of the laws creating state public utility commissions, giving an analytical digest of the main provisions covering their jurisdiction and laws of the transportation companies. This is the seventh installment of the compilation which was begun in June.

Interurban wage agreements—An analysis of the agreements now in effect on the lines of twelve large interurban companies, showing in comparative form the provisions of each agreement.

Relief from paving burdens—A review of recent developments in the movement to obtain relief from municipal requirements to repave and maintain the pavement along electric railway tracks, with accounts of the leading cases which have recently been decided.

Automobile transportation costs—Some figures on costs of automobile operation in both passenger and freight services. Contains report of the Fifth Avenue Coach Company for the year ended June 30, 1922.

Trend of materials prices—A new edition of the association's compilation bringing down to date the trend of prices of materials used by the electric railways, as furnished by the manufacturers.

In addition to the above, supplements to the association's fare bulletin, wage bulletin and cost of living studies have been prepared, bringing them down to date.

Safety Experts to Study Automobile Accidents

ONE of the first, if not the first, of the newly appointed committees to organize and meet was the committee on accident prevention of the Transportation & Traffic Association. This met in New York City on Nov. 24 with Chairman H. B. Potter, Boston, Mass., in the chair. Other members present were H. O. Allison, New Brighton, Pa.; M. W. Bridges, Chicago, Ill.; C. W. Chase, Gary, Ind.; A. W. Koehler, Rochester, N. Y.; C. E. Morgan, Brooklyn, N. Y.; C. E. Mulford, Richmond, Va.; J. V. Sullivan, Chicago, Ill.; and E. M. Walker, Terre Haute, Ind. President G. T. Seely, of the T. & T. Association, also attended for part of the meeting.

After general discussion a sub-committee was appointed to draft a questionnaire asking for reports on different classes of accidents, particularly collisions with vehicles, derailments, car collisions, boarding and alighting accidents (for open and closed cars separately) and personal collisions. This committee will consist of Messrs. Bridges, Chase, Koehler, Boyce, Sullivan and Potter. It was also decided to have this committee co-operate with the corresponding committee of the Claims Association.

A second sub-committee was next appointed to prepare a compilation of methods of handling accident-prevention problems. The investigation will include plans for co-operating with civic and other bodies. The committee will comprise Messrs. Walker, Morgan, Reade, Warren and Harmon.

The following were appointed as a committee to co-operate with the American Association Committee of One Hundred (through Labert St. Clair), in regard to the preparation of safety posters which are to be distributed free to all electric railways in the United States. The appointees were: Messrs. Potter, Allison, Morgan, Sullivan and Walker.

Mr. Potter urged strongly the giving up of such outworn slogans as "Safety First," "Watch Your Step," etc., and recommended that new ones be formulated. One of the recent epigrams which had struck his fancy was: "Any accident may be fatal."

Mr. Seely addressed the committee, stating that it has a free hand to develop its subject, which is one of the most important ones at present in connection with the welfare of the industry. The situation is so alarming that anything that can be done to assist electric railways in reducing accident costs will be greatly appreciated.

Recent Happenings in Great Britain

London Underground Railways' New Capital, Extensions and Fare Reductions—Electrification of Southern Railways—More Time Saving

(From Our British News Representative)

ON OCT. 18 a prospectus was issued inviting subscriptions for additional capital to the amount of £3,958,000 for three of the London underground electric railway companies. Three days later it was announced that the issue was oversubscribed and that lists were closed. The rapidity of subscription was no doubt due to the fact that the new capital is guaranteed by the state both as to principal and interest under the trade facilities act of 1921. The issue was the second and final portion of the total guaranteed by the government.

In June last redeemable second debenture stock was put on the market at the price of 94 per cent by the London Electric Railway to the extent of £1,000,000 and by the City and South London Railway to the extent of £1,500,000. The present issue is of £2,250,000 of 4½ per cent redeemable second debenture stock in the case of the London Electric, £1,250,000 of the same denomination of stock for the City and South London, and £458,000 of 4½ per cent redeemable debenture stock of the Central London Railway, all dated 1942-72, and all at the issue price of 93 per cent. The stocks are of course trustee securities.

The new works to be carried out, some of which have already been begun, include the widening of the tunnels of the City and South London Railway, the construction of a connecting "tube" line between the railway at Euston and the Charing Cross and Hampstead Railway at Camdentown, the building of a surface continuation on the latter railway from Golder's Green to Edgware, the construction of an extension of the Great Northern & Piccadilly railway from Hammersmith to a junction with a branch of the London & South Western Railway, the provision of additional rolling stock, the improvement of stations and the substitution of escalators for lifts at a number of stations. These works will, among other things, enable through trains to be run from Edgmore in the north to Clapham in the south, and from Finsbury Park in the north to Richmond in the southwest, thus greatly adding to public facilities. Meantime work will be afforded to thousands of men, and it may be recalled that the object of passing the grade facilities act was to promote employment for the workless on undertakings of permanent public utility.

London Fares Reductions

The London underground railway companies have announced that a scheme of reductions in force will be put into operation on Jan. 1, 1923. The minimum 1½d. fare will be retained, but fares above that amount will be reduced to an approximate rate of 1d. per mile up to 4d., and thereafter the distances given for all fares above 4d. will be increased. This, it is hoped, will encourage the longer-distance traffic and help to build up the outer suburbs.

As under the London electric railways fares act, 1920, workmen's return fares are the single ordinary fares for the double journey, workmen will benefit correspondingly with the reduction in ordinary fares. The minimum return workman's fare, however, remains at 3d. Season ticket rates will be lowered in proportion to ordinary fares. Over all, the reductions affect one-third of the railway fares. The companies have in the past not charged up to their full statutory powers on the average, and when the reductions are carried out they will be charging less on the average than 1d. per mile.

Of course the companies hope that increased traffic will be a result of the reductions. Expenses have not yet fallen sufficiently to warrant wholly the present concessions. The cost of carrying a passenger for the first nine months of 1922 compared with the first nine months of 1921 shows a reduction of only three-tenths.

The Southern Railway Amalgamation

By the railways act of 1921 it was provided, inter alia, that all the steam railway companies of Great Britain should be combined into four great companies, and that work of amalgamation is now in progress. In regard to what is called the southern group, there is an interest for readers of this journal, because two out of the three railways to form the group, the London & South Western and the London, Brighton & South Coast Railways, already use electric traction on their London suburban lines, and the third, the South Eastern & Chatham Railway, proposes to adopt the same method on its suburban routes. Toward the end of October it was announced that these companies had at last agreed on the terms on which they will form the southern group.

The new amalgamated company will issue its stocks in exchange for those of the existing companies, and its capital will be £144,846,000. It does not seem to be anticipated that there will be much trouble in arranging for the running of through electric trains between the three hitherto existing undertakings should it be found desirable. At the same time it may be noted that the London & South Western uses direct current at 600 volts on a third-rail conductor, that the London & Brighton works on the single-phase high-tension system with overhead wires, and that the South Eastern & Chatham contemplates the use of high-tension direct current.

Speed in "Booking"

On the New York underground railways, where I believe a uniform fare for any distance prevails, the question of speed in issuing tickets (here called "booking") to passengers cannot present the same difficulty as it does on the London underground railways, where the fares are in proportion to distance to be traveled. As local city railways are extended, however, the necessity for graduated fares, even in America, becomes more acute, so that the following details supplied officially to me by the London underground railway companies may be of interest. It may be remarked that the comparison between the issuing of tickets by hand and by booking machine shows such an extraordinary efficiency and smartness on the part of the booking clerk that he ought to have substantial promotion.

The figures also indicate that if there are many booking clerks like him there is no material advantage in using a booking machine.

The test was taken during the heavy rush hour of 5:30 to 6:30 p.m. At Piccadilly Circus Station of the "Underground" during the hour a booking clerk issued by hand 809 tickets. Out of the number of passengers, 441 required change, the details being: Nine required ½d. change; three required change for 3d.; 157 needed change for 6d.; 130, change for 1s.; 85, change for 2s.; 51, change for 2s. 6d., and six, change for 10s. At Oxford Circus Station, by means of an electrically operated booking machine, between 5:30 and 6:30 p.m. a booking clerk issued 872 tickets.

During that time he was delayed in answering four inquiries for season tickets and in supplying from the emergency ticket rack six ordinary tickets which the machine was unable to meet. The machine delivers the change as well as the tickets.

Edinburgh Conversion

A remarkably smart bit of work was carried out by the Edinburgh tramway department in the early morning hours of Sunday, Oct. 22, in connection with the conversion of the lines from cable to electric traction. Up to midnight on Saturday, Oct. 21, cable cars were running in Princes Street, the great central thoroughfare of the city. At half-past nine o'clock on Sunday morning the first electric car ran over the route, which is about a mile long. All the work which could be done beforehand had of course been carried out. Squads of men, numbering in all about 300, were put on at several points about midnight to adjust the tracks and to erect the center poles and trolley wires. By Sunday evening a complete Princes Street service of cars was in operation by electric traction.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Service Complaint Filed

International Blames Inability of New Men—Local Service Restored in Lockport, "Owl" in Buffalo

Traffic experts of the Public Service Commission are making a survey of service on the local lines of the International Railway, Buffalo, N. Y., as a result of an appeal to the municipal authorities for improved service. City authorities have served notice on the company that cars must be operated with more regularity.

Herbert G. Tulley, president of the International, says the company has more than sufficient men to operate its local and interurban cars, but since the so-called Philadelphia vacationists have returned home, the new men being employed by the company have given considerable trouble. The claims department of the railway company has many accident and claims investigations under way.

The City Council unanimously adopted a resolution demanding that all the cars operated on the local lines of the International be equipped with life guards, emergency brakes and rear exits and crews must report all accidents to the police. This resolution was made necessary because of the increasing number of traffic accidents. The International did not appear in opposition to the proposed resolution. It is the company's contention that the city is without such authority as the Public Service Commission only has jurisdiction.

The activities of the claims department of the International and the Philadelphia Rapid Transit Company officers who have been detailed to strike duty in Buffalo are confined almost exclusively to getting evidence against jitney owners and drivers and arresting them. Several arrests are made daily and fines of $25 to $50 are imposed by the City Court Judges. The City Court calendar is now so congested with jitney cases demanding jury trials that it will keep many of the judges busy until next April hearing the evidence.

The International Railway has taken an appeal from the decision of the Appellate Division of the Supreme Court which upset the writ of mandamus obtained by the railway to compel Mayor Schwab to enforce the anti-jitney laws. The case now has been carried to the New York State Court of Appeals.

Local service on the Lockport lines of the International was restored Nov. 25. The city had been without local service since the start of the strike, July 1. Three days after service was restored Edgar J. Dickson, vice-president of the International, stated that riding was 50 per cent of normal, with little or no disorder by the strikers.

Half-hour "owl" service has been restored by the company on many of the local lines of the International in Buffalo. Other lines with no "owl" service since the strike are now operating on an hourly basis.

Police Chief Elliott of the city of Tonawanda has served notice on the International that cars run on lines within the city limits must not operate at a greater speed than 8 miles an hour. The action follows a vote by the Board of Aldermen, which is the result of the increasing number of accidents. The order affects the old Buffalo-Niagara Falls interurban line and the Buffalo-Kenmore-Gratwick line.

Will Spend $550,000 in 1923

The Virginia Railway & Power Company and the City of Petersburg, Va., will spend approximately $550,000 in 1923 in improvements and betterments. The improvement work includes new paving work, new tracks, a trackless trolley for Walnut Hill and the extension and enlargement of Petersburg hydro-electric development. The paving will cost about $150,000 and the new tracks and power plant will cost the company approximately $400,000.

The railway service will continue in the city as the Council rejected the trollibus proposal but the system will be operated in Walnut Hill. Two of the trackless trolley cars have already been ordered and probably will be in Petersburg by Jan. 1, 1923.

Bill Provides for Electrification

William J. MacDonald, a Boston real estate operator, recently filed with clerk of the House a bill authorizing the incorporation of the Boston Rapid Transit Company, for the purpose of financing the electrification of the railroads entering the north and south stations, for the construction of a union station in the Back Bay district and for authority to construct tunnels to connect the two leading stations with the Boston, Revere Beach & Lynn Railroad.

Under the terms of the bill the company is authorized to issue stock to an amount of not more than $100,000,000, with the right to increase its capital stock. The new company offers to electrify the Boston & Maine, Boston & Albany and the New Haven for a distance of 15 miles from the State House, operating for the benefit of the traveling public. The bill provides that the corporation shall file with the legislature, on or before Feb. 1, 1925, a report of the results of its negotiations accompanied by plans, terms, surveys, estimates and other data incidental to a comprehensive plan for consolidation of proposed lines.

Votes Down One-Man Car

City Council of Toledo Disapproves of Commissioner Cann's Plan for Changing Deficits Into Balances

One-man cars left the streets of Toledo, Ohio, at midnight on Thursday, Nov. 23, by vote of the City Council, which finally stood 16 to 3 against the new type of equipment.

Commissioner Wilfred E. Cann, who has made many changes in local operations to effect an operating deficit into balances each month for the stabilizing fund, in an effort to secure lower fares, recommended the one-man cars as one of the only remaining avenues to save money. The cars were placed in operation on the Bancroft line on July 1.

With these results Mr. Cann recommended to the Council committee the adoption of a weekly pass at $1 each as a trial with the idea of making the savings immediately available to the regular patrons in decreased fares. But the Council turned down the whole proposition largely on the recommendations of street car men and organized labor in general.

The ten one-man cars on the Bancroft line and twenty placed in operation a few weeks ago on the Cherry line were saving $3,750 a month, Mr. Cann told the Council. Approximately 50 per cent of the saving had been put back into increased service.

"By going back to the old type cars we lose the net savings and the public loses the net increase in service," declared the commissioner to the Council. "The surplus earnings for October which were credited to the stabilizing fund amounted to slightly less than $7,000. With the extremely high costs incident to operation of street railways today this surplus was effected by economies of such strict character that they cannot be continued."

Mr. Cann said that the total amount of money spent for maintenance of tracks, equipment and overhead per car-mile in Toledo was less now than the amount spent for maintenance of tracks alone in Detroit. An increase of 1 cent a car-mile for maintenance in October would have wiped out the entire surplus.

The commissioner argued that changes in equipment would do away with 75 per cent of the objections to the one-man car as it was placed in operation on the Cherry line—Peter Witt type with entrance and exit at front door—and that the weekly pass would eliminate the other 25 per cent of objections.

Savings effected by the one-man cars amounted to 22 per cent decrease in the labor costs of operation and at the same time a 6 per cent increase in service.

Readjustment Plan Operative

Final Steps Being Taken Under Which the Status of Affairs of New York Companies Will Be Changed

The so-called Interborough-Manhattan plan of readjustment, under which the intercorporate relations of the Interborough Rapid Transit Company and the Manhattan Railway, New York, will be placed on a new basis, has been declared operative by concurrent action of the three committees representing the security holders principally affected. The committee for Interborough-Metropolitan 4½ per cent bonds has accordingly called for payment on Dec. 27, the purchase price of the new ten-year 6 per cent Interborough notes, amounting to $160 on each $1,000 bond, or $32 a share of Interborough Rapid Transit Company stock.

Bondholders who exercise the option to take the notes will receive $160 in notes, 5.25 shares of Interborough Rapid Transit voting trust certificates, and five shares of Fifth Avenue Bus Corporation voting trust certificates. Bondholders who exercise the second option under the plan, that of not subscribing to the new notes, will receive 2.10 shares of Interborough Rapid Transit voting trust certificates and two shares of Fifth Avenue Bus stock certificates. Depositors of Interborough stock who elect to take the notes will get $32 a share in notes and one share of Interborough stock trust certificates.

Depositors of bonds with the committee who have not heretofore elected to subscribe to the notes may do so up to Dec. 27.

Execution of the readjustment plan, by relieving the Interborough Rapid Transit Company of a portion of the rental for the Manhattan Elevated lines and providing it with additional cash, is expected to work a practical reorganization of the company, putting it on its financial feet and ending threats of receivership. The holding company, Interborough-Consolidated Corporation, and all its stocks and bonds will cease to exist.

The capitalization of the combined Interborough Rapid Transit Company and Manhattan Railway will be as follows:

(1)	Interborough Rapid Transit Company 1st and refunding mortgage 5 per cent bonds........	$154,446,000
(2)	Interborough Rapid Transit Company 10 year 7 per cent notes secured by Interborough Rapid Transit Company bonds........	34,330,000
(3)	Manhattan Railway bonds.......	45,206,000
(4)	Manhattan Railway stock........	60,000,000
(5)	Interborough Rapid Transit Company unsecured 6 per cent notes.	10,500,000
(6)	Interborough Rapid Transit Company stock..................	35,000,000

All the other securities, including $45,700,000 principal amount of Interborough Consolidated Corporation preferred stock and 932,600 shares of no par value common stock of the same corporation, are wiped out. The $64,000,000 of 4½ per cent bonds of the Interborough Consolidated Company disappear and those who were formerly bondholders of that company now become stockholders of the Interborough Rapid Transit Company. The stock of the Interborough Rapid Transit Company was formerly pledged back of the Interborough-Consolidated bonds. The details of this plan were published in the *Electric Railway Journal* for Oct. 14, page 648.

As a step in the plan of readjustment the Fifth Avenue Bus Corporation was chartered in Delaware on Nov. 14 with a capital stock of $40,000,000. The details of this move were contained in a letter sent on Nov. 27 by the protective committee of the Interborough-Metropolitan 4½ per cent bonds to all bondholders.

The plan calls for a readjustment of the stock of the New York Transportation Company—a holding company owning the entire capital stock of the Fifth Avenue Coach Company, operating Fifth Avenue-Riverside Drive bus lines. The stock of the New York Transportation Company is now held by trustee in bankruptcy of the Interborough-Consolidated Corporation, which, under the Interborough-Metropolitan readjustment plan, will be liquidated.

According to the announcement the Interborough-Metropolitan Committee, Grayson M-P. Murphy, chairman, will acquire 103,574 shares of the New York Transportation stock now held by the bankrupt Interborough - Consolidated Corporation estate. This stock will be vested in the new bus company, which will issue enough no par value stock to provide five shares for each $1,000 of Interborough-Metropolitan 4½ per cent bonds, the stock so issued to be vested in voting trustees.

From time to time, it was stated, the new corporation probably will acquire additional stock of the New York Transportation Company, of which the general public now holds 131,476 shares, and that shares of the new concern shall be issued therefor. The Fifth Avenue Bus Corporation, it was explained, has offered to purchase the 103,574 shares of New York Transportation Company stock held by the Interborough-Consolidated Corporation at $3,262,581, or $31.50 a share, the market price as of Nov. 15.

The officers of the Fifth Avenue Bus Corporation are Grayson M-P. Murphy, president; Frederick Strauss, vice-president, and D. R. Noyes, treasurer. The directorate includes Charles H. Sabin, Charles S. Sargent Jr., Frederick T. Wood and Stephen Van Ness.

The Interborough Rapid Transit Company in September operated at a deficit of $464,759 after charges, compared with a deficit of $398,204 in September, 1921. Operating revenue increased $66,437 over revenue for September last year, while operating expenses and taxes increased $164,577, amounting to $2,977,649. A comparative statement of earnings for September, 1922 and 1921, follows:

	1922	1921
Gross..........................	$4,258,082	$4,191,645
Net after taxes..............	1,280,434	1,378,573
Total income................	1,331,008	1,425,409
*Deficit after charges........	466,759	398,204

* Exclusive of deficit accruals under the provisions of Contract No. 3 and related elevated certificates, which under these agreements with the city are payable from future earnings.

It is explained that the statement for September, 1922, is provisional pending final adoption of the Interborough-Manhattan plan, which provides for readjustment of fixed charges reducing Manhattan dividend rental, omitting temporarily sinking fund payment on Interborough first and refunding 5 per cent bonds and refunding existing 8 per cent obligations by issue of $34,330,000 of new 7 per cent ten-year notes. The deficit after charges for the three months ended Sept. 30, 1922, based on existing fixed charges, amounted $1,775,418.

In September both subway and elevated divisions of the Interborough system reported deficits after charges; the former shows a deficit of $46,962, compared with a surplus in September, 1921, of $10,195, the latter a deficit of $419,797, against a deficit last year of $408,398.

Holds One-Man Car Has Place

A systematic effort has been made by the Boston (Mass.) Elevated Railway to determine the precise place of the one-man car in the transportation system of Boston. It has held hearings in various sections to sound public opinion on the subject, trying to learn first hand what the patrons of the road think of the car. In conformity with the conclusions reached the company will recast its service and withdraw the one-man car from certain sections, and perhaps extend it to others.

The public trustees of the road held a meeting on Nov. 28 and passed the following vote on the subject:

> Voted: That the trustees of the Boston Elevated believe that the one-man car has a proper place upon the railway system which is under their management as the elevated, subway or tunnel train, the two-man car and the electric or motor omnibus each has its proper place, for the reason that rightly used the one-man car is a factor that makes possible more frequent service and extension of the 5-cent fare as well as economy in operation.
>
> Further voted, That the one-man car is not suited for operation under conditions of heavy traffic for the reason that under such conditions its use provokes and often seriously annoys passengers in boarding the car, and occasions delays which result in interruptions of schedule that interfere with efficient service; that therefore all changes necessary to bring the use of one-man cars under the rules above stated be promptly made.

No Prospects for Ending Strike

Efforts to end the strike of linemen and substation operators of the Cincinnati (Ohio) Traction Company have proved futile. H. H. Broach, International vice-president of the Brotherhood of Electrical Workers, who has been negotiating for the men, has left Cincinnati, apparently abandoning his efforts. The traction company has enough men at work to keep the lines in repair, according to Walter Draper, vice-president of the company. He said that the company was stringing no new lines at the present time, but that this work would be renewed Dec. 1 by men from another city.

The men went on a strike two weeks ago, when the traction company refused their request for a 25 per cent increase in salary.

Fifteen Injured in Interurban Accident

A Flint limited interurban car of the Detroit (Mich.) United Railway was hurled from its tracks when it hit an open switch at the Fair Grounds loop on Woodward Avenue, Detroit, on Friday evening, Nov. 17, and turned over, injuring fifteen of the seventy-five passengers aboard. The car covered a distance of about fifty feet after leaving the track, crossing the sidewalk and breaking a heavy pole supporting overhead telephone wiring before coming to a stop in the soft dirt in a vacant space beside the fair grounds.

Neither the motorman nor the conductor of the car was injured.

According to statements made shortly after the accident occurred, a city car using the same track had taken the electrically operated switch and entered the Fair Grounds loop shortly before the approach of the interurban. The switch remained open. It was reported that the switch would not close upon the approach of a car traveling faster than about twelve miles an hour. While the motorman stated that his car was going at the rate of about twenty or twenty-five miles an hour, some of the passengers were of the opinion that the speed was much greater.

When the trucks of the heavy car hit the loop the body of the car was hurled clear of the trucks. The fact that the accident did not prove more serious is attributed to the heavy construction of the car, which saved it from being smashed by the force with which it hit after leaving the open switch.

Patrolmen from a nearby booth notified the nearest station and fifteen patrolmen in the police flier arrived to take charge of the rescue work. A number of motorists also aided. The prompt work averted a panic.

After making their statements both members of the car crew were released.

Replies to One-Man Car Complaint

In reply to a letter by Paul A. Franke, secretary of the Twenty-Eighth Taxpayers' Protective Association, Brooklyn, N. Y., Lincoln C. Andrews, chief executive officer of the New York Transit Commission, upholds the uses of the one-man car. Mr. Franke calls the one-man cars "murder cars" and refers to an accident on Oct. 28 where a pedestrian was run over by one of these cars. In Mr. Andrews' reply it was made plain that the accident in question could not be attributed to carelessness on the part of the driver and that the records of the various companies throughout the country show that there are less street accidents from the use of one-man cars than there were when the same lines were operated by two-men cars. Further, that "the use of one-man car operation is being accepted and more and more broadly used throughout the country where traffic conditions and car equipment justify it."

In conclusion Mr. Andrews requests Mr. Franke to inspect the operation of a new type of one-man car equipment which has just been put into service on the Park Avenue line in Brooklyn.

Conferences on Wage Agreement

Officials of the Worcester Consolidated and the Springfield Street Railway Company are in conference with the officials of the Carmen's Union over the establishment of a wage agreement for 1923. They have held several conferences and have failed to reach an agreement.

Consequently the case will be submitted to a special board of arbitration. Bentley W. Warren will act for the companies and James H. Vahey for the unions, and if these men can come to an early agreement on a third arbitrator the case will come to a hearing within a week or two.

The men have asked for an increase in the maximum wages from 58 to 68 cents an hour, and the company has asked them to accept a reduction to 50 cents as the maximum. A reduction of 14 per cent is proposed for the trackmen and shop men.

News Notes

An Example of Spirit.—The Dallas (Tex.) Railway and its employees have contributed more than $2,000 for the support of Dallas charities during 1923.

Employees Perform.—The Colonial Minstrels, the members of which are Public Service Railway employees, recently conducted a successful two-night performance at Camden, N. J. William G. Scheina, assistant superintendent of the southern division of the railway, was the interlocutor.

Wage Agreement Continued.—The employees of the United Railways & Electric Company, Baltimore, Md., have accepted the offer of President C. D. Emmons to continue the present wage agreement. The contract which would have expired on Jan. 1, 1923, provides a scale of from 45 to 50 cents an hour for motormen and conductors.

Wages to Remain the Same.—Samuel W. McCall, neutral arbitrator in the Berkshire (Mass.) Street Railway's wage dispute, on Nov. 27, returned a report to the effect that wages shall remain the same for the year beginning June 1, 1922, as for the year preceding. Blue uniform men receive a maximum of 53 cents an hour. The 400 employees sought increases averaging about 25 per cent, while the company desired to reduce the pay by about 10 per cent.

Welfare Work Continues.—The director of the welfare department of the Interborough Rapid Transit Company, New York, N. Y., has submitted the annual report to the president and general manager for the year ended June 30, 1922. According to figures shown sixty-five men were listed on the pension payroll as of July 1, 1922. For the fiscal year ended June 30, 1922, the voluntary relief department paid out a total of $108,391, including sickness and accident benefits. The total amount of loans outstanding on June 30, 1922, amounted to $8,226.

Power Development Article Reprinted.—H. M. Atkinson, chairman of the board of directors of the Georgia Railway & Power Company, Atlanta, Ga., wrote an article in the Nov. 2 issue of the *Manufacturers' Record* entitled "Power Development of Georgia Railway & Power Company on Tallulah and Chattooga Rivers." The article has been reprinted in pamphlet form, with illustrations showing a remarkable series of aeroplane views of the properties and power development of the company in the counties of Habersham and Rabun, Georgia.

Protests Street Widening Plan.—An argument is on in Louisville, Ky., between merchants and the city administration over a proposed plan to widen two or three blocks of Fourth Avenue, the busiest street in the city, by cutting 15 ft. from the east side, with owners on the west side paying for the necessary changes. The change would result in resetting all car tracks, and perhaps result in less congestion in the widened area, but greater congestion where the street again narrowed. It would also cost the Louisville Railway a good deal of money in rebuilding its tracks.

Hydro Commission Favored.—By a vote of seven to five the City Council of Windsor, Ont., expressed its approval of the operation of the Windsor Municipal Railway by Ontario Hydro-Electric Commission. In other words the move of the transportation committee to call into conference delegates from other municipalities interested in the lines met with defeat. Alderman A. W. Jackson, who supported the recommendation of the committee, asserted that municipalities by their delegates should decide whether it was advisable to take advantage of the new municipal street act, and appoint a local commission to operate the railway system.

Seeks Twenty-five-Year Franchise.—The management of the Waterloo-Wellington Railway, an electric line operating between Kitchener and Bridgeport, has applied to the city for a twenty-five-year franchise. The present franchise ran out a year ago, and a year's extension was granted. This will be up in February. If the city will not grant the franchise the railway company was asked that the city of Kitchener purchase the line. The railway was offered to the city some years ago, and the City Council turned it down. The question has been turned over to the railway committee of the City Council, which will have a conference with the Light Commission.

Financial and Corporate

Valuation at $70,000,000

Brief Filed Fixes United Railways Valuation $20,000,000 Higher than Commission's Figure

Attorneys for the receiver of the United Railways of St. Louis have filed with the Missouri Public Service Commission at Jefferson City a brief declaring that the valuation of the company's property for rate-making purposes should be fixed at $70,000,000. This is $20,000,000 higher than the tentative valuation put on the property by the Public Service Commission in September, 1919.

The brief was filed by Charles W. Bates and T. E. Francis, attorneys for Rolla Wells, receiver of the United Railways, and for F. W. Doolittle and William H. Bennett, consulting engineers for the receiver.

It is stated by the brief:

> While under some theories of valuation announced by the courts and adopted by evaluating bodies as the yardstick by which to measure the present fair value of the property of a public utility for a rate base we should be justified in asking for a higher figure, we have concluded, after studying the evidence, that the above amount ($70,000,000) constituted the fair value of the property devoted to public use on Jan. 1, 1919.

After stating that additions to the property since Jan. 1, 1919, are matters for consideration by the technical staff of the commission, the brief says that the property involved included the United Railways and its subsidiaries, the Missouri Electric Railroad and the Florissant Construction, Real Estate and Investment Company, all referred to as "the company."

The brief outlined some statistical facts with respect to the United Railways. The company serves a population of about 1,000,000 and an area of approximately 240 square miles. It employs in the furnishing of transit service a total of 460 miles of track and overhead distribution system. It operates 1,449 passenger cars, 225 work service cars and three electric locomotives.

During the last calendar year for which complete figures are available (1921) the company, according to the brief, carried 282,447,190 revenue and 150,562,354 transfer passengers, a total of 433,009,544. In performing this service the receiver operated 44,301,764 car-miles and 4,789,450 car-hours, employing 3,508 trainmen and 2,118 other employees, including officers.

Purchase price paid to syndicates for shares of capital stock of underlying companies, measured by the market value of the securities of the United Railways given in payment	$32,811,105
Purchase of scattered stock of underlying companies	1,316,031
Bonds of underlying companies	13,980,100
New current assets of underlying companies assumed (a credit)	708,498
Purchase of suburban stock 1906	3,200,000
Suburban bonds assumed	7,500,000
Suburban current liabilities assumed	447,932
Construction 1890-1919	16,895,274
Working capital	2,253,876
Total	$76,895,820
To this is added $736,608 as the value of the Missouri Electric Company, making a grand total "historical cash investment" of	$77,632,428

The brief includes a table to show what is termed "the historical cash investment" of the United Railways and the Missouri Electric Company as of Jan. 1, 1919. The table for the United Railways is given herewith.

By "historical cash investment" is meant the aggregate purchase price paid by the United Railways for the property, together with the amount of working capital employed in operating the properties and the cost of constructing all extensions, additions and permanent improvements.

Recently Sold Property to Be Improved

The property of the Maumee Valley Railways & Light Company, sold at sheriff's sale to Marion Miller, president of the Home Savings Bank, Toledo, and chairman of the bondholders' protective committee, on Nov. 15, will be turned over to the Maumee Valley Railway. A reorganization and extensive improvements will be made with $100,000 of new capital.

The property sold for $50,000. It has been operating at a loss for the last three years.

Following recommendations of engineers who made a recent survey of the property one-man safety cars of the light interurban type will be put into service rather than gasoline-driven cars. Both had been under consideration. Seven of the new cars will be purchased. Heretofore the company has rented most of its equipment from the Community Traction Company.

The new company will seek twenty-year franchises in Maumee and Perrysburg, the twin villages up the river from Toledo. In return the railroad will promise twelve-minute headway service, the new equipment, and possibly reduction in fares. The general plan is more or less contingent upon the granting of the franchises.

The Maumee Valley Railway will have an authorized bond issue of $500,000, of which only $350,000 will be outstanding. There are $300,000 of 5 per cent underlying bonds of the old company represented by the bondholders' protective committee.

In addition the new company will issue $100,000 of preferred stock and $400,000 worth of common stock.

LeRoy Eastman, of the law firm of Smith, Baker, Effler, Allen & Eastman, is attorney for the bondholders' committee.

Electric Line Sold—Improvements and Extensions Contemplated

John B. Weekley of Birmingham has purchased the electric railway system of the Alabama Traction Company, which operates electric cars in Decatur and Albany, Ala. The consideration was not made public.

The Alabama Traction Company has been in the hands of a receiver for some time, hence the purchase of the electric property by Mr. Weekley depends upon the confirmation of the sale by the United States Court. A representative of Mr. Weekley said that the matter of confirmation of sale would come before the United States Court on Dec. 15, and that he was confident the sale would be confirmed at that time.

Mr. Weekley's representative stated that it was the intention of Mr. Weekley to organize a stock company, which would take over eventually the electric lines of Decatur and Albany. It is stated from Decatur that Mr. Weekley is contemplating improving and extending the lines, just as soon as the confirmation of the sale by the United States Court is completed and all necessary details are arranged.

Mr. Weekley was before the Decatur City Council recently and asked for a thirty-year franchise over the streets of that city for the operation of the electric lines. This franchise has been granted. A similar franchise was asked for at the hands of the Albany City Council. The Albany franchise is now in the hands of a committee, and reports from Albany say the franchise will be granted. The present franchise of the Alabama Traction Company has but a short time to run, it is stated.

The stock of the Alabama Traction Company is owned largely by Eastern interests, which have controlled the company for a number of years. The Alabama Traction Company is the oldest street car company in North Alabama. The company had its beginning in 1887 when Sam Wharton built about 2 miles of track and operated mule cars over these tracks. About the year 1906 Mr. Wharton sold out to a stock company, which converted the proposition into an electric street car system, connecting the cities of Decatur and Albany. The company went into bankruptcy about five years ago and since that time has been operated by a receiver.

Today the Alabama Traction Company's trackage is about 10 miles, the lines reaching the principal sections of Decatur and Albany. They have a number of modern street cars and a large brick carhouse and offices.

It is understood from Decatur that people in several of the outlying suburban sections of Decatur and Albany are asking for street car lines to be built to those sections. It is believed that Mr. Weekley and his company, when fully organized and ready for business, will extend the lines for several miles, reaching out to the principal suburbs of Decatur and Albany.

Improvement Seen in Brooklyn Report

An improved condition is noted in the four months' operation of the Brooklyn (N. Y.) Rapid Transit Company ended Oct. 31, 1922. Compared with a net income of $724,097 for the four months ended Oct. 31, 1921, the net for the same period this year stood at $1,032,114. Total operating revenues were $12,140,178 against $11,501,296 a year ago. Expenses this year were $7,982,153 against $7,618,286 for the same four months in 1921. The improvement was credited to strict economy.

Reorganization Plan Up for Approval

Approval of the reorganization of the Syracuse & Suburban Railroad, Syracuse, N. Y., as the Syracuse & Eastern Railroad has been asked of the Public Service Commission. Edward Powell, representing the bondholders who bought the road under foreclosure sale, made the application. The new concern asks authorization to issue $300,000 in common stock and $512,000 in bonds, which are to be delivered to the reorganization committee for payment of the railroad property.

The new company will not take over a spur line tapping Montclair and did not include it in its petition to the commission. The abandonment of the spur line has brought a wide protest.

October Operations in Toledo Show Surplus

October operations of the Community Traction Company, Toledo, Ohio, show that a surplus of $6,991 was added to the stabilizing fund, which now shows a balance of $174,313, according to the report made by Commissioner W. E. Cann to the Board of Control at its mid-month meeting.

The city ownership or sinking fund now amounts to $362,316, of which $255,000 is represented by 6 per cent bonds of the company which have been purchased.

During October the gross earnings amounted to $311,117, representing an increase of $6,746 over the same month last year.

Operating expenses also showed an increase of $10,620, due in large part to credit for overpayment on power returned last year. Increased maintenance and higher taxes produced a net income of $49,925, being approximately $10,000 less than for the month of October last year.

During the month there were operated 651,096 car-miles, as compared with 625,758 for October, 1921. Revenue passengers totaled 5,032,026, an increase of 285,326 over the same month last year. The increase in riding is due principally to elimination of direct bus competition and the improvement in industry.

Commissioner Cann gave the Board of Control a complete history of his dealings with the Council on the one-man car subject and outlined his belief that changes in equipment and trial of the weekly pass at $1 would show remarkable results in favor of the new one-man cars.

He said increased charges for maintenance would be necessary soon.

1921 Income Amounts to $230,531

The board of directors of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., recently submitted to the shareholders a report on the operations for the year ended Dec. 31, 1921. Railway operating revenues for 1921 were $2,512,540, against $2,092,334 for 1920. Operating expenses advanced from $1,534,206 in 1920 to $1,810,455 for the year ended Dec. 31, 1921. The net income in 1921 was $230,531.

This figure is considered low when compared with former years. In 1917 the net income was $462,651; 1918, $494,536; 1919, $319,400; 1920, $287,006. The 1921 figures include operation of the Annapolis Short Line.

Surplus of More Than $1,010,347 for Nine Months

For the first nine months of 1922 the Virginia Railway & Power Company, Richmond, Va., realized a surplus of $1,010,347 after deducting all items except depreciation and reserve. The gross earnings for the nine months' period in 1922 were $6,830,822, which represented a decrease of $778,233 over the same period in 1921. However, there was a decrease in expenses in 1922 amounting to $1,099,705. This decrease helped materially the net earnings of $2,583,487, an increase of $321,473 over the first nine months' net earnings of 1921. The company's statement shows a much improved financial condition.

Sioux City Railway and Light Properties Merge

The Sioux City Service Company and the Sioux City Gas & Electric Company recently came under the same control when a merger was completed on Nov. 2. This settlement places both companies under the control of the United Gas & Improvement Company, which has had an interest in the gas and light company at Sioux City for some time. The merger was in accordance with an ordinance passed by the City Council and approved by the people of Sioux City on Aug. 28. The property of the Service Company, which operates the railways in Sioux City and furnishes part of the power and lighting service, is valued at approximately $4,000,000.

H. L. Kirk, formerly general manager of the Service Company, has been elected president to replace R. J. Dunham, who has resigned. W. J. Bertke, formerly general superintendent of the Gas & Electric Company, has been elected vice-president and general manager of the Service Company. Mr. Bertke will hereafter be in charge of the operation of the street railway system in addition to the gas and electric properties.

The merger will mean little or no change in the railway service; however, ambitious plans have been laid for enlarging the gas and electric service through the installation of additional mains and transmission lines. The merger has also made possible the consolidation of the two power and lighting services so that they can now be operated as a unit.

Improvement in 1922 Operation Noted

The annual report of the United Light & Railways Company, Grand Rapids, Mich., for the calendar year 1921 contains a comparative statement of operation for the twelve months ended Sept. 30, 1922, compared with the twelve months ended Dec. 31, 1921. This statement shows the progress the company made during the first nine months of 1922. The gross earnings for the year ended Sept. 30, 1922, were $11,467,995, an increase of $93,179 over the calendar year ended Dec. 31, 1921. The operating expenses decreased from $8,002,742 to $7,886,079 for the twelve months ended Sept. 30, 1922. The balance after all dividend charges for the 1922 period was $982,899 against $833,201 for the year ended Dec. 31, 1921.

Financial News Notes

Authorizes Purchase.—The City Council of Toronto, Ont., has passed a by-law authorizing the purchase of the Toronto Suburban Railway, including the line to Guelph.

Authorizes Bond Issue.—The Missouri Public Service Commission has given authority to the Hannibal Railway & Electric Company, Hannibal, Mo., to issue $150,000 first mortgage 7 per cent bonds, due Nov. 1, 1932.

Bonds Offered.—Halsey, Stuart & Company, Philadelphia, Pa., are offering $3,500,000 of the Sioux City Gas & Electric Company's first mortgage 6 per cent gold bonds, series "A." The bonds, in denominations of $1,000, $500 and $100, are offered at 99½ and interest yielding about 6.05 per cent. The due date is Sept. 1, 1947.

Balance Shows Increase.—For the twelve months ended Oct. 31, 1922, the Republic Railway & Light Company, Youngstown, Ohio, reports gross earnings of $7,793,409, against $7,568,619 for the twelve months ended Oct. 31, 1921. Operating expenses and taxes in the 1922 period decreased $110,639. The balance for depreciation, dividends and surplus was $551,843 in 1922, an increase of $269,079 over the twelve-month period ended Oct. 31, 1921.

Traffic and Transportation

Council Rejects Proposal

Seattle Body Tables Mayor's Request for Lower Fare—Other Developments in Discussion

After extended discussion and debate by Mayor E. J. Brown and members of the City Council of Seattle on the advisability of bringing up for decision at this time the matter of a 5-cent fare on the lines of the Seattle (Wash.) Municipal Railway, the City Council, as a whole, voted to table the Mayor's most recent proposal submitted to the Council in letter form. The Mayor's letter recommended the adoption of a 5-cent carfare, effective Feb. 1, with the issuance of transfers only for tokens to be sold at the rate of four for 25 cents or 6¼ cents each. Mayor Brown had first intended that the matter as to whether the deficit caused by a 5-cent fare should be made up by taxation be submitted to the voters at the spring election, but decided later that this move would be inadvisable.

The City Council, after discussion of the Mayor's recommendation, tabled the letter, on the ground that it would be most impolitic to talk about reductions in carfare before the United States Circuit Court of Appeals renders a decision in the street car litigation now before it. Decision in the so-called "specific performance suit" brought by the Stone & Webster interests against the city in the street car litigation is expected daily. The case was heard two months ago by three judges of the Circuit Court of Appeals, sitting in Seattle, arguments being presented by the legal representatives of the Puget Sound Power & Light Company and the city of Seattle on Sept. 19.

In this case the power company asked for a decree directing that in event the revenues of the street railway are sufficient to pay the interest and principal on the $15,000,000 bonds given for the railway system, but not sufficient to pay all cost of maintenance and operation, the city should make up the deficit in cost of operation and maintenance out of the general tax fund or any other available fund.

Judge E. E. Cushman last spring before the State Supreme Court, in the "fourteen taxpayers" suit, made a decision that under no circumstances could the city's general fund be invaded for the support of the Municipal Railway. Following the State Supreme Court's decision, the city appealed the decision of Federal Judge Cushman in the specific performance suit to the United States Circuit Court of Appeals, asking that the decree entered by Judge Cushman be annulled and set aside. The Circuit Court of Appeals decision is the one expected daily.

There were other developments in the carfare discussion. Superintendent D. W. Henderson said that the railway could return to a 6¼-cent fare, that is, four tokens for 25 cents, by March 1, probably without any deficit. The Mayor rejected, on advice of Councilman Erickson and Superintendent Henderson, the idea of the weekly pass system. A discussion was held on the plan of adopting the pay-as-you-leave system of fare collection for outbound cars and pay-as-you-enter system for inbound cars.

MAYOR'S LETTER QUOTED

In his letter to the City Council, Mayor Brown said:

> The obligations of our transportation system were made under the present carfare charge, and all obligations due and payable will be met Feb. 1, 1923, and I see no reason why a reduction in carfare cannot be made to take effect on that date. Many plans have been suggested and I have given careful consideration to each and every one of them, carefully considering at all times that our transportation system should be popularized and brought into public favor by lowering the rate of charges on car-riding to the public and increasing the gross revenue.
>
> The pass system has been investigated. But the pass system would not give relief in lower carfare to the citizens of Seattle who are compelled to use the street cars, but would only afford cheaper transportation to those who are constantly moving about the city. It would give that class transportation far below cost.
>
> The people of our city are accustomed to using a transfer. If we were to abandon the transfer and sell car ride tokens at 4 cents, no one would pay 5 cents for a ride, when they could buy tokens for 4 cents. This would endanger the revenue and would compel transfer users to pay two fares, and would not be equitable.
>
> I believe that a 5-cent carfare for all straight rides will secure for our transportation system all the short rides that 4-cent tokens would do. I believe that our citizens are willing to pay 6¼ cents, or 25 cents for four tokens, in all cases where transfers are to be used.
>
> I do not believe that our homeowners should at any time be asked to make up any deficit that may arise from the operation of our transportation system.

Permits Elimination of Low Ticket Rate

The City Council of Meridian, Miss., recently granted the privilege to the Meridian Light & Railway Company of eliminating the present rate of 5 and 6¼ cents for tickets. This ticket rate will be replaced by a 7-cent ticket charge, to be sold in strips of five for 35 cents, and will have a universal transfer privilege. The present 10-cent cash fare and school ticket rate of 3⅓ cents will remain in force.

H. G. Bonner, general manager of the Meridian Light & Railway Company, sent a letter to the City Council requesting such changes because of the company's insufficient income. He said that the experiment with the 5-cent fare had proved a failure after a trial period of nine months. He claimed further that the results showed that the 5-cent ticket fare had increased riding to a very limited extent, so that the net result had been to decrease railway income about $113 a day as compared with the income for the same nine months of last year. In spite of materially reduced expenses the railway was now failing to make its operating and maintenance expenses by over $100 a day.

Fight on Jitneys Renewed

Company at Albany, N. Y., Determined Unfair Competition Growing Out of Strike Shall Stop

An aftermath of the United Traction Company's trolley strike in Albany and Troy a year ago is the continued operation of jitneys between Albany and Troy and Troy and Averill Park. Recently Justice Ellis J. Staley in the Supreme Court imposed a fine of $250 or thirty days in the Albany county jail on six operators of jitneys who have been operating in the face of an injunction granted during the strike by Justice Harold J. Hinman. Only two of the six adjudged guilty were present in the court at the time they were declared in contempt.

J. Stanley Carter, representing the United Traction Company, made proof of the service of charges of violations on sixteen men. Those not adjudged guilty were represented by attorneys, who asked for adjournments to make a defense. They were given until Nov. 29 to present affidavits disproving the charges, and at this time if Justice Staley is in doubt as to their guilt on the affidavits he will require the production of the witnesses on both sides at a hearing on Dec. 2 in special term.

OPPOSED TO ADJOURNMENT

Mr. Carter opposed any adjournment of the proceedings and said the injunction order was well known to the defendants operating jitneys illegally and that all the judges of the district have imposed fines on those who have been adjudged guilty for more than a year. He said they have been making a joke of the order of the court and persist in violating the law and the injunction.

The United Traction Company included many other alleged jitney operators in the show cause order, but they have not been served. Efforts will be made, Mr. Carter said, to bring these additional defendants into court to put an end to jitneying.

Warrants for the arrest and commitment of the six men adjudged guilty of contempt of court were placed in the hands of Sheriff John J. Allen, of Albany County, who will either collect the fines or take them to jail to serve their sentences.

The operation of jitneys between Albany and Troy, due to the fact that the boat line did not run ferries during the past summer on account of the coal situation, has been a particularly lucrative venture and the jitney operators have been willing to take the chance. While the fare on the jitneys is higher than that of the traction company many persons have preferred that means of transportation because of its celerity. The traction company is now determined to stamp out the last remaining signs of competition in this line.

Law Does Not Require Cut in Capital Traction Fare

In reply to an application of the Federation of Citizens' Associations seeking a reduction in fare on the lines of the Capital Traction Company, Washington, D. C., Corporation Counsel Stephens recently advised the Public Utilities Commission that the law did not require a cut in the fare on the Capital Traction cars on the ground that that company was earning more money than the Washington Railway & Electric Company. It was the position of the federation that the commission was acting without authority in maintaining the same fare for both companies when the rate gave the Capital Traction a larger return. It is believed that the commission will reject the application.

Arguing that the commission had no power under the law to fix a rate of return upon valuation which is greater for one company than for another, Mr. Stephens went on to say that the decisions of public utility commissions and courts throughout the country had established the principle that a public utility corporation had the right to earn a fair return upon the investment, which would have to be decided by the Public Utilities Commission having supervision of the subject. "Certainly," he said, "it cannot be conclusively said, as argued on behalf of the citizens' associations, that it is discrimination, within the meaning of the law, to allow one rate of return for one company and a larger rate for another, because the law is entirely silent upon this subject.

Concluding Mr. Stephens said in part:

> I do not think the argument could be maintained before any judicial tribunal that the commission is guilty of a discrimination, in the legal sense, in fixing the same rate of fare for both street railroad systems of the District of Columbia, especially so in view of the fact that it is generally recognized by those cognizant with the subject that to do so would seriously cripple, if not permanently wreck, one of the great transportation systems in the city.

Pass Plan Extended—Mayor Prefers Five-Cent Fare

The Tacoma Railway & Power Company has received notice of an extension of the pass system for ninety days, the initial trial period of the system expiring Nov. 26. During the trial period the company has built up its pass patronage from 7,000 to 11,000 a week, and company officials, including Manager Richard T. Sullivan, consider the system a success. The renewal of the trial period will run to Feb. 25, 1923, at which time the company hopes the system will have proved itself a success to the point of warranting its permanent adoption. Figures given out by the company show that the system has increased traffic during the non-peak hours to an average of 4½ cents per ride.

Mayor A. V. Fawcett, who has made a vigorous fight for a 5-cent fare for Tacoma residents and who started a bus system on routes where travel was heaviest in an effort to compel the traction company to grant a 5-cent fare, states that he would like to see the pass system made permanent, but that he also wanted a straight 5-cent fare for the workingman. Discussing the question, Mayor Fawcett said that the present system economically was beneficial to about half the residents of Tacoma as compared with previous cost conditions. He believed that the pass encouraged people to go down town more often and afforded more opportunity for spending money. He said he did not object to the pass plan, but believed the solution of the fare problem lay in the 5-cent rate.

Refuses Ordinance for Bus Operation

The City Council of Richmond, Ind., at a recent meeting, refused to consider an ordinance on third reading which would have granted a franchise to a company to operate passenger buses in the streets of that city. The ordinance was postponed indefinitely. The proposed bus line was to operate in competition with the car lines of the Terre Haute, Indianapolis & Eastern Traction Company. The Council was disposed to favor the bus lines when the ordinance was first introduced some weeks ago, but since that time there has been some criticism of the ordinance. The traction company has indicated its intention of improving city service where a survey indicates improvement is needed. New cars are to be put on some lines.

Pasadena Has "Weekly Pass"

Effective Nov. 27, the Pacific Electric Railway will establish a "weekly pass" plan on its local lines in Pasadena, Calif. This will provide passengers with a pass good for an unlimited number of local trips at a cost of $1 weekly. The pass is transferable; the only limitation is that the pass is honored for only one person on any one trip of a car.

The passes will be sold at local ticket offices of the company and on local cars beginning on Monday of each week and will be good for passage until midnight the following Sunday. They will be accepted on interurban trains for transportation within local zone fare limits. The company introduced the weekly pass plan for the first time on its local lines in September, 1922, in Riverside and Pomona, and Pasadena, the third point, is decided upon in a continuation of the plan to test the acceptability of the weekly pass to the patrons.

Another City Will Try "Pass"—It was recently announced by an official of the Interstate Public Service Company that the weekly pass plan would be adopted on the lines in New Albany, Ind. It will be the regular $1 transferable pass good for one week, although only one person may ride on it at a time. The date for starting the new plan has not been announced, but it is probable that it will be Dec. 3.

Rejects Application

Commission Disapproves Extension of Washington Bus Company's Lines—Railway Service Adequate

The Public Utilities Commission of the District of Columbia has declined to approve the application of the Washington Rapid Transit Company for an extension of its service. In refusing the petition the commission stated that earlier approval for the establishment of bus lines on a number of routes now being served had been given because at that time the street car lines were seemingly unable during the rush hours to provide adequate and convenient carrying capacity for the public. The number of car riders were then greater than at present, however, and the conditions that warranted the comparatively large invasions of the regions already served by the railway no longer present themselves.

If the Public Utilities Commission were now to grant further bus extensions of like character, while promoting the convenience of relatively few, they would tend to damage the interests of greater numbers of the people. The commission spoke further of the high investment required by the railway company in installing the underground type of construction and the fact that they are required to pay a tax of 4 per cent on their gross receipts, pave a large portion of the streets and pay the salaries of the street crossing policemen, all of which must be earned over and above the so-called fair return out of the receipts of the car riders.

The Public Utilities Commission said that certain diagonal streets not occupied by car lines lend themselves to a more direct and more rapid transportation than can be had on the railway lines and that bus lines had been permitted for that reason. Such bus lines, however, have invariably taken from the car companies the cream of their traffic—the short-haul rider—and this notwithstanding the fact that bus lines pay into the public treasury no portion of their gross receipts, no paving tax and nothing for street crossing policemen.

In opinion of the commission there is a legitimate field for bus service, but this does not lie in the multiplication of lines or vehicles reaching the heart of the city. It lies rather in providing service in extension of the street car lines into territory so thinly settled as not to justify the large investment necessary for street railway service.

The bus lines should be feeders. They should create business and not rob the street railways of the just reward due to their heavy investment for the public benefit. The commission also stated that such public service as was justified in a city should be owned and operated by the street railway companies and co-ordinated so that transfer privileges and other desirable joint relations would result.

Personal Mention

J. R. Ong Consultant

Mr. Ong Has Resigned from Atlanta Company to Take Up Independent Work

Another proof of scientific specialization in the field of mass transport is the creation of the job of transportation engineer, the man who co-ordinates the efforts of the mechanical department in providing the transportation equipment and of the operating department in handling that equipment to best advantage. It involves the analysis of operating methods to the end that good service may be rendered economically. One of the earliest workers in this field has been J. R. Ong, who after varied experience on both large and small properties and in both the operating and regulating fields has just hung out his shingle as consulting transportation engineer. He will make his headquarters at Piqua, Ohio, because of its central location.

J. R. ONG

Mr. Ong in taking up independent work resigns as transportation engineer of the Georgia Railway & Power Company, Atlanta, Ga. While connected with the Atlanta property he has done much to co-ordinate schedules with traffic and has been instrumental in planning methods to improve "on-time" operation; but even more to study the general trend of the city's growth so that proper provision would be made in the future for maintaining and bettering the company's standards of service. In this he has had the encouragement of F. L. Butler, general operating manager, who induced Mr. Ong to come to Atlanta after previous association with him in his work with the Winnipeg (Canada) Electric Railway.

A review of the positions which Mr. Ong has held indicates that he is well equipped for his new work. In 1909 he was graduated from Purdue University in electrical engineering, having previously been with the Indianapolis & Cincinnati Traction Company and the Chicago, Lake Shore & South Bend Railway in the car shops during the stressful period of construction and inaugural operation. From Purdue Mr. Ong became an apprentice with the Westinghouse Electric & Manufacturing Company at its main plant in East Pittsburgh and was later transferred to the company's Philadelphia sales office. In 1911 he became superintendent of substations on the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.

With the experience obtained in the manufacturing, commercial, construction and operating side of electric transportation, Mr. Ong has completed the circle by work with the regulating bodies. From 1912 to 1918 he was a member of the joint engineering staff serving the Railroad Commission of Wisconsin and the Wisconsin Tax Commission. In this position he not only made investigations of street and interurban railway service matters but was also engaged in the valuation of these properties. Later he resigned to become traffic engineer for the board of control of the Kansas City Railways, following which he went to Winnipeg, where he made a fine record for economical operation, at the same time maintaining a high standard of service.

Municipal Railway Advocate Will Go to Washington

James Couzens, Mayor of Detroit, has been appointed by Gov. Alexander J. Groesbeck as United States Senator from Michigan. He will fill the unexpired term of former Senator T. H. Newberry, resigned. The appointment has been accepted.

Mayor Couzens has long been a prominent figure in Detroit. In 1919 his proposition to purchase the Detroit United Railway lines was defeated. Undaunted, he obtained permission from the voters to build a municipal system. Later, he arranged for the purchase of the privately-owned system and, after the voters had approved, consolidated it with the new municipal lines. This undertaking by the city of Detroit became effective last May. Complete details of the taking over of the lines were given in the *Electric Railway Journal*, issue of May 20, 1922.

New Director in Electrical Engineering School

Paul M. Lincoln has recently been appointed director of the school of electrical engineering in the College of Engineering, Cornell University. He succeeds in this position the late Alexander Gray. Mr. Lincoln brings to his new position a practical engineering experience of nearly thirty years with wide connections in the engineering world. He has been connected with the Short Electric Company, Cleveland; the Westinghouse Electric & Manufacturing Company, Niagara Falls Power Company and the Lincoln Electric Company, which had been organized by his older brother in 1894. For many years he has taken an active interest in the affairs of the American Institute of Electrical Engineers. In 1902 he invented the synchroscope, a device which has come into universal use where alternating-current machines are paralleled. For this invention he was awarded the John Scott Medal by the city of Philadelphia on recommendation of the Franklin Institute of that city.

Edited from the Cars

"Boise Valley Stotts" Has Traveled 121,680 Miles by Interurban Railroad in Quest of News

Editing a department of a well-established daily newspaper literally from an electric railroad is unique even in these modern days, but it has been done for almost seven years by James R. Stotts, editor of the Loop Department of the Boise *Evening Capital News*, better known throughout Idaho, Oregon and Washington as "Boise Valley Stotts" because of the big part he has played the past thirteen years in the development of the Boise Valley and its agricultural, horticultural, dairying and livestock raising industries.

J. R. STOTTS

His faith in the Boise Valley since he came to it in the early part of 1910 has been of an optimistic nature and his vision of the greatness of its future has been clear, for before the Gem Irrigation district tributary to the Boise Valley was reclaimed he traveled over the great desert then comprising it and predicted its ultimate reclamation. It was on April 1, 1916, that Mr. Stotts initiated the "Interurban Department" of the evening paper of Boise, using the interurban electric railroad of the Boise Valley Traction Company in making his daily 60-mile trip around the valley, and from the date of the initiation of his department up to the present he has never had a vacation and has missed only one day from his work, that day's absence having been due to sickness. Up to Oct. 1 of the present year Mr. Stotts had worked 2,027 days, used 121,680 miles of interurban railroad mileage and written for his department approximately 10,000 columns of news matter.

The psychology and value of "Touching Elbows with Folks" and especially those engaged in agriculture is thoroughly understood by him and it is probable that he knows and can call by name not less than 20,000 people of the different communities of the valley. He knows their environments, has studied their industries and is constantly active in every movement for the progress of those industries. One of his penchants is getting the view of the other fellow and understanding his problems. If Bill Smith and his neighbors import a pure-bred bull into the community they tell "Boise Valley Stotts" and he writes of it. If one of them has raised the standard of his hogs "Boise Valley Stotts" is advised and the incident is given publicity, or if a bumper crop has been produced he is told of it. He has a mania for statistics and he can tell you the exact annual revenue of any of the valley's industries or the exact annual shipment of any commodity and its total value.

Both of the local newspapers of Boise carry an "Interurban Loop Department" and this results in considerable free and valuable advertising for the traction company.

Guy A. Richardson Resigns

Guy A. Richardson, vice-president in charge of operation of the Philadelphia (Pa.) Rapid Transit Company, has announced his resignation. The reason for his leaving the Mitten forces was not disclosed. It was said that Mr. Richardson had originally intended to resign on Oct. 13, but had remained to assist in the scheduling of the Frankford Elevated Market Street subway routes.

In April, 1919, Mr. Richardson came to Philadelphia as superintendent of transportation, leaving the position of general superintendent of the Puget Sound Traction, Light & Power Company. Within a year he was elected vice-president of the company, becoming one of the youngest electric railway executives in the country. On one occasion Mr. Mitten pronounced Mr. Richardson "the best transportation operating engineer in America."

R. F. Tyson, assistant to Mr. Richardson, will temporarily assume the duties of vice-president.

A. E. Duty Dead

A. E. Duty, assistant general manager of the Cleveland (Ohio) Railway, died on Nov. 29. Mr. Duty had been with the electric transportation system in Cleveland for more than fifty years. He served from 1912 until eight months ago as general superintendent of transportation, at which time he was promoted, on the death of George L. Radcliffe, to the position of assistant general manager.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Commercial Community Co-operates

An extract from the forthcoming annual report of the Secretary of Commerce for the fiscal year 1921-1922 refers to the administrative work of the department in the matter of revising commercial statistics. It said that through the manufacturers' associations, committees were created in the principal industries, and upon their advice the work of the Bureau of the Census in this important direction had been reorganized and simplified. Further, that co-operation had also been established with various trade associations for the proper publication of current statistics bearing on production and distribution, and the monthly publication entitled "Survey of Current Business" had been started by the department and had been greatly welcomed by the business community.

Co-operation on Specifications for Federal Purchases

The American Engineering Standards Committee has appointed a standing committee on co-operation with the Federal Specifications Board with the object in view of eliminating the differences between specifications for government purchases and the usual practice of commercial supplies. Many manufacturers of electric railway supplies furnish the government with materials, so that this co-operation promoted through this committee "will give the industry a better opportunity to participate in the development of specifications for government purchases and it will at the same time bring to the government, to a greater degree than has heretofore been possible, the talent of the 200 industrial organizations co-operating in the work of the American Engineering Standards Committee." It is expected that the net result will be national specifications recognized by the industry and government alike.

Advice Offered on Export Problems

The National Foreign Trade Council New York, N. Y., has announced the organization of a Trade Adviser Service "to act throughout the year as a medium for the interchange of experience on foreign trade problems." According to the anouncement more than 100 leading foreign trade executives from all parts of the United States have agreed to co-operate in this work.

This service will be given without obligation to the inquirer and without remuneration to the adviser "solely with the bigger and broader point in view of assisting in the development of American foreign trade."

The general chairman of the Trade

ELECTRIC RAILWAY MATERIAL PRICES—NOV. 28, 1922

Metals—New York

Copper, electrolytic, cents per lb	13.625
Lead, cents per lb	7.10
Nickel, cents per lb	39.00
Zinc, cents per lb	6.975
Tin, Straits, cents per lb	36.50
Aluminum, 98 to 99 per cent, cents per lb	22.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	35.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$8.00
Somerset mine run, Boston	4.00
Pittsburgh mine run, Pittsburgh	2.625
Franklin, Ill., screenings, Chicago	2.50
Central, Ill., screenings, Chicago	1.675
Kansas Screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$40.00
Standard open hearth rails, gross ton	40.00
Railroad spikes, drive, Pittsburgh base, cents per lb	2.75
Tie plates (flat type), cents per lb	2.35
Angle bars, cents per lb	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.17
Steel bars, cents per lb	2.00
Ties, white oak, Chicago, 6i n. x 8 in. x 8½ ft.	1.40

Hardware—Pittsburgh

Wire nails, base per keg	2.75
Sheet iron, (28 gage), cents per lb	3.00
Sheet iron, galvanised, (28 gage), cents per lb	4.00
Galvanized barbed wire, cents per lb	3.40
Galvanized wire, ordinary, cents per lb	2.50

Waste—New York

Waste, wool, cents per lb	15.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	14.00
Colored	12.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	90.00
White lead, (100 lb. keg), cents per lb	12.125
Turpentine, (bbl. lots), per gal	$1.55
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength, all sizes, A quality), discount*	85.0%
Putty, 5 lb. tins, cents per lb	5.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	15.75
Rubber-covered wire, No. 14, per 1,000 ft	6.70
Weatherproof wire base, cents per lb	16.00

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd	$3.35
Common, per sq.yd	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.39
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	50.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	2.60
Gravel, ¾-in., cu.yd., N. Y	2.00
Sand, cu.yd., N. Y	1.00

Old Metals—New York

Heavy copper, cents per lb	12.00
Light copper, cents per lb	9.50
Heavy brass, cents per lb	6.50
Zinc, old scrap, cents per lb	4.50
Yellow brass, cents per lb (heavy)	7.00
Lead, heavy, cents per lb	5.75
Steel car axles, Chicago, net ton	$18.00
Old car wheels, Chicago, gross ton	16.50
Rails (short), Chicago, gross ton	18.75
Rails (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	9.75

Adviser Service is E. P. Thomas, president United States Steel Products Company; A. E. Ashburner, American Multigraph Sales Company is vice-chairman, and C. J. Warren, Remington Typewriter Company, is executive chairman.

Automatic Substations for Baltimore

The United Railways & Electric Company is contemplating the installation of automatic substation equipment in its substations during 1923. A study of the advantages of such installation is now being made under the direction of Vice-President H. B. Flowers.

Rolling Stock

Maumee Valley Railway, Toledo, Ohio, the new company formed by the acquisition of the Maumee Valley Railways & Light Company, will make extensive improvements to the system. Seven new cars will be purchased.

United Railways, St. Louis, Mo., has been authorized, through Rolla Wells, receiver, by Judge Faris in the United States Court to expend $1,227,902 for fifty new cars and to meet interest on bonds and current expenses.

New York State Railways, Syracuse, N. Y., suffered the loss of the Oneida carhouse by fire. The loss is in excess of $100,000. Four trolleys, two of the third-rail type, in use between Syracuse and Utica, were destroyed. These cars were each valued at $30,000. The building was totally destroyed.

Track and Roadway

Southern Pacific Company, San Francisco, Calif., has received permission from the Railroad Commission to relocate a spur track at grade across a county highway in the vicinity of Visalia, Tulare County.

Columbus, Delaware & Marion Electric Company, Columbus, Ohio, is making rapid progress on the new lines it is building between Worthington and North Columbus. All-steel ties are being laid in concrete and new and very heavy rail is being used. Officials say that the track will be smooth and free from defects that cause cars to sway. It is expected that the new line will be completed and ready for use before February. All of it is to be double-tracked.

Power Houses, Shops and Buildings

Pacific Electric Railway, Los Angeles, Calif., proposes to replace a manually operated motor-generator set at its substation at Strawberry Park on its Watts-Redondo line with a synchronous converter automatic 1,000-kw. set. The present 1,000-kw. motor-generator set at Strawberry Park substation is to be transferred to the Watts substation to increase the present capacity of this unit.

Puget Sound Electric Railway, Tacoma, Wash., has completed plans and will start work immediately on a new interurban station to be erected at South Eighth and A Streets, to replace the present station, which will be dismantled. Building will be of mission type, with brick and stucco exterior. It will have an arcade for the entrance to cars, and a covered parking space for motor buses. Complete, it will cost approximately $20,000.

Birmingham Railway, Light & Power Company, Birmingham, Ala., suffered an explosion of a gas pipe at its carhouse recently which did a considerable amount of damage to the offices on the second floor. The office furniture was badly scorched and burned, while all of the window glass was demolished. Officials of the company say there was a leak in one of the gas pipes and a number of men were looking for it when one of them struck a match and the explosion followed. No one was injured.

Trade Notes

Peter D. Thropp, vice-president of the John E. Thropp's Sons Company, Trenton, N. J., died on Nov. 23. Mr. Thropp was an official of the De Laski & Thropp Circular Woven Fire Company and the Eureka Flint & Spar Company. The Thropp company specializes in the making of rubber machinery.

Wilson Welder & Metals Company, New York, N. Y., is now represented exclusively in Maryland, Virginia and the District of Columbia by the Alexander Milburn Company of Baltimore. A large stock of color-tipt welding metals and plastic-arc welding machines is available at this point for distribution throughout the territory and a complete demonstration plant is in operation.

Refractories Manufacturers' Association, Pittsburgh, Pa., is sending out a printed questionnaire to be used in connection with a survey which it is organizing to obtain complete information regarding the furnaces in which refractory materials are used. All consumers of refractory brick, it is stated, will derive a certain benefit from the successful prosecution of the work and cooperation with the undertaking.

Power Specialty Company, New York, N. Y., builders of Foster superheaters, economizers and oil heating and cooling equipment, announces the opening of new branch offices in Detroit, Mich., in the Dime Savings Bank Building, in charge of L. Lanyi, and in Boulder, Colo., at 2324 Fourteenth Street, in charge of R. B. Nutting, who was formerly Chicago district manager.

Roller-Smith Company, New York, N. Y., announces the appointment of the Electric Material Company as its agent in the state of Washington and parts of Oregon and Idaho. The Electric Material Company has recently opened an office in the Hinckley Building, Seattle, and will handle the Roller-Smith Company's lines of electrical instruments, circuit breakers and radio apparatus in that territory. The Seattle office is in charge of R. F. Robinson, who has been engaged in the electrical industry since 1905, when he was graduated from the University of Wisconsin with the degree of electrical engineer. The Electrical Material Company's main office is at 589 Howard Street, San Francisco, and it also has a branch office in the Title Insurance Building, in Los Angeles. Roller-Smith apparatus is handled by both of these offices as well as the Seattle office, which means that the Electric Material Company represents the Roller-Smith Company along the entire Pacific Coast.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., received during the month of October contracts for power apparatus aggregating more than $3,500,000. This shows a marked increase in the total sales of previous months and, according to the company, indicates a definite trend toward a revival of business in the electrical industry. Among the concerns from which the contracts were received are the Georgia Railway & Power Company, Union Traction Company of Indiana and the Ohio Public Service Company.

New Advertising Literature

Heine Boiler Company, St. Louis, Mo., has issued an attractive folding pamphlet called "Talk, Talk, Talk versus Coal Production." The pamphlet tells what the Heine boilers are doing all over the country in helping the industry "to carry on" during the coal strike.

General Electric Company, Schenectady, N. Y., has issued Bulletin 44,018, called Metropolitan and Elevated Systems, which presents from an engineering viewpoint the principal characteristics of several great rapid transit systems. The facilities for power production, transformation, transmission and utilization are outlined briefly for each of the systems in the cities of Boston, Chicago, New York and Philadelphia.

Combustion Engineering Corporation, New York, N. Y., has issued two pamphlets entitled "The Coxe Stoker" and "Service." The larger bulletin on the Coxe stoker covers particularly the performance of this stoker on Western and Mid-Western bituminous coals. A number of test reports, each accompanied by corresponding curves, are included. These tests show very remarkable results and because they are complete in every respect they will be of considerable interest to the engineering world. The "Service Bulletin" will be of value to all stoker companies. This booklet presents the stoker manufacturers' side of the question and shows why a proper charge for real stoker service would not only be fair to the recipient but would be to his advantage. It is illustrated with an interesting cartoon story.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 60 New York, December 9, 1922 *Number* 24

The Engineer as an Industrial Leader

A SIGNIFICANT feature of the annual meeting of the A.S.M.E. in New York this week was the attention given to the economic and human side of engineering. An evening session was devoted to it and the same topic was emphasized in the presidential address of Dean Kimball, who strongly urged engineers to acquire a broader knowledge of human nature and the economic principles of industry and commerce. With this equipment he visualized the engineer as possessing many of the attributes for leadership in the modern state, which are lacking in the military man, the lawyer and the financial business men. Through the progress of civilization each of these types has successively been most prominent in directing human affairs, but with the growing technical complexity of modern life the rôle of industrial manager is being forced more and more on the engineer.

The changes that Dean Kimball described are evident in individual industries as well as in business in general, and the railway industry is no exception. Mass production is the order of the day in manufacturing, and the application of engineering principles in mass transportation are no less necessary in our large cities. When a transportation line consisted of a few miles of track and cars almost any one could direct its affairs. The next step was the consolidated property, for whose creation the banker and lawyer were necessary. But the main problems in city transportation now are not simply those of finance or law. The aid of the engineer is being sought in their solution to a greater and greater degree. The problems of finance and law remain, but they are becoming equaled by if not subordinated to those of equipment design and traffic movement. The chief executive in many of the largest electric railway properties now, in London and New York for instance, have risen to those positions through the engineering or transportation sides of the service rather than that of banking and law, and the same condition applies to many other properties.

Thus electric railway progress seems to be along the normal lines of development indicated by Dean Kimball.

The Charles A. Coffin Foundation— A Noteworthy Event

THE establishment by the General Electric Company of the Charles A. Coffin Foundation announced this week is most praiseworthy. It commemorates in a suitable manner the activities of one whose services in establishing the electrical industry on its present firm foundations have been of great value, and it encourages in a definite way advances in the application of electricity to the service of man. The electric railway industry is especially interested in this endowment, partly because Mr. Coffin has always taken a keen interest in technical improvements in railroad motive power from the time that the original Thomson-Houston Electric Company acquired the Van Depoele patents, and partly because the foundation specifically provides for an annual award to that electric railway company "which, during the year, has made the greatest contribution toward increasing the advantages of electric transportation for the convenience and well-being of the public and the benefit of the industry."

The four groups designated in the deed of gift for recognition by awards were well selected. They represent, first, the men in the employ of the General Electric Company, outside of its officers, heads of departments and others occupying similar executive positions, who make the most signal contributions toward the increase of the company's efficiency or the progress of art. Then come the two large electrical industries with which Mr. Coffin's activities as president of the General Electric Company and chairman of its board of directors were most intimately associated, namely, the electric railway and electric light and power. Then there is the fourth purpose of the foundation, the expansion of technical research. This is encouraged by annual awards to technical graduates who continue their research work in electricity, physics or physical chemistry, and to technical schools to expand their research work along these lines.

The Charles A. Coffin Foundation is a noteworthy gift to electrical science, typical in its generosity and broad nature of the man whose name it bears.

Time Control Not the Last Word in Handling Traffic

THERE seems to be a great tendency to praise and to copy the three-light signal and time-element control of the traffic on and across Fifth Avenue, New York City, without much consideration of how well it aids traffic in New York, or would help elsewhere. The Fifth Avenue system is rather spectacular, and it probably attracts attention because of its uniqueness. But as to facilitating the movement of traffic, that is more fiction than reality.

During the hours of the day when travel is very heavy, the system may serve to speed up traffic on this main north and south artery, but this is done at the expense of the crosstown travel, which is very much slowed up, as compared to the usual system of control. In the hours of lighter travel, the speed on Fifth Avenue is itself slowed up by the time-element control system, for the period of travel in one direction is determined by the conditions at Forty-second Street, the heaviest crosstown street. The result is that for long stretches of time often no use is being made of the other intersections all along the avenue, while many north and south vehicles wait patiently for the signal. Certainly an efficient use of the crossings cannot be claimed for the Fifth Avenue system.

Furthermore, the adherence to a certain time element in changing direction of travel has spread to several other thoroughfares in New York, for the policemen follow the scheme even without the signal lights. The result is a slowing up of traffic generally, as compared to other large cities where the officer handles the traffic in shorter "takes" and does not wait for any time period to lapse before permitting the vehicle from the other direction to go, if the way is clear.

Do Motormen Realize that They Are Custodians of Valuable Property?

WHEN a man takes his place at the front end of his car and puts the car in motion he assumes responsibility for the safety of the car riders behind him and for the preservation of his employer's property. A realization of this fact cannot but tend to lend dignity to the position of motorman and thus promote the incumbent's self-respect. It should also make him careful, and carefulness is needed now as never before because of the congestion of street traffic by automobiles and the recklessness with which many of those vehicles are driven. The alarming increase in the rate at which vehicles are colliding with cars indicates an unusual need for caution.

It is true that a large part of the collisions between cars and automobiles are due to carelessness of the drivers of the latter. At the same time it is up to the motorman, who is a responsible employee of an established public service corporation, not only to avoid causing collisions himself but also as far as possible to prevent less careful drivers from running into his car.

Aside from the urgent and primary duty of minimizing injury to persons, which is "another story," the motorman has it in his power to safeguard costly physical equipment. If he is on an interurban car the value of this may run to $30,000 or more. It is difficult to visualize just what this means. That amount of money in real estate or grocery store stock would make quite a show. And a motorman on a train has behind him several times this value, possibly a quarter of a million dollars. Even when it is an inexpensive safety car that is being operated the principle is the same. Besides this, the motorman also in part determines the life of switches, crossings and other special trackwork, which also are more expensive than he usually realizes. It would be well for managers to impress the above line of thought upon their men at this time as a part of the campaign against the accident evil.

Higher Salaries Will Bring Young Men to the Industry

QUITE a lot of thought has been given to ways of interesting more young men in the electric railway business, particularly on the part of the A. E. R. A. committee on education. It was suggested that apprenticeship courses be revived, that joint study and practical work be arranged between technical schools and railway companies, etc. However good the suggestions of the committee may be, they are likely to avail little until a fundamental deficiency in this field is remedied. Probably the most pertinent reason why young college men are not coming to the electric railway field more plentifully is that they are not paid enough. In fact, the average run of salaries throughout the industry is lamentably low. In comparison with the electric railway field the inducements that come to these energetic young men from other industries include not only the interest of rapidly expanding fields but more money right from the start and in the future, if the man shows capabilities.

This is certainly not as it should be. Considering the great opportunity in the electric railway field for brains and skill to make tremendous savings, or the lack of them to make ruinous losses, there ought to be sufficient compensation to attract and hold the very best of talent. Taking into account the demands imposed on a man by seven-day, twenty-four-hour service to the public, the compensation ought to be relatively higher than in other lines where the conditions are less exacting.

Knowledge of this salary situation somehow penetrates college circles and the young men shy at apprenticeships in railway work (at small pay) and hire out to the automobile, the general manufacturing, or some other field.

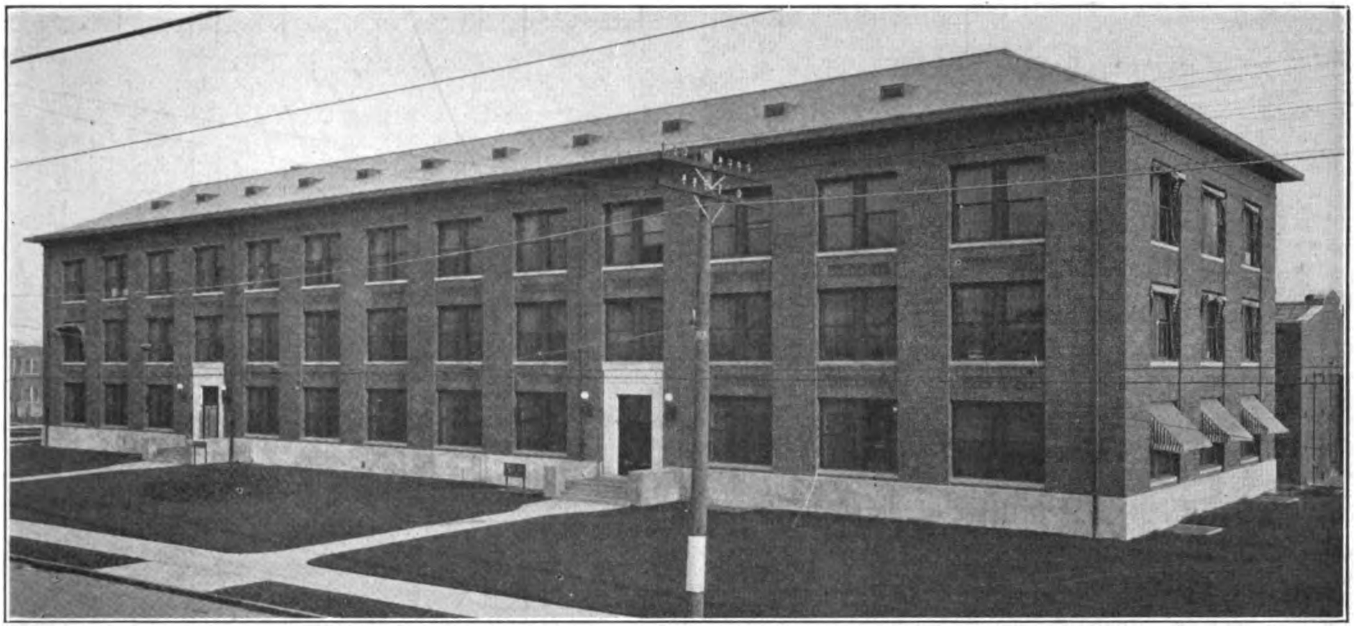
The whole level of salaries of electric railway operating heads and their assistants is too low, on some roads ridiculously so. It is apprehended that if data were available for a comparison of the general rise in electric railway salaries as compared to the trend in level of wages in the field it would make it appear that brain is much less appreciated than brawn. Taking into account this condition, it is not altogether surprising that the personnel on some roads is failing to measure up to the opportunities. The good men in many cases have gone to better paying fields, for the salary situation not only deters the best young men from entering the field but makes it difficult to hold good men. The corrective measures are obvious.

While Others Talk Subway Rochester Quietly Builds One

THE city of Rochester, N. Y., is exhibiting initiative and foresight in utilizing the bed of the abandoned Erie Canal for subway purposes. Little publicity has as yet been given to the subway development in this city; there has been no blowing of horns about what was going to be done. At the same time construction has been going ahead at a good pace, as is evidenced from the construction pictures reproduced elsewhere in this issue. There will be in the subway accommodations for two interurban tracks and two freight tracks, with necessary sidings; the freight trains, of course, to be moved by electric locomotives. These facilities will greatly relieve congestion in the streets and permit higher speed to be made by the interurban cars. Further, the roof of the subway will be a broad street, which will further improve street transit conditions.

This work is facilitated by the fact that the canal site could be occupied exclusively for construction purposes, a condition not usually met in subway construction. This condition also largely eliminated interference with street traffic, which is one of the bugaboos of subway work in large cities.

The site of the abandoned Erie Canal presents an interesting problem in several cities. Its route lies naturally through their business and manufacturing districts, because the cities were built up commercially along the line of the canal. Hence the canal site presents great possibilities in the way of civic improvements. Rochester is utilizing her section by making a subway of it. In near-by Lyons the track of the Rochester & Syracuse Railroad, a high-speed interurban line, has been removed from the main streets to the bank of the old canal, permitting much faster and, therefore, better service through the town.



New General Office Building Which Houses All Departments of Detroit Municipal Railway

Detroit Street Railway Moves Administration Center to New Buildings

Office Building, Car Storage Yard and Inspection Shop and Track and Line Building Located on 14-Acre Plot in Outlying District —Many Interesting Features in Design and Layout of Facilities

A RECORD of the progress made by the Department of Street Railways, city of Detroit, would be incomplete without a description of the new buildings which were erected during 1922 for office and shop use. A plot of land of approximately 14 acres was used. This extends from Shoemaker Avenue to Warren Avenue in one direction and from St. Jean Avenue to Lillibridge Avenue in the other. The buildings erected consist of an office, carhouse, heating plant and building for the track and line department. The original plans also provided for the erection of a large car shop, but when the city took over the Detroit United Railway property last May it was decided to use its shop and not erect a new maintenance shop at the present time.

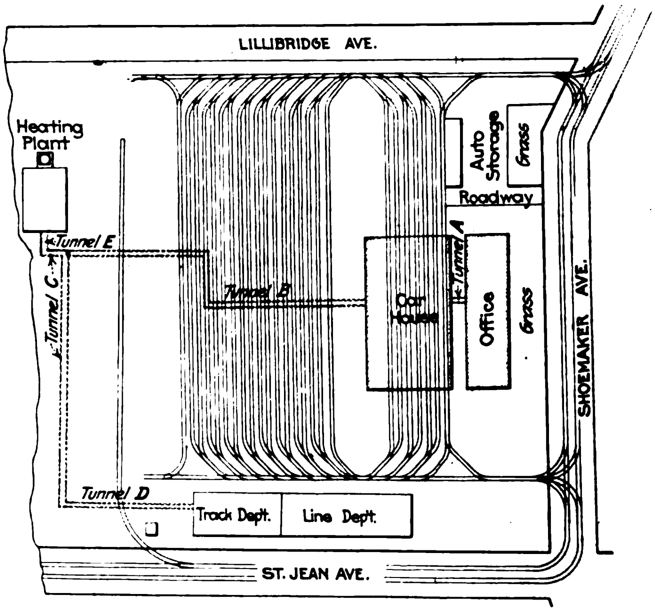
The office building faces on Shoemaker Avenue and is a three-story and basement building, 217 ft. 9¾ in. long by 61 ft. 9 in. wide. It is made of rough, red-faced brick, and the concrete walls of the basement extend to the bottom of the windows of the first floor. This adds materially to the fine appearance of the building. The front line of the building, which faces north, sets back 50 ft. from the street and this space, as well as large areaways at each end, is devoted to well-kept lawns. Attractive buildings and surroundings are a particular asset to the city, since they insure that other buildings erected in the locality will also be of high-class construction and the revenue obtained from taxes and from the increased valuation of other adjacent property will prove an advantageous source of income. There are two entrances to the office building on the front and one at the east end of the building. One of these, that at the front toward the west, is used as a general entrance; the other two are used for employees only. The main entrance leads into a spacious lobby with tile floor and at the end of this lobby is a stairway with an elevator to serve the other floors. Corridors run lengthwise of the building on each floor, off which entrance to the various offices is obtained. The offices on the first floor are devoted particularly to the transportation department. A fire stairway which is shut off from the other parts of the building forms a part at the east end. Washroom and toilet facilities are particularly extensive, and the heating, ventilating and lighting of the building incorporate all the latest improvements in office building construction. The ventilation of the toilets and the locker rooms is particularly interesting. In the locker room a duct is provided underneath the floor with screened openings from each locker leading into this. There are other openings at the front and top of each locker so that air is led in at the top and exhausted through the bottom of the locker so as to insure a complete circulation of air to carry off any offensive odors. A duct is also provided overhead in the toilet rooms which also insures very effective ventilation.

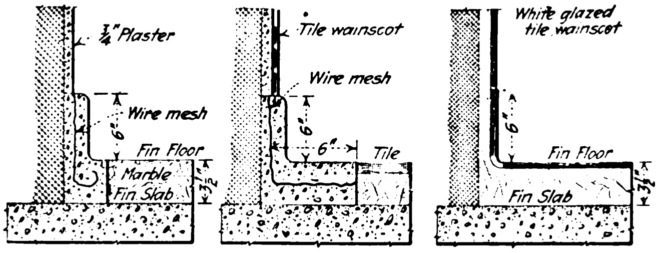
The heating pipes are brought into the office building through a tunnel which extends underneath the inspection shop and has a branch leading to the line and track department building. This tunnel has a cross-section of 5 ft. x 7 ft. and its location is shown in the accompanying layout of the buildings and yards.

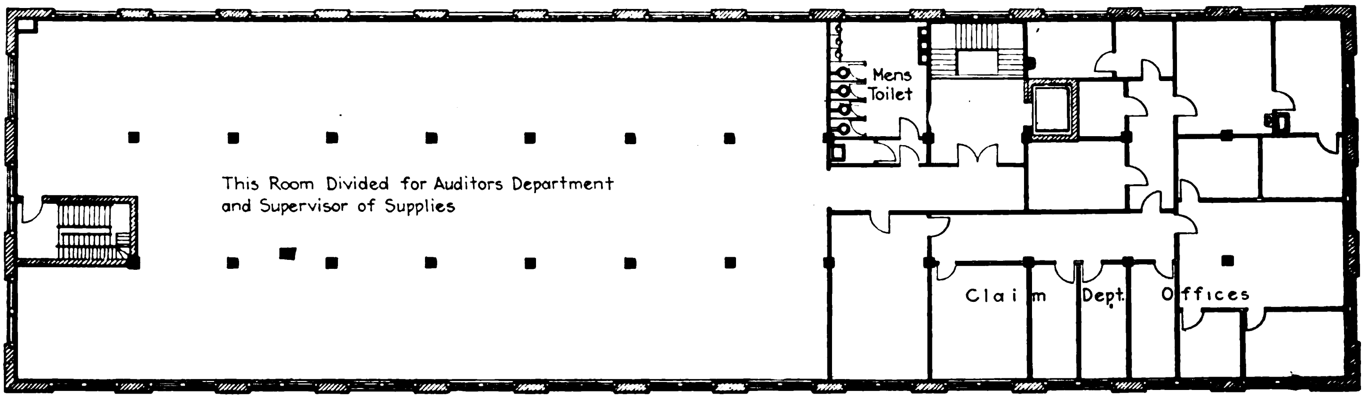
The floor and base construction used throughout the office building is of particular interest, as extreme care was used in the design to provide round sanitary corners and provision for washing without danger of damage to the walls. The floors are of cement, slate, tile or linoleum and the bases are of cement or tile. The

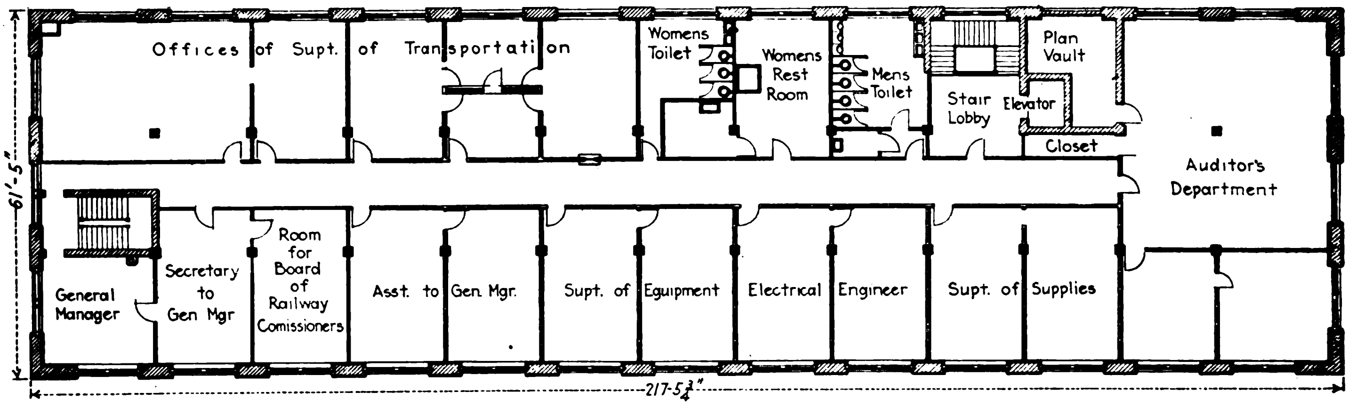
Building Layout and Plans of Office Building

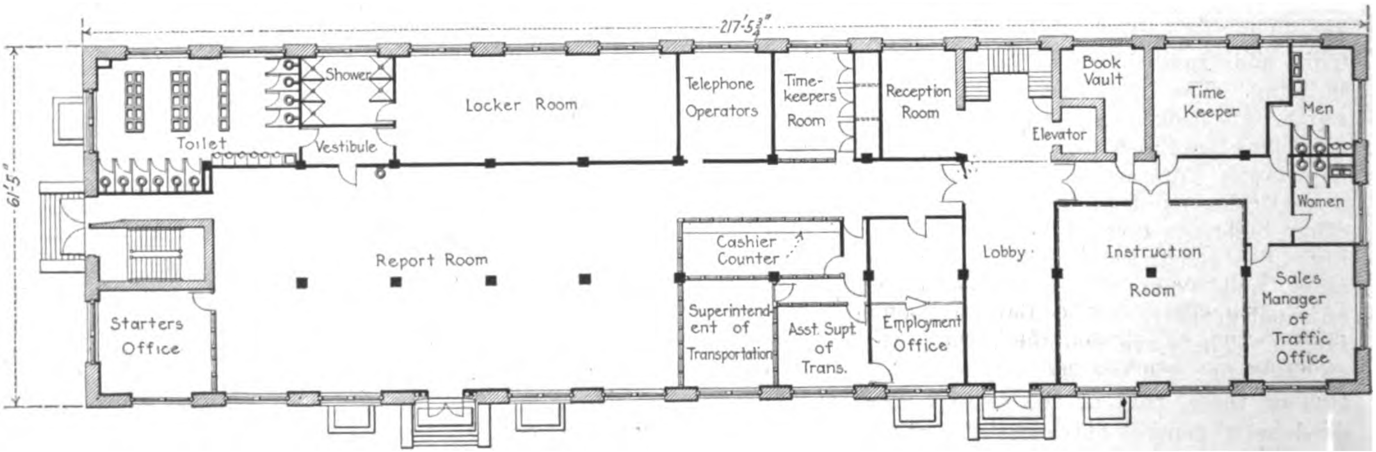
At right, track yard and building layout. Below, details of base and floor construction. At bottom, first floor plan of offices. Center, second floor plan of offices. At top, third floor plan of office building.


LILLIBRIDGE AVE.
Heating Plant
Tunnel E
Tunnel C
Tunnel B
Car House
Tunnel A
Auto Storage
Grass
Roadway
Office
Grass
SHOEMAKER AVE.
Tunnel D
Track Dept.
Line Dept.
ST. JEAN AVE.


¾" Plaster
Wire mesh
6"
Fin Floor
Marble
Fin Slab
3½"
Tile wainscot
Wire mesh
6"
6"
Tile
White glazed tile wainscot
6"
Fin Floor
Fin Slab
3½"


Mens Toilet
This Room Divided for Auditors Department and Supervisor of Supplies
Claim Dept. Offices


Offices of Supt. of Transportation
Womens Toilet
Womens Rest Room
Mens Toilet
Stair Lobby
Elevator
Plan Vault
Closet
Auditor's Department
General Manager
Secretary to Gen Mgr
Room for Board of Railway Comissioners
Asst. to Gen. Mgr.
Supt. of Equipment
Electrical Engineer
Supt. of Supplies
61'-5"
217-5¼"


217'-5¼"
61'-5"
Shower
Toilet
Vestibule
Locker Room
Telephone Operators
Time-keepers Room
Reception Room
Book Vault
Elevator
Time Keeper
Men
Women
Report Room
Starters Office
Cashier Counter
Superintendent of Transportation
Asst. Supt of Trans.
Employment Office
Lobby
Instruction Room
Sales Manager of Traffic Office

walls above the bases are of either plaster, tile wainscot, marble or a solid plaster preparation. A few cross-sections shown will give an idea of the construction.

The second floor is devoted to offices for the various officials. These include the general manager with various assistants, the superintendent of equipment, electrical engineer, supervisor of supplies, and the superintendent of transportation. The auditing department also occupies rooms at the west end of this floor. The principal part of the third floor is taken up by the auditor's department, the supervisor of supplies, and the claim department.

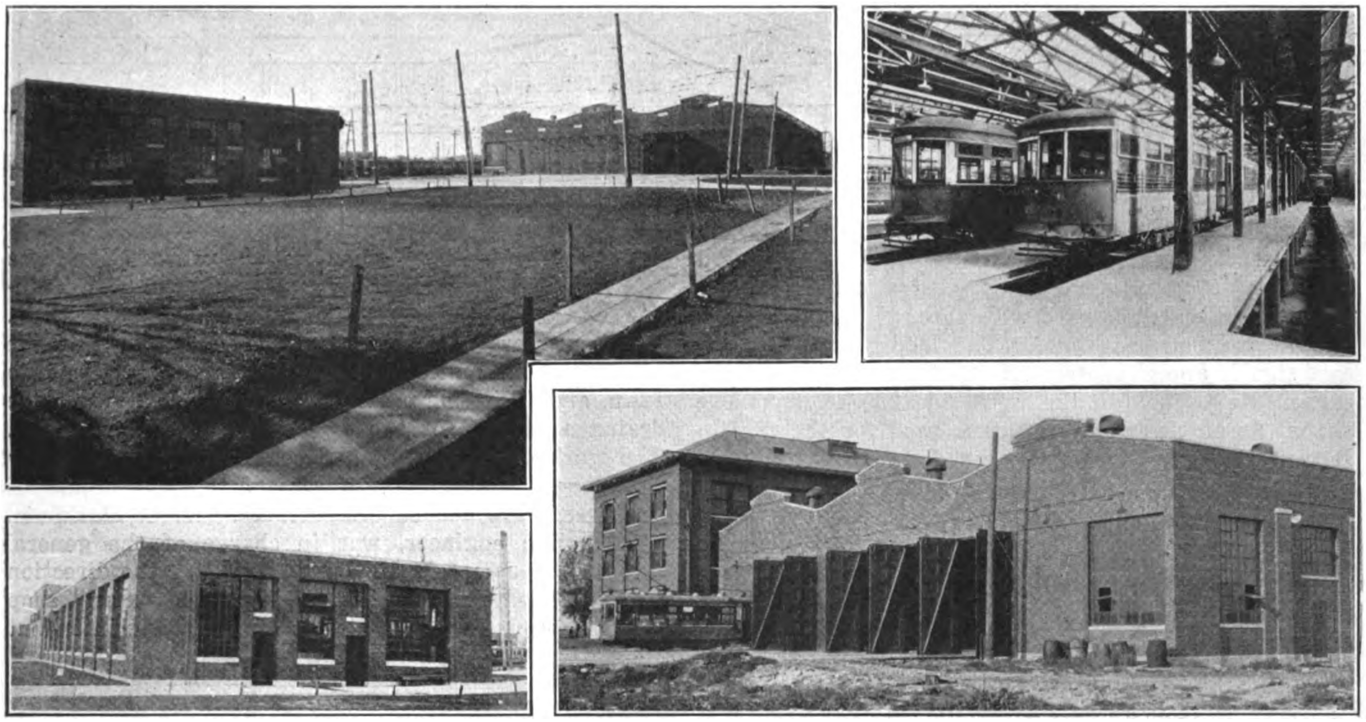
CARHOUSE CONSTRUCTION

The carhouse occupies a space of 124 ft. x 216 ft. immediately back of the office building. This is constructed with three bays. The center bay is 40 ft. wide and the outside bays 42 ft. and 40 ft. respectively. A space on the south side of the building 20 ft. wide and running the entire length is partitioned off for use as an office, storeroom, machine shop, oil room, sand room and toilet. A particular feature of this is that the wall which separates these departments from the inspection shop extends up only to the roof truss. This is of particular advantage as this construction does not shut off any of the light, as would otherwise be the case.

Provision has been made throughout the construction to provide plenty of light, and one of the outstanding features is that of the roof construction. Fifty per cent of the roof is skylight, and the remainder is concrete slab covered with Barrett roofing. The entire construction throughout the carhouse is fireproof, steel concrete and brick being used. In the layout and arrangement of facilities, many improvements utilized in modern carhouses throughout the country have been incorporated in the design and construction. In order to provide for the use of chain hoist for hoisting car bodies or lifting equipment, the roof truss is figured for a 1-ton load at each panel point on the lower chord.

There are seven tracks running through the building, each being provided with a pit for the entire length. The tracks are located with a center to center distance of 13 ft. 4 in. and the pits are 5 ft. deep.

The floor and pit construction is of particular interest. It consists of structural steel support piers incased in concrete. The track rails are used as the top members. The concrete between adjacent tracks is supported by partitions and not by the rail. The rail, however, which is 7-in. 91-lb. T-rail, forms the support for the cars. The supporting piers are located at 8-ft. centers and passageways are left between these to give free access to adjacent pits. The inner rails of adjacent tracks are supported in pairs by vertical structural steel members diagonally braced. Two angles 2½ in. x 3½ in. x ¼ in. are used for the vertical members, and angles of the same size serve for diagonal braces. This construction leaves the pit entirely unobstructed and gives a very satisfactory arrangement. Accompanying cross-sections and photographs will give a clear idea of the construction used.

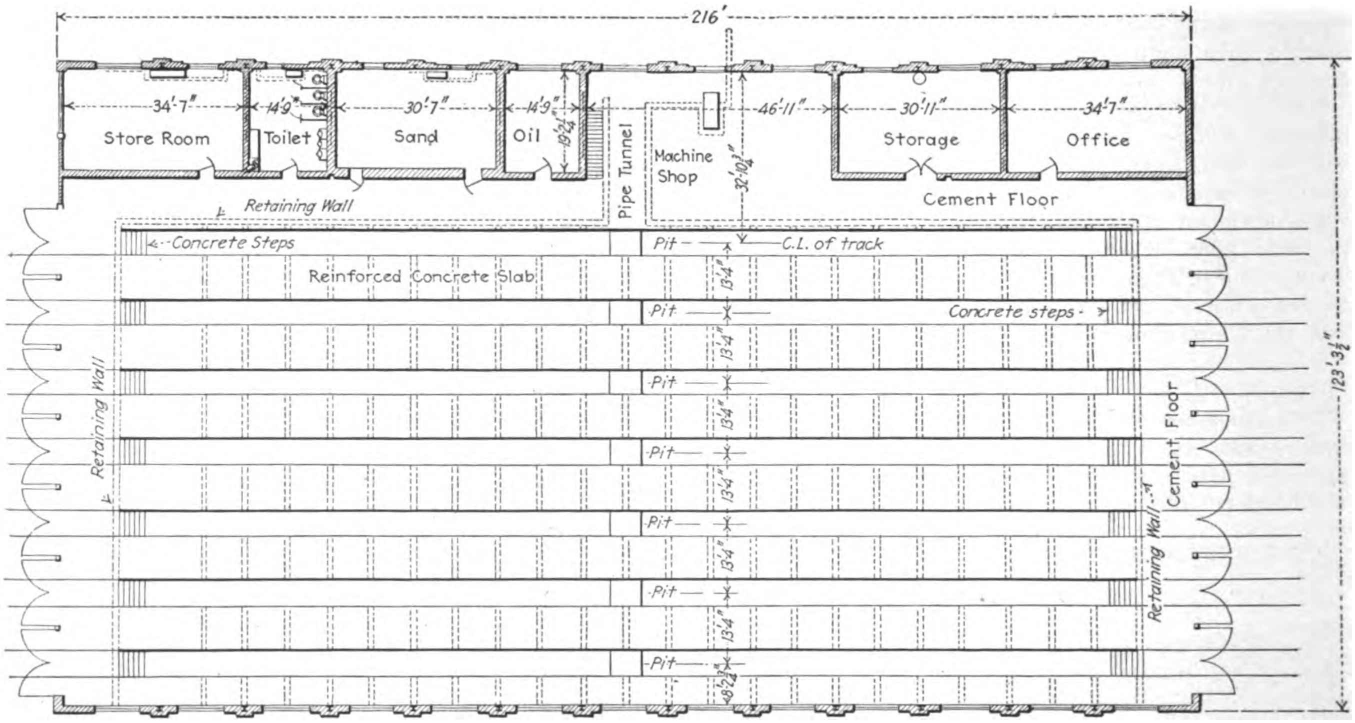


NEW BUILDINGS AND YARDS OF THE DETROIT MUNICIPAL RAILWAY

Upper left—View of ground showing shop and building for line and track department.
Upper right—Interior of shop showing pit construction.
Lower left—Line and track department building.
Lower right—End of shop showing three-unit construction, with office building adjacent.

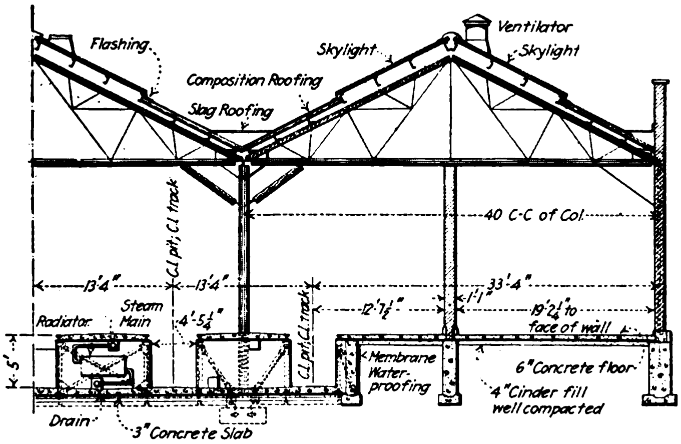
Heating is provided by radiators installed between adjacent pits, there being eighteen radiators in the entire length of the building between two pits. The steam mains are brought into the building through a tunnel as already referred to, and this tunnel extends through the center of the shop and runs to the office building. The system of steam pipes and fire lines has been worked out very carefully.

The door construction has not followed the usual practice for electric railway shops, which is that of using rolling doors for carhouses. Each track of the Detroit shop is provided with two swinging doors, which open outward.


216'
34'7"
Store Room
14'9"
Toilet
30'7"
Sand
14'9"
Oil
19'2¼"
Pipe Tunnel
Machine Shop
32'10½"
46'11"
30'11"
Storage
34'7"
Office
Cement Floor
Retaining Wall
Concrete Steps
Pit
C.L. of track
Reinforced Concrete Slab
13'4"
Concrete steps
Retaining Wall
Cement Floor
123'3½"

FLOOR PLAN OF CARHOUSE

The track layout for the carhouse and storage yard is shown in an accompanying illustration. A ladder track arrangement is used with through tracks the entire length between these. The ladder track at the east side is approximately 120 ft. from the end of the carhouse and that on the west side 230 ft. from the shop. As single-end operation is used for the cars in Detroit the track facilities were designed particularly to handle this type of equipment. The scheme in general provides for cars to enter from Shoemaker Avenue, although on the east end there is also a connection to St. Jean Avenue. Cars which are to pass through the carhouse for inspection or light repairs can proceed in either direction from the ladder track, either from the street or storage yard, and after passing through the house completing the loop they can be returned to any desired location. The arrangement of the track layout, while providing a complete loop for either the storage yard or from the street, also gives facilities so that cars can be turned without interfering with regular traffic through the use of the Y provided at the entrance to each end of the carhouse yard. The yard has been designed with pavement which insures cleanliness and provides favorable working conditions. The drainage has also been carefully worked out. Five 6-in. drains are provided between tracks lengthwise of the yard. These connect the cross drains which lead to 12-in. and 18-in. main sewers. The latter also provide drainage outlets for the carhouse and office building. The work of excavating and constructing foundations was done by contract by forces of the department of street railways and superstructures. W. C. Markham, construction engineer, was in charge of the general layout and supervision of this work under the direction of J. S. Goodwin, general manager. The general shop facilities were developed by A. C. Colby, superintendent of equipment.


Flashing
Composition Roofing
Slag Roofing
Skylight
Ventilator
Skylight
C.L. pit, C.L. track
40' C-C of Col.
13'4"
13'4"
33'4"
Steam Main
Radiator
4'5¼"
12'1½"
1'1"
19'2¼" to face of wall
C.L. pit, C.L. track
5'
Membrane Water-proofing
6" Concrete floor
4" Cinder fill well compacted
Drain
3" Concrete Slab

CROSS-SECTION TO SHOW SHOP CONSTRUCTION

Repair Shops Nearly Double in Size in Five Years

THE fourteenth United States census of manufactures gives some very interesting facts on the growth of electric railway repair shops in a bulletin just issued by the Department of Commerce. In 1919 the value of the materials used and amount of wages paid had more than doubled over the figures in 1914, and while the value of the products had not increased in quite the same ratio, it was almost 200 per cent of that in 1914. The figures for 1919, 1914 and 1909 follow:

ELECTRIC RAILROAD REPAIR SHOPS

	1919	1914	1909
Number of establishments	624	649	541
Persons engaged	33,120	28,215	23,699
Primary horsepower	53,830	44,989	35,794
Capital	$82,557,905	$63,613,741	$38,898,686
'Salaries and wages	42,052,521	20,559,383	15,690,228
Salaries	2,979,367	1,914,538	1,204,219
Wages	39,073,154	18,644,845	14,486,009
Paid for contract work	118,335	24,596	23,480
Rent and taxes	765,463	581,657	351,626
Cost of materials	32,025,484	17,609,574	15,167,899
Value of products	72,210,701	38,576,565	31,962,561
Value added by manufacture*	43,185,217	20,966,991	16,794,662

* Value of products less cost of materials.

Richmond Finances Analyzed

A Report Prepared by John A. Beeler for the Richmond City Council Shows a Number of Interesting Facts—Economical Operating Methods Found

THE first portion of a report which John A. Beeler is preparing on the Richmond Railway division of the Virginia Railway & Power Company has just been made public. It contains about 7,500 words and many tables and relates to the financial condition and history of the company. A second part will follow on capital accounts and investment in connection with the valuation of the property, while service and operating methods will be considered in a third volume. The report is being made by the Beeler Organization for the committee on streets of the Richmond City Council. Among other interesting facts disclosed by the report it is found that the Richmond Railway division is making an operating profit on total operating revenues of only about 33 cents a car-mile, in spite of the fact that its taxes amount to nearly 10 per cent of its gross receipts.

TABLE I—INCOME STATEMENT, RICHMOND RAILWAY DIVISION

Year	Gross Earnings	Operating Expenses	Net from Operations	Operating Ratio
1910	$1,237,274.24	$836,475.21	$400,799.03	.676
1911	1,341,330.71	880,619.24	460,711.47	.657
1912	1,380,043.66	947,414.45	432,629.21	.687
1913	1,473,555.72	953,185.07	520,370.65	.647
1914	1,487,579.47	983,939.67	503,639.80	.662
1915	1,390,708.27	953,719.44	436,988.83	.686
1916	1,526,357.19	1,073,340.67	453,016.52	.704
1917	1,597,777.78	1,154,196.01	443,581.77	.722
1918	1,657,895.52	1,370,559.00	287,336.52	.826
1919	1,939,050.24	1,698,869.32	240,180.92	.876
1920	2,321,559.61	2,064,487.35	257,072.26	.889
1920 *a*	1,345,027.33	1,298,111.19	46,916.14	.965
1921 *b*	2,553,284.76	2,441,734.97	111,549.79	.956

a Six months period ended Dec. 31.
b Fiscal years ended June 30, except 1921 ended Dec. 31.

Mr. Beeler finds the income during the last twelve and one-half years was as shown in Table I.

Almost the entire operating receipts of the company are derived from passenger earnings. Other sources of revenue, totaling less than 1 per cent, are chartered cars, advertising and minor items. From July 1, 1908, to Feb. 13, 1919, the fare was 5 cents, with tickets sold at the rate of six for 25 cents, good any time, and labor tickets good before 7 a.m. sold for 2½ cents. From Feb. 14, 1919, to July 31, 1920, the fare by cash or tickets was 5 cents and labor tickets were sold six for 25 cents. Since Aug. 1, 1920, all fares have been 6 cents.

TABLE III—EXPENDITURES FOR MAINTENANCE OF WAY FOR LAST TWELVE AND ONE-HALF YEARS

Year	Current Maintenance	Per Cent of Gross Revenue	Cents per Car-Mile	Track* Mileage	Average Maintenance per Track-Mile
1910	$81,388.25	6.58	1.40	69.270	$1,175
1911	84,405.90	6.29	1.43	69.270	1,218
1912	103,849.83	7.53	1.73	*c* 71.430	*c* 1,454
1913	104,654.19	7.10	1.74	72.714	1,439
1914	114,264.27	7.68	1.86	73.540	1,554
1915	95,327.25	6.85	1.55	77.956	1,223
1916	84,038.64	5.51	1.21	82.612	1,017
1917	78,472.43	4.91	1.13	82.714	949
1918	94,633.37	5.71	1.40	83.168	1,138
1919	142,320.83	7.34	2.13	83.290	1,709
1920	173,898.78	7.49	2.20	83.228	2,089
1920 *a*	92,988.99	6.91	2.30	83.228	2,234
1921 *b*	211,871.35	9.30	2.75	83.818	2,527

* From annual reports to stockholders
a Six months period ended Dec. 31.
b Fiscal years ended June 30, except 1921 ended Dec. 31.
c Mileage is given in annual report as 81,430.

Table II shows operating revenues and expenses for the period in cents per car-mile and cents per car-hour.

Mr. Beeler finds that the maintenance of way has been kept up well as shown by Table III. A considerable part of the increase, as compared with the early years, is undoubtedly due to the increase in material prices and labor rates. The figures for maintenance of equipment are shown in Table IV. The figures for the last two or three years undoubtedly in equipment maintenance include some deferred maintenance and this account should now be lower. Power is obtained at cost from the light and power division of the company. Conducting transportation cost last year 39.81 per cent of the gross earnings and 41.69 per cent of the operating expenses. Nevertheless the rate of wages paid has been very conservative in comparison with those that are paid in other cities. Table V gives the figures since 1910.

"General and miscellaneous" were 18.1 per cent of the gross earnings and 18.9 per cent of operating expenses. The figures given in the report included only $12,655 chargeable to the railway division for the

TABLE II—OPERATING REVENUES AND EXPENSES RICHMOND RAILWAY DIVISION, 1910–1921

	Cents per Car-Mile												
	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1920*a*	1921*b*
Car earnings	21.18	22.59	22.75	24.25	24.00	22.39	21.66	23.00	24.48	29.01	29.31	33.12	32.85
Miscellaneous earnings	0.07	0.08	0.24	0.26	0.25	0.22	0.39	0.08	0.08	0.07	0.08	0.21	0.28
Total operating revenue	21.25	22.67	22.99	24.51	24.25	22.61	22.05	23.08	24.56	29.08	29.39	33.33	33.13
Maintenance way and structures	1.40	1.43	1.73	1.74	1.86	1.55	1.21	1.13	1.40	2.13	2.20	2.30	2.75
Maintenance equipment	1.73	1.39	1.34	1.23	1.27	1.17	1.09	1.35	1.65	2.63	2.94	4.44	3.44
Power	1.03	1.24	1.28	1.10	1.06	1.04	1.04	1.43	2.27	2.39	2.52	3.20	3.02
Conducting transportation	5.71	5.96	6.31	6.43	6.43	6.43	6.54	7.08	8.85	11.23	10.91	13.42	13.21
Traffic	0.07	0.03	0.06	0.06	0.06	0.04	0.06	0.05	0.06	0.07	0.06	0.04	0.08
General and miscellaneous	1.44	1.51	1.11	0.98	1.05	1.16	1.33	1.06	1.15	1.20	1.23	1.37	1.69
Injuries and damages	0.74	0.79	0.80	0.85	0.85	0.79	1.08	1.15	1.23	1.45	1.47	2.33	2.32
Depreciation and renewals	0.51	0.76	1.38	1.47	1.45	1.36	1.32	1.39	1.47	1.75	1.76	2.00	1.99
Taxes	1.68	1.76	1.77	1.99	2.01	1.97	1.83	2.03	2.23	2.63	3.05	3.06	3.18
Total operating expenses	14.36	14.87	15.78	15.85	16.04	15.51	15.50	16.67	20.31	25.48	26.14	32.16	31.68
Net earnings from operations	6.89	7.80	7.21	8.66	8.21	7.10	6.55	6.41	4.25	3.60	3.25	1.17	1.45
	Cents per Car-Hour												
Car earnings	167.65	175.91	176.63	186.18	183.80	170.64	169.69	180.25	194.09	231.62	234.34	260.34	260.81
Miscellaneous earnings	0.52	0.59	1.89	1.97	1.94	1.68	3.01	0.62	0.62	0.56	0.61	1.61	2.23
Total operating revenue	168.17	176.50	178.52	188.15	185.74	172.32	172.70	180.87	194.71	232.18	234.95	261.95	263.04
Maintenance way and structures	11.06	11.11	13.43	13.36	14.27	11.81	9.51	8.88	11.11	17.04	17.60	18.11	21.83
Maintenance equipment	13.70	10.80	10.39	9.43	9.71	8.89	8.53	10.56	13.05	20.97	23.48	34.87	27.30
Power	8.57	9.69	9.96	8.42	8.10	7.96	8.16	11.18	18.02	19.11	20.10	25.17	23.99
Conducting transportation	45.21	46.38	48.98	49.33	49.22	48.99	51.19	55.51	70.16	89.67	87.20	105.42	104.88
Traffic	0.45	0.22	0.46	0.49	0.48	0.27	0.44	0.37	0.50	0.53	0.51	0.34	0.65
General and miscellaneous	11.43	11.83	8.59	7.54	8.01	8.85	10.44	8.35	9.07	9.54	9.85	10.76	13.43
Injuries and damages	5.89	6.18	6.25	6.58	6.50	6.03	8.48	9.04	9.74	11.61	11.75	18.34	18.41
Depreciation and renewals	4.06	5.96	10.71	11.29	11.14	10.34	10.36	10.85	11.68	13.93	14.10	15.72	15.78
Taxes	13.31	13.71	13.78	15.26	15.42	15.03	14.33	15.91	17.63	21.02	24.34	24.08	25.28
Total operating expenses	113.68	115.88	122.55	121.70	122.85	118.17	121.44	130.65	160.96	203.42	208.93	252.81	251.55
Net earnings from operations	54.49	60.62	55.97	66.45	62.89	54.15	51.26	50.22	33.75	28.76	26.02	9.14	11.49

a Six months period ended Dec. 31. *b* Fiscal years ended June 30, except 1921 ended Dec. 31.

TABLE IV—EXPENDITURES FOR MAINTENANCE OF EQUIPMENT FOR LAST TWELVE AND ONE-HALF YEARS

Year	Current Maintenance	Per Cent of Gross Revenue	Cents Per Car-Mile	Average Active Cars in Service	Average Maintenance Per Car
1910	$100,811.04	8.15	1.73	125	$806
1911	82,109.81	6.12	1.39	126	651
1912	80,330.80	5.82	1.34	128	627
1913	73,875.83	5.01	1.23	128	577
1914	77,771.35	5.22	1.27	131	594
1915	71,770.42	5.16	1.17	131	548
1916	75,384.31	4.94	1.09	148	509
1917	93,236.88	5.83	1.35	148	630
1918	111,077.81	6.70	1.65	144	771
1919	175,158.49	9.03	2.62	142	1,233
1920	232,009.91	10.00	2.94	168	1,381
1920 *a*	179,066.35	13.31	4.44	168	2,140
1921 *b*	264,970.62	10.37	3.44	168	1,577

a Six months period ended Dec. 31.
b Fiscal years ended June 30, except 1921 ended Dec. 31.

salaries of president, vice-presidents, general counsel, assistant general counsel, secretary and treasurer, assistant secretary and treasurer, auditor, general manager, purchasing agent, electrical engineer and assistant engineer. These charges are considered by Mr. Beeler as "remarkably small for a company doing its business. Had the property been operated as a separate unit it would have been necessary to have an independent set of officers and clerks, which would have cost much more than under the present arrangement. It is possible, of course, that such an organization, while costing more, might have obtained greater attention to the problems of the railway system, but this is problematical."

Injuries and damages for a number of years were charged at 5 per cent, but at 7 per cent from July 1, 1920, to Dec. 31, 1921. It was then decreased 5 per cent.

A depreciation reserve was begun July 1, 1909, and since July 1, 1911, 6 per cent of the gross has been charged to that reserve. This basis is not considered by Mr. Beeler so desirable as one on historical accumulated investment. On such a basis, for the conditions in Richmond, Mr. Beeler considers 2½ per cent proper. During the last three years this would have corresponded pretty closely to the amount actually accrued, but prior to that time the amount accrued by the method then followed by the company would be very much less. The taxes in 1921 were 9.6 per cent of the revenue, which is considered high.

TABLE V—EXPENDITURES FOR CONDUCTING TRANSPORTATION FOR LAST TWELVE AND ONE-HALF YEARS

Fiscal Year	Conducting Transportation	Cents Per Car-Mile	Cents Per Car-Hour	Per Cent Gross Earnings	Per Cent Operating Expense
1910	$332,664.07	5.71	45.21	26.88	39.77
1911	352,459.61	5.96	46.93	26.28	40.02
1912	378,634.91	6.31	48.98	27.44	39.96
1913	386,394.11	6.43	49.33	26.22	40.54
1914	394,171.40	6.43	49.22	26.50	40.06
1915	395,422.37	6.43	48.99	28.43	41.46
1916	452,434.57	6.54	51.19	29.64	42.15
1917	490,405.35	7.08	55.51	30.69	42.48
1918	597,433.45	8.85	70.16	36.03	43.59
1919	748,843.55	11.20	89.66	38.10	44.08
1920	861,652.81	10.91	87.20	37.11	41.73
1920 *a*	541,329.16	13.42	105.42	40.25	41.70
1921 *b*	1,018,051.80	13.21	104.88	39.81	41.69

a Six months period ended Dec. 31.
b Fiscal years ended June 30, except 1921 ended Dec. 31.

TRAFFIC STATISTICS

The revenue riders have increased 31 per cent in eleven and one-half years in spite of the increase in fares. The car-miles have increased over 32 per cent, though the speed has not shown any change of moment. While the revenues of the Richmond division have increased approximately 100 per cent in the past twelve and one-half years, the net earnings have decreased 75 per cent.

Transit Commission Standardizes Time-Table

After an Examination of Time-Tables Used in Many Cities, a Standard Form Is Recommended by the New York Transit Bureau

THE New York Transit Commission has found that the time-tables of the various surface railway companies in New York City vary widely, and for no adequate reason. As the object of all is the same, to guide transportation employees in the operation of cars, it is thought that a standard form of time-table will be of advantage not only to the companies but to the Transit Commission as well. In consequence the commission has proposed to the companies to adopt the standard form, illustrated herewith. An explanation of this time-table, as compiled from the report submitted to the commission by Edward A. Roberts, its chief of transit bureau, follows:

A time-table may be divided into the following four parts: (a) The heading, (b) The details of runs, (c) The run guide, (d) Information on running time, time points and headways.

The heading is a simple statement giving the name of the line, serial number of the time-table, date in effect, serial number of the superseded time-table, terminals of the line and a brief statement of the route followed. It is also desirable to show in the heading the name of the operating company, and the carhouse from which the line is operated.

The details of runs is the major part of the time-table and shows the time that each car or crew starts out of the carhouse, the time it leaves terminals on each trip, and the time the car goes back into the carhouse or is turned over to another crew. The details of runs usually occupies the upper left section of the time-table. The variations in the details of runs on different styles of time-tables in New York City are:

1. The movements of individual cars or crews are written horizontally on some tables, vertically on others.
2. The continuous columns of either horizontal or vertical figures represent in some tables the day's movements of an individual car, and in others the continuous day's work of a crew.
3. There are variations in the symbols and abbreviations used to denote certain standard car movements, such as "car is taken out of barn," "crew is relieved," etc.

The run guide usually appears in the upper right section of the time-table. It is a summary of working hours, showing for each crew the time for reporting to work, the time for relief from work, and the total hours of the day's work. The manner of stating this information varies slightly with different companies, due to variations in the form of the details of runs.

The miscellaneous information is generally placed in the lower part of the time-table. No general information at all is presented in the time-tables of some companies, whereas a complete statement should include: running time, time points, explanation of symbols, summary of intervals between cars at all periods of the day, and number of cars required for operation at various periods of the day.

On many street railways in New York City the use of a formal time-table is comparatively recent.

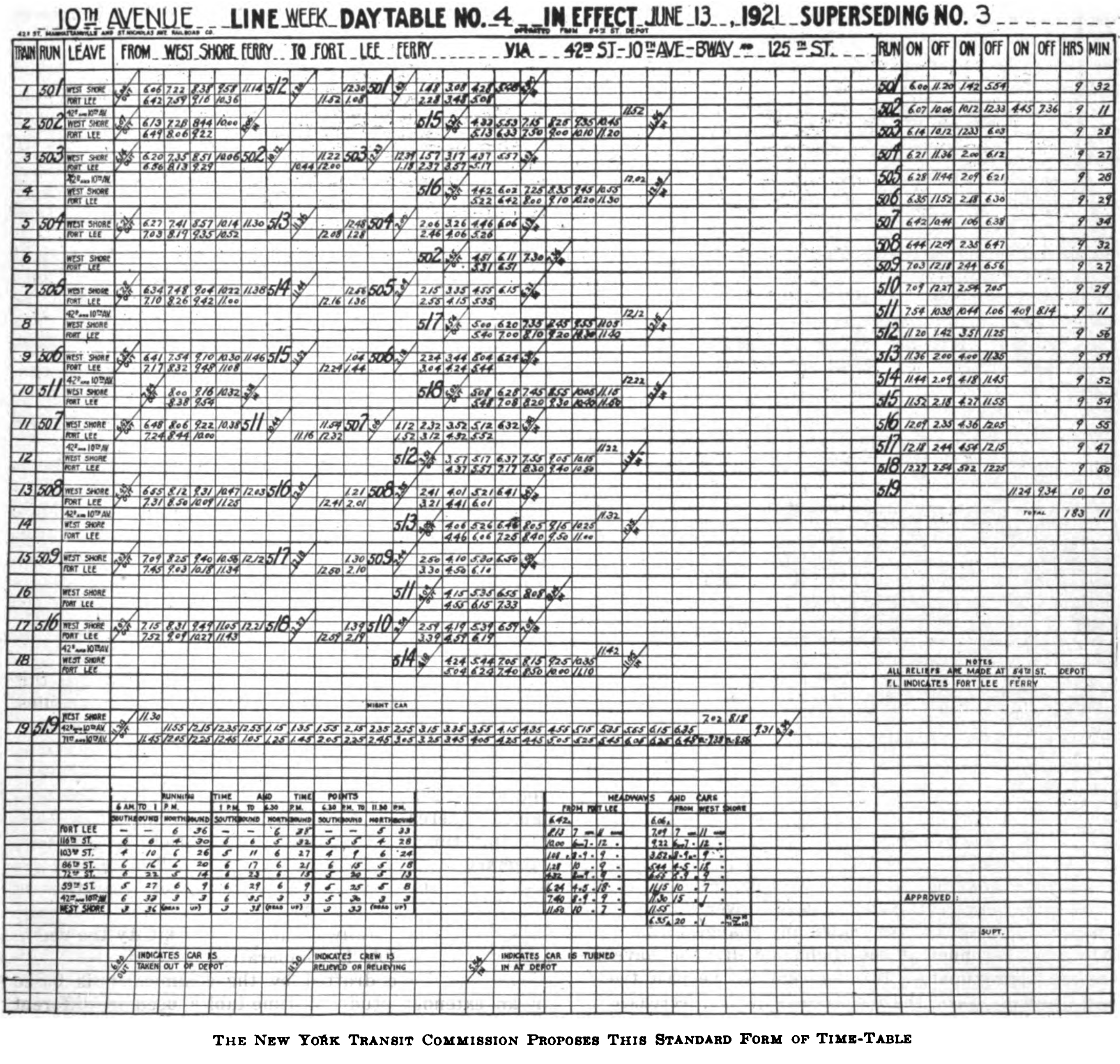
The time-table drafted by the commission is based on an extended study of time-tables used in different cities, and of the recommendations of the time-table committee of the American Electric Railway Transportation & Traffic Association. Hence, no claim for originality is made for it, as it consists simply of what were considered to be the best features of the large number of time-tables examined.

The details of runs are read horizontally, and each section of the details of runs represents the movements of an individual car or train during the day. The movements of each individual crew are indicated by run numbers written with bold figures, so that the various pieces of work of each individual crew may readily be picked from the time-table. By using this method, the time-table permits one to follow all movements of cars as well as crews, a feature which is not easily possible when each horizontal section of the details of runs refers to the day's movements of an individual crew rather than of an individual car.

The symbols used in the details of runs to indicate cars going in and out of carhouses and crews being relieved are in the simplest possible style and are fairly well recognized as standard. The indication of terminals, in connection with the work of each run, is a feature which, it is thought, will eliminate much of the mystery of the street railway time-table and make it as easily read as the ordinary steam railroad public time-table. On routes where operations are not complicated, the details of runs could be arranged on the time-table in such a way that, when read vertically, it constitutes an almost perfect headway sheet showing the time that successive cars leave their terminals.

The run guide in the recommended form is the same as on all time-tables in which each horizontal section represents the day's movements of an individual car.

The other information called for in the recommended form includes a statement showing the running time in each direction between terminals and between intermediate time points. Provision is made for varying the running time during the different hours of the day in accordance with variation in street traffic conditions. The intermediate time points, at each of which motormen are supposed to ascertain whether or not they are running in accordance with the schedule, should be spaced not more than ten minutes apart. A statement is also included in the lower section of the time-table showing the interval between cars and the number of cars in operation during all periods of the day.



10TH AVENUE LINE WEEK DAY TABLE NO. 4 IN EFFECT JUNE 13, 1921 SUPERSEDING NO. 3

FROM WEST SHORE FERRY TO FORT LEE FERRY VIA 42ND ST.-10TH AVE.-B'WAY 125TH ST.

ALL RELIEFS ARE MADE AT 54TH ST. DEPOT

F.L. INDICATES FORT LEE FERRY

INDICATES CAR IS TAKEN OUT OF DEPOT

INDICATES CREW IS RELIEVED OR RELIEVING

INDICATES CAR IS TURNED IN AT DEPOT

APPROVED:

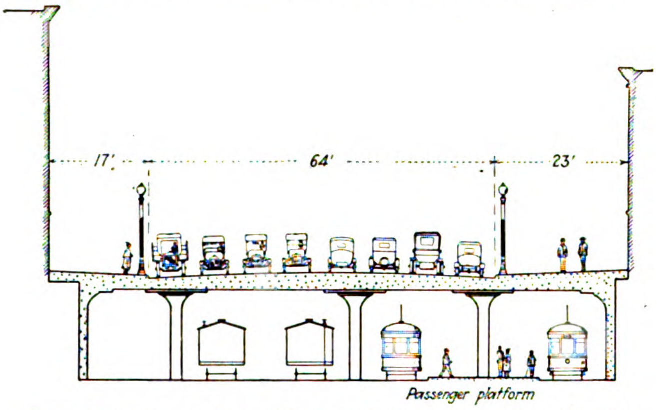
SUPT.

TRAIN
RUN
LEAVE
RUN ON OFF ON OFF ON OFF HRS MIN
WEST SHORE
FORT LEE
42ND ST. 10TH AV
NIGHT CAR
RUNNING TIME AND TIME POINTS
HEADWAYS AND CARS
FORT LEE
116TH ST.
103RD ST.
86TH ST.
72ND ST.
59TH ST.
42ND 10TH AV
WEST SHORE
TOTAL

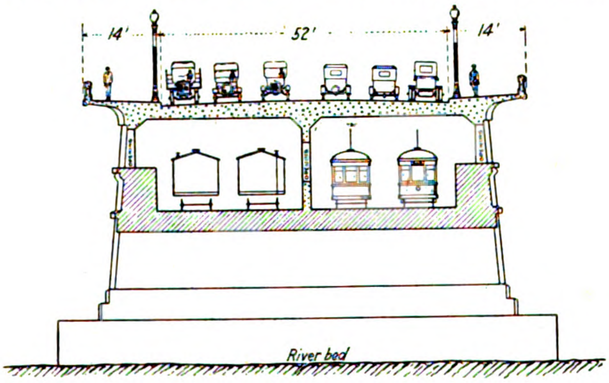
THE NEW YORK TRANSIT COMMISSION PROPOSES THIS STANDARD FORM OF TIME-TABLE

CONSTRUCTING STREET OVER SUBWAY—VIEW FROM ABOVE

THE WHOLE CONSTRUCTION EQUIPMENT IS HERE IN PLAIN SIGHT


17'
64'
23'
Passenger platform

CROSS-SECTION OF ROCHESTER SUBWAY AT CITY HALL STATION


14'
52'
14'
River bed

CROSS-SECTION OF ROCHESTER SUBWAY AT FORMER ERIE CANAL AQUEDUCT

Rochester to Utilize Erie Canal Bed for Transportation

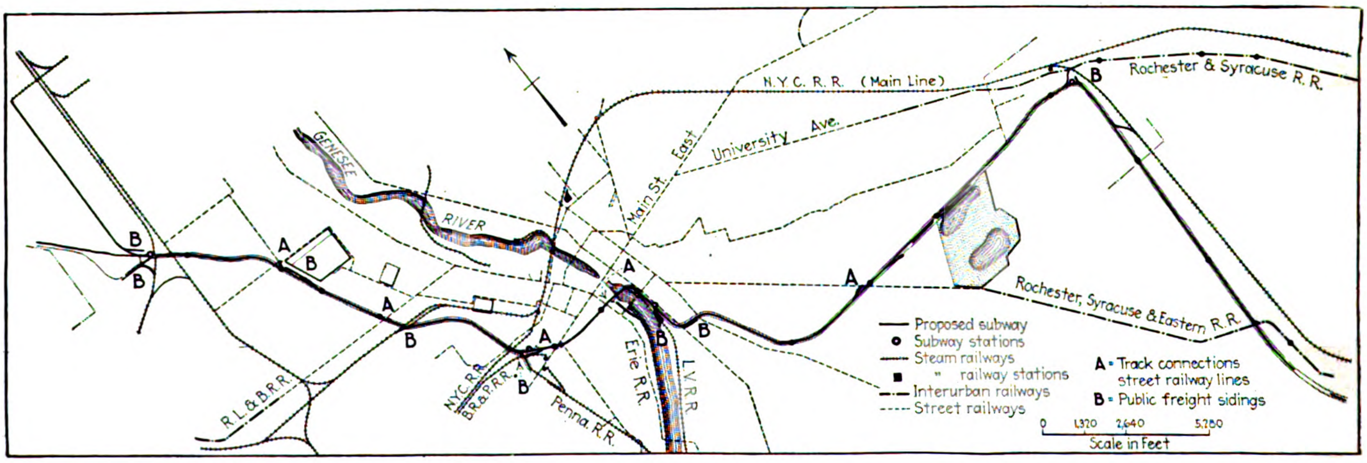
Passenger and Freight Service to Be Provided for in Subway Being Built in 13-Mile Section of Erie Canal Purchased by the City

THE city of Rochester, N. Y., has begun the construction of a rapid transit and industrial railway in the bed of the abandoned Erie Canal. Through the construction of the Barge Canal south of the city a 13-mile section of the Erie Canal has been vacated. This has been acquired by the city at a cost of about $1,500,000, for use as a subway.

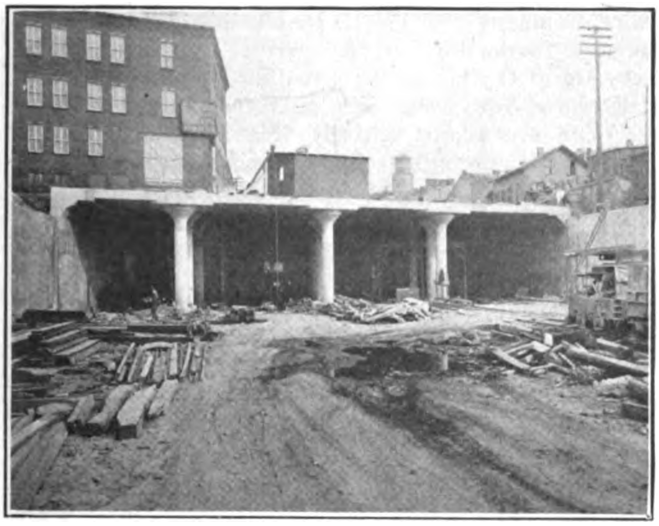
Two tracks for passenger service and two for freight service will be constructed. Tracks will connect with all the steam railroads for transferring freight to the various manufacturing concerns along the canal. The interurban trolley lines will be diverted from the streets and the running time to outside points reduced considerably. Three main stations, located in the business section of the city, will be served by the several interurban lines.

The contract recently let to Scott Brothers of Rome, N. Y., for $1,183,780, comprises about ¾ mile. This section will be covered by a street parallel with Main Street. This street will be 60 ft. wide between curbs, excepting the portion over the Genesee River aqueduct, where the width will be 52 ft.

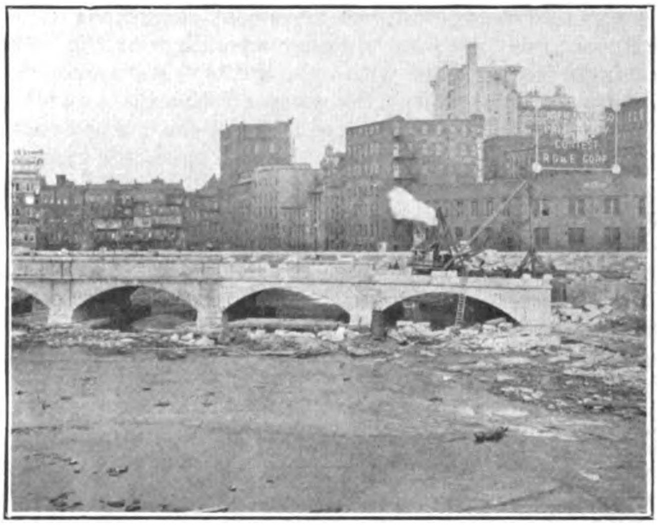
The trunk of the aqueduct is to be used for the


N.Y.C. R.R. (Main Line)
Rochester & Syracuse R.R.
University Ave.
Main St. East
GENESEE
RIVER
Rochester, Syracuse & Eastern R.R.
Erie R.R.
L.V.R.R.
Penna. R.R.
N.Y.C.R.R.
B.R.&P.R.R.
R.L.&B.R.R.
A
B
Proposed subway
Subway stations
Steam railways
" railway stations
Interurban railways
Street railways
A = Track connections street railway lines
B = Public freight sidings
0 1,320 2,640 5,280
Scale in Feet

PLAN OF THE PROPOSED RAPID TRANSIT AND INDUSTRIAL SUBWAY FOR ROCHESTER, N. Y., OF WHICH AN IMPORTANT SECTION IS UNDER CONSTRUCTION



Cross-Section of Subway at Oak Street—At Left, Siding to Warehouse Above; Next, Passenger Track; Both Sides of Middle Row of Columns, Platform Main Street Station; Next, Passenger Track; at Right, Freight Track



Extending Arches of Aqueduct, Street to Be Above Supported on Graceful Short-Span Arches with Railway Tracks Laid in the Bed of the Old Canal. Cross-Section of Completed Structure Is Shown on Page 908.

tracks, the street being carried above the parapet walls. Catenary trolley construction with steel bridges will be used and the freight will be handled with 50-ton electric locomotives.

The detailed study of the project and preparation of the plan were made by LeGrand Brown, engineer of subway, under the general direction of Edwin A. Fisher, consulting engineer, and City Engineer C. Arthur Poole. Prof. George F. Swain of Boston examined and reported favorably on the entire project.

One-Man Cars for Hydro-Electric Railways

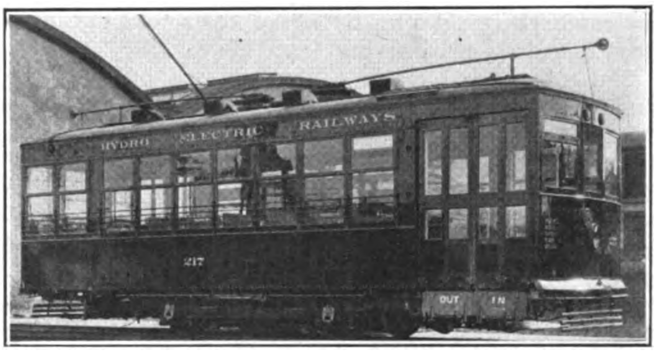
Passenger Comfort Has Been Considered as Most Essential in the New Cars, Which Have Double Doors, Long Platforms, Trucks with Long Wheelbases and Seats with Spring Cushions and Backs

THE Hydro-Electric Power Commission of Ontario has recently placed in service at Windsor and Guelph, Ontario, twenty-five one-man cars. The car bodies and trucks were furnished by the Canadian Brill Company, and as several departures in design have been made from the Birney safety car, a review of the new features will be of interest. A seating capacity of thirty-four has been provided and in addition there is comfortable standing room for thirty passengers. The cars are double ended and weigh, completely equipped, 26,175 lb. This is approximately 10,000 lb. heavier than the Birney car and when consideration is given the features which go to make up this increased weight, it is evident that the question of light weight and low power consumption were not regarded as of so great importance as that of passenger comfort. The cars are mounted on Brill No. 79-E-2 trucks, with a 9-ft. wheelbase, and 26-in. diameter wheels. In general appearance, the cars are quite similar to the Birney cars, but are of increased dimensions and weight. The seats are of the Brill "Waylo" reversible type and have spring cushions and backs with rattan covers.

Some Features of the Door Control Equipment

The Hydro cars are of the two-stream type having separate entrance and exit doors and steps. These are selectively controlled by the operator by means of the brake valve handle and the Westinghouse "selector valve." Either door may be operated separately or both doors may be operated simultaneously. This selective control gives the motorman command of the situation and prevents passengers from boarding through the exit door. It is also a vital factor in the conservation of heat, which is a most important consideration during the Canadian winters. At approximately 75 per cent of the stops, only one-half of the total doorway (either the entrance or exit, as the case may be) is opened.

The folding door and step mechanism is the National Pneumatic Company's standard ball-bearing type throughout, and embodies all of the latest improvements. The engines are mounted in a pocket above the doors, which protects them from dust and dirt, and also reduces the possibility of freezing due to the high drainage position. They are mounted on a steel base plate and bolted through the header. The door shafts pass up through this steel base plate and the door shaft top bearings are riveted to the plate, the engines being connected with rods less than 2 ft. long. This base plate construction makes the engine and the door shafts a complete mechanical unit which will operate properly regardless of vibration. The door-shaft mechanism is ball bearing with taper-thrust collars which allow free movement even though the car platforms may sag or twist and throw the equipment out of line.

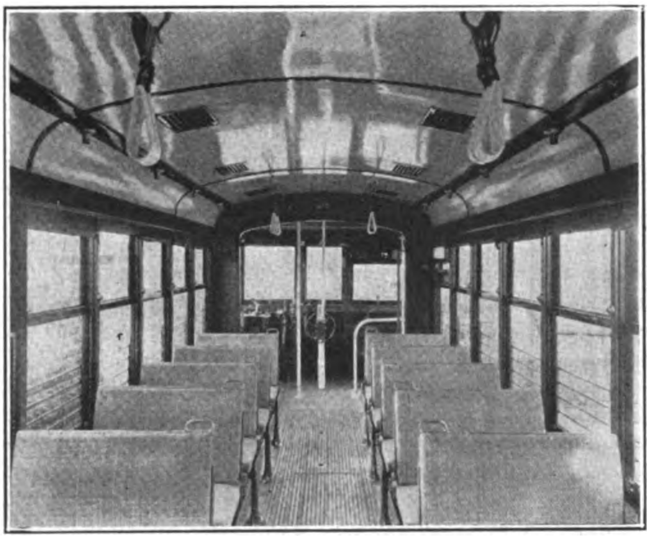


Double-Door Openings Are a Feature of the Hydro-Electric Cars

The folding step mechanism is also ball bearing with the same advantage of free movement should the step be knocked out of line. Another advantage of the ball bearings is the ease with which they are renewed. The thrust collar keeps the wear off the shaft, while with a plain or sleeve bearing both the shaft and housing wear. The step mechanism is connected to the door shafts by means of the National Pneumatic Company's slide bar device, which insures perfect adjustment when new and provides for adjustment to take up wear from time to time as required.

The engine connecting rods are connected to the door shafts through adjustable levers, which provide for perfect adjustment of doors both open and closed and the proper movement of both doors in unison. These levers also provide for taking up the slack due to wear so that the doors may be kept in the same operating condition regardless of the length of time the car is used.

The bottom door guides and catches insure the proper locking of the doors at the bottom, keep the door panels from twisting and are so designed that passengers will not catch their clothing or strike their toes or knees when boarding or alighting from the car.



Reversible Type Seats Have Spring Cushions and Backs

The control and motor equipment was built by the English Electric Company of Canada, Ltd. Two D.K.84-A, 40-hp., 600-volt ventilated box frame motors are used. These motors are of the standard English Electric design arranged for mounting on axles up to 5 in. in diameter. They are of the four-pole series-interpole type and are self-ventilated by a fan mounted on the armature shaft at the pinion end which produces a dual flow of air through the machine, one current passing through the armature core and the other along the surface of the armature and through the field coils. The frame being of the box type, the motor leads are brought out on the suspension bar side, the two armature leads at the commutator end, and the two field leads at the pinion end. Among other desirable features to be found in the motor is the type of brushholder, which is provided with a serrated clamping face, thereby securing absolute rigidity and making it impossible for the holder to slip down on to the commutator. The interpole and main field coils are secured against movement by the insertion of a flat spring between the coil and the frame, the coil being protected by a sheet steel tray.

The gears were supplied by the Tool Steel Gear & Pinion Company and the R. D. Nuttall Company, each company furnishing 50 per cent of the order. The gears are of the helical type, the teeth having a 7½ deg. angle and a 5-in. face. The gear cases are of pressed steel, and are almost entirely free from any riveting or welding, the weight complete being 70 lb.

The controllers are standard Dick-Kerr system two-motor controllers, for use with the Safety Car Devices' apparatus, and are supplied with standard notching device and Zweigbergh patent magnetic shield blow-out coil. The winding of the blow-out coil is short circuited on the two running positions, thereby preventing overheating of the coil. The power and reverse drum segments are built up on square steel spindles which are insulated with a thick covering of mica, a maximum amount of clearance being provided between segments, so as to facilitate cleaning and to overcome the depositing of greasy dust. The cutting out of the motors is done by a crank at the back of the controller, which is operated by the reverse key and which raises or lowers the reverse drum, the movement cutting out either No. 1 or No. 2 motor as desired.

DIMENSIONS OF THE HYDRO-ELECTRIC ONE-MAN CARS

Length over bumpers	30 ft. 3⅜ in.
Length over vestibules	29 ft. 3⅜ in
Length over body	17 ft. 7⅜ in.
Height from underside sill of top of roof	8 ft. 3 1/16 in.
Height from rail top to roof	10 ft. 4 1/16 in.
Height from rail top of trolley boards	10 ft. 7 11/16 in.
Height from rail top of car floor	29 11/16 in.
Height from rail top to first step	14 ½ in.
Height from first step to platform	13 ⅜ in.
Ramp in floor	2 1/16 in.
Width over all	8 ft. 6⅜ in.
Width over side sheets	8 ft. 4 in.
Width of aisle	28 ⅜ in.
Door opening both ends	4 ft. 6 in. clr.

The circuit breakers are of a standard English Electric design and are for mounting in the vestibule roof. They are type "D," form "A" and have a continuous current capacity of 100 amp. The frame of the breaker is of cast iron, the contacts and arc tips being contained in a chamber of molded insulation. All working parts are of cast brass. A main contact and arcing tip is provided and the breaker is so designed that the arc tip makes before and breaks after the main contact brush, which is made up of laminated copper strip. The whole breaker is covered by a black japanned cover with polished brass lettering.

Automatic Substation with Remote Control for New York Central

THE New York Central Railroad has contracted with the General Electric Company for the first automatic substation installation to be used on its electrified division. While the equipment furnished will provide for full automatic operation, the operator at Mott Haven substation will have the new station under his supervision through pilot wires providing for remote control. This equipment will furnish power for train operation at a point where the growth of traffic developed a load center which did not exist at the time of the original installation.

The new substation will be located beneath the elevated tracks at 110th Street and Park Avenue, near the point where they emerge from the Park Avenue tunnel.

The equipment will consist of a 2,000-kw. motor-generator set operated directly from the 11,000-volt transmission, and with the generator tied into the 660-volt third-rail system.

The set may be floated on the line all day or closed down during the periods of light traffic, at the discretion of the operator at the Mott Haven Junction substation. To start the station the operator simply operates a control switch and the automatic control in the new substation takes care of starting the motor-generator set and bringing it onto the line. He can follow the output of the machine and its load conditions at any time of the day and, from his knowledge of train movements, he is in a position to know when the set may be unnecessary. Indicating equipment on his meter panel gives another check on the line load.

In the event of a service interruption, due to failure of the high-tension supply, the automatic station will of itself shut down and be ready to come onto the line again with the resumption of service from the power station.

The automatic station control is laid out so as to present the characteristics of a constant-current generator, in that the control can be adjusted so that the generator will supply continuously any value of current below the rated output for as long as the operator may anticipate the concentration of load will continue, or for such a period as is possible without overheating.

Preparing for Snow in Boston

There Is a Heavy Snowfall Annually and the Company Has to Remove Much of the Snow as Well as Clear Its Tracks—Increasing Dependence Is Being Placed in Machinery, Particularly Tractors

RAILWAY TRACTOR HAULING ROAD WAGON TO BREAK UP ICE ON STREET

THE Boston Elevated Railway has long been required on narrow streets to remove the snow which it cleared from its tracks and not simply to push it to one side. This requires a much more extensive organization than in cities where the company needs simply to run a sweeper or plow over the track and let the city take away the surplus snow. This year a slightly different plan will be followed as the result of an arrangement made with the city authorities. Certain streets have been definitely set aside which the company will clear from curb to curb, while on other streets the city has undertaken to remove the snow which the company clears from its tracks.

Boston has a heavy snowfall in winter and formerly the Boston Elevated Railway owned a large number of horse-drawn sleds for hauling away the snow. Latterly greater dependence has been placed on gondola cars and auto trucks, but the greatest development during the past two years in snow-fighting equipment has been with tractors and other snow-fighting machinery. The company is entering this winter with the following snow-fighting equipment:

Sweepers: Two single-truck, 14 double-truck. Plows: Wason, 22; Taunton, 59; Russell, 8; other types known as steel plows, 74. Tractors: Holt, 3; Cletrac, 1. Snow removers (Bradley) horse-drawn, 18.

This is in addition to various road machines and plows designed to be hauled by the tractors, dump cars, sleds, heavy steel brushes attached to the trucks of the elevated cars to clear the third rail from sleet, etc.

TEAMS USE THE RAILWAY RIGHT-OF-WAY BECAUSE IT IS CLEAR OF SNOW

All snow work comes under the general direction of the general manager and superintendent of transportation, and the co-operation of the municipal authorities of all towns and cities

Dumping Sleds and Dumping Cars for Hauling Snow in Boston

through which the elevated operates is solicited and obtained.

In the late summer of each year the company, through its superintendent of transportation, posts a notice in the carhouses that applications for snow work will be received from the trainmen and by Oct. 1 usually sufficient applications have been received so that the organization can be completed. Besides the rapid transit or elevated division there are four operating divisions of the company to include the surface lines, and the division superintendent of each surface division is responsible for the work of plowing and carting away the snow on his division. This means that he must (1) arrange to get the necessary dumps, (2) see that the snow-fighting equipment is in proper repair, has been tested on the street and is in readiness to put into use, (3) make out a list of the different snow routes and have it posted in the lobbies of the carhouses, and (4) be sure that the men applying for snow work are familiar with these routes. Under the division superintendents, either the station masters at the different carhouses or some duly appointed snow foremen are in charge of the snow work for the districts for which their stations are headquarters. These men see that snow foremen are appointed to follow up the work on streets. A certain number of blue uniformed men are also appointed to act as foremen, timekeepers and paymasters for the shovelers. A considerable part of this latter help is made up of regular maintenance of way men, supplemented, where that supply is insufficient, by outside labor.

Arrangements have also to be made by the division superintendent for sufficient dumping places for the snow. Docks and bridges are secured for this purpose whenever available. Permits to use sewer manholes are also obtained. Open areas, either owned by the municipalities through which the lines of the company run or by private individuals and corporations, are made available. Full details as to all arrangements of this kind made are filed by each division superintendent with the superintendent of transportation, together with a list of the men who have been accepted for snow duty with their residence and telephones, if any.

Two of the accompanying illustrations show a tractor at work breaking up a layer of ice or hardened snow at the side of the track. In one case a road machine is being used and in the other an ordinary hand plow. The former is considered preferable, and in the truck used in Boston the tongue of the road wagon is so arranged that it does not have to be hauled directly after the tractor, but will run at some distance to one side or the other if that should be desired. Another view shows one of the horse-drawn dumping sleds and another a train of dumping cars being loaded by hand. These cars are usually run in trains of not more than

Tractor Clearing Packed Snow by Using Plow

A Heavy Drift in a Boston Suburb

three cars each, the reason being that the dumps are arranged for three cars as a maximum number.

The two other views illustrate some of the difficulties of winter operation in Boston. The lower view at the right on page 912 was taken after a snowstorm in 1920 on one of the outlying lines of the company. The one at the bottom of page 911 illustrates what trucks and automobiles do in Boston after a heavy snowstorm where the company has cleared its right of way, but the rest of the street is still covered with snow. A fact which makes this picture even more notable is that the tracks at this point are not laid in the street but on a reservation in the center of the street, with no paving between the rails. The result is that after a day or two of this use of the reservation by heavy trucks the company finds most of its tie rods broken and other damage done to its right-of-way.

Improved Underfeed Stokers for P.R.T. Boiler Plant

Forced Draft Substituted for Natural Draft Under Twelve Boilers of the Company's Principal Peak-Load and Reserve Power Station—Steam-Operated Dump Plate a Feature

THE Philadelphia Rapid Transit Company in part generates the electrical power needed for its lines, purchasing the remainder from the Philadelphia Electric Company. Two-thirds of the power requirements are purchased in off-peak hours and one-third in the peak-load period. Several power plants, fairly well distributed over the city, are operated, the most modern of which is located on the Delaware River somewhat more than a mile north of Market Street. This station contains five steam turbines, one Westinghouse of 15,800-kw. capacity, two Westinghouse of 9,500-kw. capacity each, one Westinghouse of 6,000-kw. capacity and one General Electric of 2,000-kw. capacity.

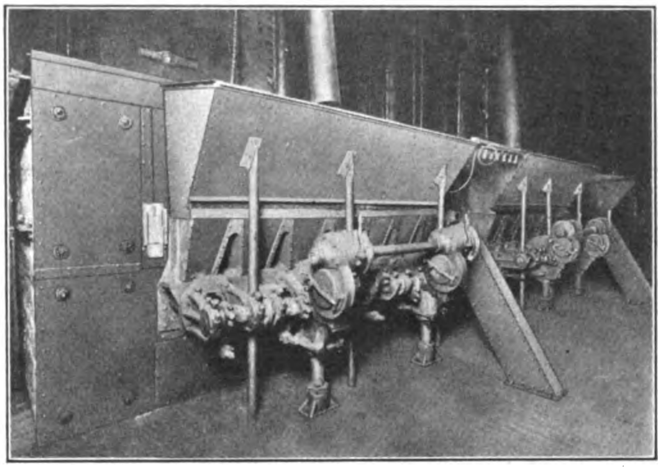
Coal is received at the plant by rail and water, being dumped into hoppers, from which it is delivered to bunkers by means of bucket type elevators and flight conveyors made by the Webster Manufacturing Company. Ashes are removed from the boilers to hoppers in a basement beneath, whence they drop into cars from which they are taken by means of a Morse & Williams dumping bucket elevator to an elevated ash bin. From this they go into electrically operated ash cars.

In studying the general power system of the company, the engineers some time ago decided that money could profitably be invested in changing over some of the boilers in this plant for forced-draft combustion. The boiler room contains sixteen 800-hp. Parker boilers and twelve Babcock & Wilcox boilers, all formerly equipped for natural draft.

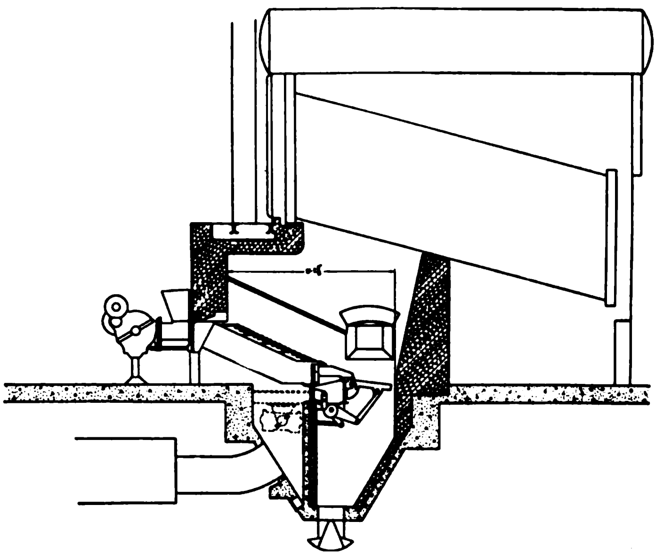
It was decided to change the stoker equipment of the twelve B. & W. boilers from the Roney overfeed type to the Taylor underfeed type. These boilers are of the marine type, six rated at 627 hp., four at 680 hp., and two at 450 hp. The Taylor stokers are of the new seventeen-tuyere, "H" type and are guaranteed to burn sufficient coal to develop 250 per cent of boiler rating continuously, and 300 per cent of rating for two hours. One hundred and thirteen square feet of stoker grate area is installed under each of the ten larger boilers and 81 sq.ft. under the two smaller boilers.

While this type of Taylor stoker is no departure in basic principles of operation from the well-known Taylor stoker, it has many improvements. Features of the fuel-feeding mechanism and air supply make possible exceptionally high fuel-burning rates per unit of stoker grate area. Advantage of the possibilities of this design was taken materially to increase the furnace volume by setting the stoker low in relation to the floor line without sacrificing operating accessibility. A furnace depth of 9 ft. 2 in. was obtained, with little change in existing ashpit construction, by using a short arch.

Among the novel features of this stoker is the use of a spur-gear power box, said to give a much higher power transmission efficiency than the worm-gear box in general use on underfeed stokers. A 50 per cent variation in the ratio between driving-shaft speed and crankshaft speed is obtained without shifting of gears or the use of clutches. All driving shafts are completely guarded. Hoppers are designed to eliminate arching of wet coal. A special feature of this design is the ease of renewing all parts subject to replacement with the minimum loss of material in so doing. A reciprocating extension grate for burning the fixed carbon from the ash is provided. The stoker is equipped with a steam-operated dump plate giving maximum free discharge opening when the plate is dropped. The plate swings above the horizontal by steam power to free the bridge wall from clinker adhesions. A cross-section of the installation is shown in the accompanying line cut and the reproduction of a photograph shows the front of the boilers and stokers.



THESE STOKERS HAVE NEW TYPE OF POWER BOX. OPERATING MECHANISM IS LARGELY WITHIN THE BOILER SETTING



CROSS-SECTION OF BOILER SETTING, WITH NEW UNDERFEED STOKER, IN DELAWARE AVENUE POWER PLANT OF PHILADELPHIA RAPID TRANSIT COMPANY

Letters to the Editors

Discussion on Depreciation

BALTIMORE, MD., Dec. 5, 1922.

To the Editors:

I have looked over with much interest your report of the Detroit meeting of the National Association of Railway and Utilities Commissioners, published in the *Journal* of Nov. 25, page 851, and desire to call your attention to one point with regard to the discussion on depreciation.

I am inclined to think that any one reading this report would infer that the sense of the meeting was in favor of the setting up of a straight reserve based upon cost less scrap and accurate life tables.

This ignores the very important statement made by Mr. Jackson and received with apparent approval by the delegates, in which he called attention to the fact that on account of the equalization of renewals the accumulation of a depreciation reserve on the method outlined above resulted in building up an enormous fund for which the utility would at no time during its future life find a legitimate use.

This fact, while it has been recognized for some time by a number of the more careful students of depreciation theories, has not, so far as I know, been publicly emphasized, and Mr. Jackson's statement was to me one of the most important ones made during the entire convention. W. H. MALTBIE.

Every Street Intersecting an Electric Railway Is a Grade Crossing

BOSTON ELEVATED RAILWAY,
BOSTON, MASS., Dec. 4, 1922.

To the Editors:

The editorial on the vehicle situation which appeared in the issue of the *Electric Railway Journal* for Dec. 2 was read with much interest. The tremendous increase from year to year in numbers of vehicles on the highways and the result to street railways of a proportionate increase in vehicle collisions should direct the attention of all concerned to trying to reduce in some manner the numer of these accidents.

A few weeks ago the Massachusetts Safety Council made a study of vehicle collisions that had occurred on Massachusetts street railways during the first eight months of the present year and came to the following conclusions:

1. Collisions with automobiles coming out of side streets without warning, or at improper speed, constitute the most serious group.
2. Automobiles turning out from the curb without signaling constitute another large but less serious group.
3. Turning in front of a car, or cutting in in front of it, is a frequent cause of serious collisions.
4. On suburban or interurban lines, where trolley cars operate at a relatively high speed, automobiles stop on the track or too close to it, and resulting collisions almost always involve serious personal injury.

The publication of this report caused an interesting editorial discussion which accomplished something toward informing the public as to the nature of this hazard. I believe that it is our duty to present these facts again and again to motorists in every state until their significance is driven home.

That the seriousness of the situation extends beyond the confines of the cities is indicated by the fact that the steam railroads of the country have this year conducted a campaign to reduce collisions with automobiles occurring at grade crossings. Our investigations on this railway have shown that automobiles and trucks coming out of side streets without warning and at high speed produce our greatest and most serious class of vehicle collisions.

Practically every side street entering a highway on which we operate street cars establishes a grade crossing over our tracks. The absolute disregard of the average driver of a motor vehicle in approaching these tracks from side streets, together with his high speed and disregard of the use of his warning signal, constitutes, in my judgment, a greater element of danger than exists at steam railroad grade crossings. This is due to the greater frequency of our cars and the greater frequency of these side street crossings. Our task is to educate the driving public to an understanding of this fact.

According to the morning press reports, in the matter of vehicle accidents and particularly in that of cross-street vehicle accidents, the street railways are up against a world-wide problem.

In a statement to the press, President Harding declares that he believes that the world in general, and the United States in particular, is finding it difficult to adjust itself to the automobile age. He thinks that this country is moving at an automobile pace and generally needs a policy of caution at the crossroads and the turnings of its future. H. B. POTTER,

Chairman Committee on Accident Prevention,
American Electric Railway Association.

Through the Gotthard Tunnel in Comfort

IN A REPORT to the Department of Commerce, Consul-General James J. Murphy declares that, in the light of experience with electrification up to the present time, the electrification of the Gotthard line, through the tunnel connecting Italy and Switzerland, may from a technical point of view be considered as entirely successful. The movement of trains is just as regular as with steam locomotives; the passengers and the railroad personnel appreciate highly the elimination of smoke; and there is no doubt that this is an important step forward, hygienically. Strain on the rolling stock is lessened and wear on the removable parts has been found to be considerably reduced. Experience shows, on the other hand, that the greater speed obtained apparently causes a more rapid wear of the outer rails on the curves. With the greater speed attained it has been possible to make improvements in the time-tables. The efficiency of the crews engaged in maintaining tracks and tunnels has increased noticeably.

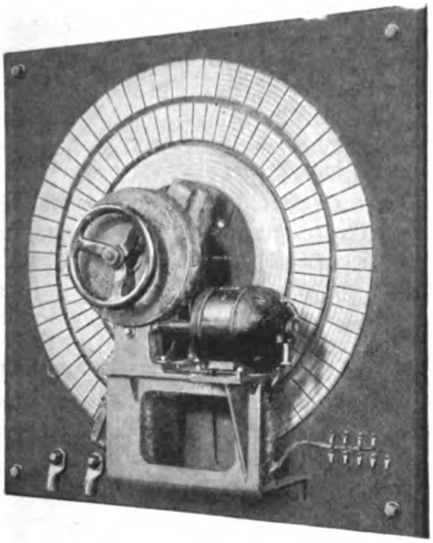
South African Railways Power Plant

AFTER numerous surveys Colenso has been chosen by the South African Railways as the best site for the new power plant which will generate the power for the electrification of the railway line. For this the locomotives have already been ordered. Colenso is about midway between the two termini of the Glencoe and Maritzburg-Colenso electrified section. Colenso will therefore probably be an important power center.

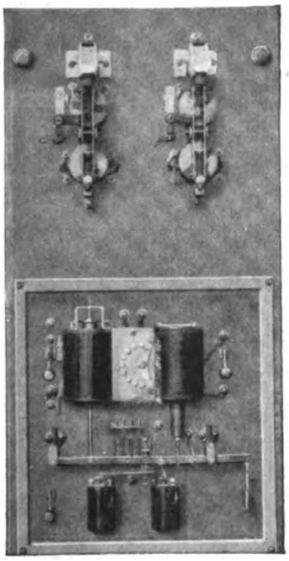
What's New from the Manufacturers

New Voltage Generator of Rheostatic Type

THE Westinghouse Electric & Manufacturing Company has installed in a number of recent power plants a type of voltage regulator differing fundamentally from the vibrating type, or "Tirrill" regulator. The new regulator maintains a constant alternating-current voltage by means of the generator field rheostat, the exciter voltage being kept at a constant value. The new regulator is not intended to supersede the Tirrill, but rather to meet conditions to which the latter is not inherently well adapted. It is particularly applicable to installations where the time constant (or rate of response to change in voltage on the field of a generator) is slow, where exciters are of large capacity and low speed, thus having heavy field currents beyond the capacity of the vibrating regulator contacts, or for synchronous condenser application, where the excitation voltage across the field of the condenser must be lowered to a value below the residual voltage of the exciter, as is very often the case.



FACE PLATE OF FIELD RHEOSTAT, OPERATED BY HIGH-SPEED MOTOR



CONTROL ELEMENT AND REVERSING CONTACTORS

The regulator equipment comprises the following: (1) A control element mounted in a glass case, and located either on a panel of the main switchboard, or on a bracket or a pedestal. (2) A pair of reversing contactor switches actuated from the main contacts of the control element. The reversing switches are for operating the rheostat motors in one direction or the other, and may be mounted on the same panel with the control element or on a separate base in the rear of the switchboard. (3) A special generator field rheostat, operating at a high rate of speed. The motor of the rheostat is quickly brought to rest by so connecting the reversing switches as to employ dynamic braking the moment the control element ceases to cause a change in the excitation current.

The control element consists essentially of a set of contacts jointly actuated by an alternating current and a direct current coil. These contacts control the direction of rotation of the rheostat motor through two reversing contactor switches. The alternating-current coil is connected to the generator lead through the use of a suitable potential transformer. The direct-current coil is connected across the terminals of the generator field. A current coil is also provided together with a suitable number of taps for compensation purposes.

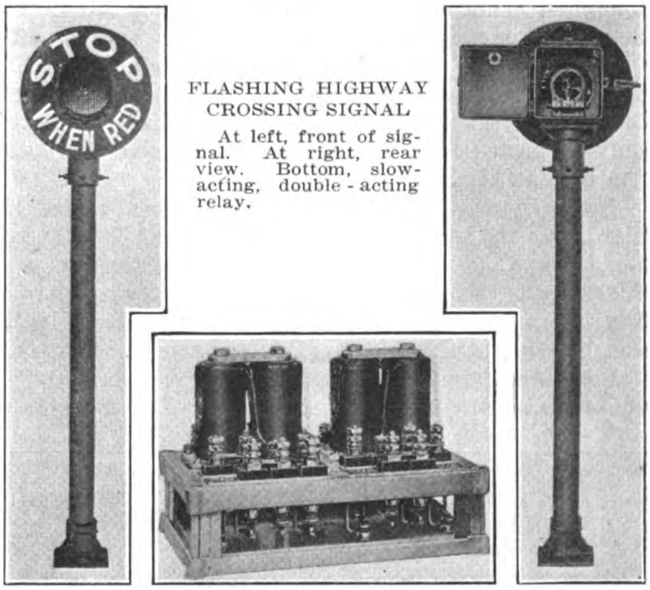
Anti-hunting features, incorporated in the design, consist of auxiliary contacts on the reversing switches which automatically change the strength of the current in the alternating-current coil at the moment there is a change in excitation voltage on the machine.

The operation of the rheostatic regulator is exactly the same as if the station operator were regulating the voltage by hand. When the line voltage is at the correct value, the regulator is in equilibrium, and consequently there are no moving parts. Should the voltage deviate from the correct value, the regulator will operate the generator rheostat to bring the voltage back to normal.

The regulator is either put in or out of service by means of a single-drum control switch.

Flashing Light Highway Crossing Signal

THE General Railway Signal Company, Rochester, N. Y., has developed a flashing-light highway crossing signal which is simple, dependable and which requires little maintenance. A special lens is used to spread an intense flashing red light which is clearly visible under adverse sunlight conditions at all distances up to 1,500 ft. The lens is protected from mechanical injury by a wire mesh guard. A double filament lamp is so placed that the effective light from both filaments is in the focal center of the lens, thereby giving the maximum intensity of light for the combined wattage of both filaments. The lamp and lamp receptacles are so made that no adjustment for focus is necessary in changing lamps. The two filaments of the double filament lamp are so made that they will not burn out simultaneously.



FLASHING HIGHWAY CROSSING SIGNAL

At left, front of signal. At right, rear view. Bottom, slow-acting, double-acting relay.

Thirty flashes per minute are produced by the use of a simple slow-acting double relay. The relay is designed to break a current of 3 amp. continuously without injury to contacts, whereas in electric railway service, a current of less than 1 amp. is all that is required. The signal is equipped with a small clear glass on each side so that its operation may be checked from the track. Provision is made for easy alignment with the highway, a sighting device being included in each signal for convenience in making this adjustment. The light unit is mounted on top of a 4-in. pipe mast or by the use of a bracket it may be mounted on an existing pole. Backgrounds are furnished lettered as shown in the illustration or as specified by the railroad.

Electric Railway Publicity

Uses Track Construction to Emphasize Interest in City

CONSTRUCTIVE advertising of a new and distinctive type is being done by the Tri-City Railway, Davenport, Iowa. It is calling attention to its municipal improvement work in the laying of 4,200 ft. of double tracking and offering for sale the 7 per cent prior preferred stock of the United Light & Railways Company, its financing corporation.

The company has erected signs between the tracks along the mile of double tracking in the central district. These signs are heavy canvas between steel pole uprights. They call attention to the $77,000 of improvement, and emphasize the fact that of this amount $23,000 will be paid out to labor. The sign states that the Tri-City Railway is undertaking this big improvement because it believes in the city and realizes that it is only by such improvements that it can give the public the best service.

In addition to this general or institutional appeal the sign gives the interesting information that 363,000 paving brick, 7,000 tons of excavation, 1,300 tons of sand, 6,900 sacks of cement, 4,200 creosoted oak ties, and 260 tons of rail and fastenings are to be used in the construction of this loop surface car artery.

Past these signs runs the steam shovel employed by the company in its excavation work. On the side of this shovel, in plain view of the thousands of spectators who watch it at work daily, is this advertisement: "Buy United Light & Railways 7 per Cent Prior Preferred Stock and Keep This Shovel Moving."

Proverbs XII-19

THE Philadelphia Rapid Transit Company was recently beset with an agitation on the part of the local newspapers to do away with the skip-stop plan of operation. The newspapers had carried the agitation to extremes and were taking every possible opportunity to reflect discredit on the skip stop. Whenever an accident occurred, for example, some such headline as this was likely to appear: "Another Murder Caused by Skip Stop." At the peak of the agitation, every car on the system appeared one morning with a dash poster which had on it only the Bible reference in large letters: "Proverbs XII-19."

The Bible verse reads as follows:

> "The lip of truth shall be established forever:
> but a lying tongue is but for a moment."

The effect was almost electrical. By noon probably 2,000,000 people, a far greater audience than any newspaper reached, had noticed and renoticed this peculiar dash sign and curiosity did the rest. One of the local Bible Institute offices was besieged with telephone calls inquiring about the reference.

The message of the poster was unassailable, and it politely told the newspapers what they were doing without calling them what they were. They apparently got the point, for it is said that the agitation was suddenly and completely dropped.

Louisville Railway Wants Representatives in City's Associations

THE Louisville (Ky.) Railway is placing men in the various clubs, business organizations and associations. This means that when any railway subject comes up for discussion in any one of these associations the representative of the railway who is a member should be able to place the case of the company properly before its members. Officials and department managers of the railway are now active in a large number of local organizations, which of course is resulting in more friends for the company, and good will is the one thing the company needs.

THIS NEW TRACK
FROM IOWA TO WARREN STREETS
363,000 PAVING BRICK
7000 TONS OF EXCAVATION
1300 TONS OF SAND
6900 SACKS OF CEMENT
4200 CREOSOTED TIES
260 TONS RAIL AND FASTENINGS
IT WILL COST $77,000 OF WHICH $23,000 ALONE WILL GO FOR LABOR.
THE TRI-CITY RAILWAY COMPANY HAS BORROWED THIS LARGE SUM FROM THE UNITED LIGHT & RAILWAYS COMPANY BECAUSE IT BELIEVES IN DAVENPORT AND REALIZES THAT ONLY BY SUCH IMPROVEMENTS CAN IT GIVE THE PUBLIC THE BEST SERVICE.
TRI CITY RAILWAY COMPANY OF IOWA

AT LEFT, STEAM SHOVEL SPREADS THE MESSAGE OF 7 PER CENT PRIOR PREFERRED STOCK. AT RIGHT, TRI-CITY RAILWAY OF IOWA BUILDS GOOD WILL AND A TRACK SIMULTANEOUSLY

Samuel Riddle, vice-president Louisville Railway, was recently elected a director of the Board of Trade.

Before the election, President Barnes sent a letter to every member of the Board of Trade calling attention to the nomination of Mr. Riddle. He explained that as a member of the directorate he would be in better position to understand the problems of the community.

Stop Guide for Electric Railway Cars

THE Metropolitan Electric Tramway, Ltd., of London, England, is trying out a car road guide in one of its tramway cars. The indicator is manufactured by the Road Guides, Ltd., London, and is a box arrangement of approximately 36 in. x 14 in. This contains a chart of the route being traveled by the car. Midway along the glass dial is a pointer which indicates to the passenger the exact position of the car at all times. As the car moves along the chart unwinds itself from one spool to another. The moving chart has printed on it all the features of the journey, such as streets, compulsory stops, museums, places of business, etc. The top portion of the chart is used for advertising to announce current events and interesting news.

Two indicators are used on each car, one on either side, so placed that the passengers can see them quite comfortably. The indicator is automatic and requires no adjustment except when the car diverges from a given route or when going in or out of service. It can be neutralized by moving a lever and can be set to any point on the route by turning another small hand lever. It is driven through reduction gears from a friction wheel which operates on the rim of one of the car wheels. Provision is made for changing the chart in a convenient manner.

Mr. Mitten to Stand Four-Square

THE familiar phrase, "Mitten Men and Management," is hereafter to include owners and public. The owners were recently added to this working combination, and the Philadelphia (Pa.) Rapid Transit Company is now out to win the public. What the company wants is intelligent interest on the part of the public. This it will attempt to gain by inviting suggestions from car riders as to improvements in service and methods. Suggestion cards will be carried by conductors, who are to write down criticisms or suggestions of the riders. In announcing the new plan, the following statement was made:

> The men and management for eleven years have been proving the value of working together. The stockholders by their recent vote and since by the use of suggestion cards, have come splendidly into line, thus completing three sides of the square which is emblematic of street railway perfection.
>
> Viewing our joint accomplishments, is it too much to hope that there may also be developed a spirit of public co-operation which shall complete the entire square—men, management, owners, public?
>
> To this end conductors should use their suggestion cards to report not only their own suggestions, which are the fruit of their observations and first-hand knowledge, but also those of their passengers, which are from the standpoint of those we are here to serve.
>
> We have been keeping our eyes open to improvements to service with splendid results. Let's keep our ears open, that we may also have the advice of our car riders.

Transformer and Busbar Standards Adopted by Electric Power Club

THE Electric Power Club, the headquarters of which are located in the Kirby Building, Cleveland, Ohio, held its regular fall meeting at Grove Park Inn, Asheville, N. C., recently.

Of the proceedings of particular interest in the electric railway field the following are the most important:

Requirements for high-potential test guarantees applying to transformers having single-voltage ratings from 550 to 50,000 inclusive were adopted as follows: High-voltage winding to low voltage winding and core, maximum high voltage rating from 550 to 4,500 volts, 10,000; above 4,500 to 50,000 volts, twice the highest rated voltage of the high-voltage winding, plus 1,000 volts; above 50,000 volts twice the normal voltage of the circuit to which the low-voltage winding is connected, plus 1,000 volts.

Busbar Ratings

The club made some revisions of its rules on application and rating of busbars and connection bars. The standard now specifies that busbars shall be rated on a basis of temperature rise instead of current density, and curves are given to cover the current-carrying capacities of the usual sizes of copper buses. These show the reduction in permissible amperes per square inch with increase of number of laminations and with increased width of bar. The capacity of alternating current is, of course, much lower than that for direct current, on account of the "skin effect," etc. A contact pressure of 250 lb. per square inch is prescribed as a minimum in bolted or clamped connections, and all contact surfaces and connections are to be cleaned by sandpapering or other suitable means immediately before bolting. The maximum temperature for proper buses is specified at 70 deg. C. in general, or 80 deg. under specified exceptional conditions.

In addition to the above, standard voltage ratings of oil circuit breakers, together with standard interrupting capacities, were adopted. Up to 73,000 volts oil circuit breakers and other switching equipment are to have ratings based on maximum values as follows: 750, 2,500, 4,500, 7,500, 15,000, 25,000, 37,000, 50,000 and 73,000. Above 73,000 volts, the standard voltage ratings corresponding to standard normal system voltages are specified as follows: 88,000, 110,000, 132,000, 154,000 and 220,000.

The standard interrupting capacities for oil circuit breakers are specified as follows, the arc amperes and the rated voltage being given respectively in all cases: 3,200 amp., 4,500 volts; 2,500 amp., 7,500 volts; 2,000 amp., 15,000 volts; 3,000 amp., 15,000 volts; 4,500 amp., 15,000 volts; 7,000 amp., 15,000 volts; 10,000 amp., 15,000 volts; 14,000 amp., 15,000 volts; 20,000 amp., 15,000 volts; 30,000 amp., 15,000 volts; 40,000 amp., 15,000 volts; 60,000 amp., 15,000 volts.

A number of definitions covering standard nomenclature for oil circuit breakers were also adopted. These will greatly assist in furthering clarity in specifications.

Management and Administration Experts Meet

A MEETING of the Taylor Society was held in New York City, Nov. 22-24, beginning with an informal dinner and the annual business meeting.

Each of six public discussions was devoted to a particular topic, covered principally by presentation of cases. The topics were: The Organization and Management of a Medium-Sized Plant; Statistical Compilation—Some of Its Uses as a Function of Scientific Management; Shaping Your Management to Meet Developing Industrial Conditions; Master Budget of Sales and Production; Reduction of Waste Through Research Studies in the Operating Department of Retail Stores; Supervision of Personnel.

Arkansas Association Meets

THE Arkansas Association of Public Utilities held its fifteenth annual meeting at Hot Springs National Park on Nov. 9. Seventy-five registered members of the association attended. A feature of the meeting was an address by Ex-Governor Charles H. Brough on the development of the state. The convention was also addressed, among others, by E. F. Wickwire, Mansfield, Ohio. It was voted to hold the 1923 meeting at Pine Bluff. The following officers were elected: President, S. A. Lane, general manager Bell Telephone Company of Arkansas, Little Rock; first vice-president, J. L. Lorgino, Pine Bluff; second vice-president, Arthur E. Main, Mammoth Springs; secretary-treasurer, R. L. Brown, Little Rock, who was re-elected.

Kentucky Association Meets on Dec. 12

AS PREVIOUSLY announced in this paper, the Kentucky Association of Public Utilities will meet in Lexington on Dec. 12. The program includes a number of addresses on public relations and allied topics, beginning with an address by President L. B. Herrington, vice-president Kentucky Utilities Company, Louisville. In the list of speakers are the names of James P. Barnes, president Louisville Railway; Samuel Insull, president Commonwealth Edison Company, Chicago; Dean F. Paul Anderson, University of Kentucky, and C. N. Manning, president Security Trust Company, Lexington. The sessions will be held at the Phoenix Hotel and the University of Kentucky, and will probably be well attended, judging by the interest that was shown last year.

Pacific Railway Club Admits Manufacturers

AT ITS November, 1922, meeting the Pacific Railway Club adopted the recommendation of its board of governors and amended the club's constitution to admit supply men. This is done under the classification "Associate Membership," which includes persons not eligible for active membership but who are actively engaged in occupations where they co-operate with men in railroad service for the advancement of the science of railroading and the best interests of the railroad profession. Associate members will have all privileges except those of voting and holding office, and their dues are $3 per year.

American Association News

Dinner Committee Meets

THE first meeting of the mid-year conference special dinner committee was held in the office of the chairman, J. H. Hanna, in Washington, D. C., on Dec. 6. The general preliminaries were gone over. It was decided to hold the meeting and banquet at the Willard Hotel on Friday, Feb. 16, where there is available a meeting room which will seat 500 and a fine new banquet hall which will provide for 800. The price of the dinner tickets was set at $10, and tentative plans for music, entertainment, decorations and a separate dinner party for the ladies were agreed upon.

Those present were Chairman Hanna, Secretary J. W. Welsh, H. B. Flowers, C. C. Peirce, W. F. Ham, Harry L. Brown and J. N. Shannahan, chairman of the meetings and subjects committee, which has general charge of the mid-year conference.

Advertising to the Automobile Owner

THE advertising section of the American Electric Railway Association has just gotten out fifteen publicity cards for use in newspapers and directed at the automobile owner. The text of each is that he would do much better to store his car in the garage until next April and depend on the electric car for his transportation.

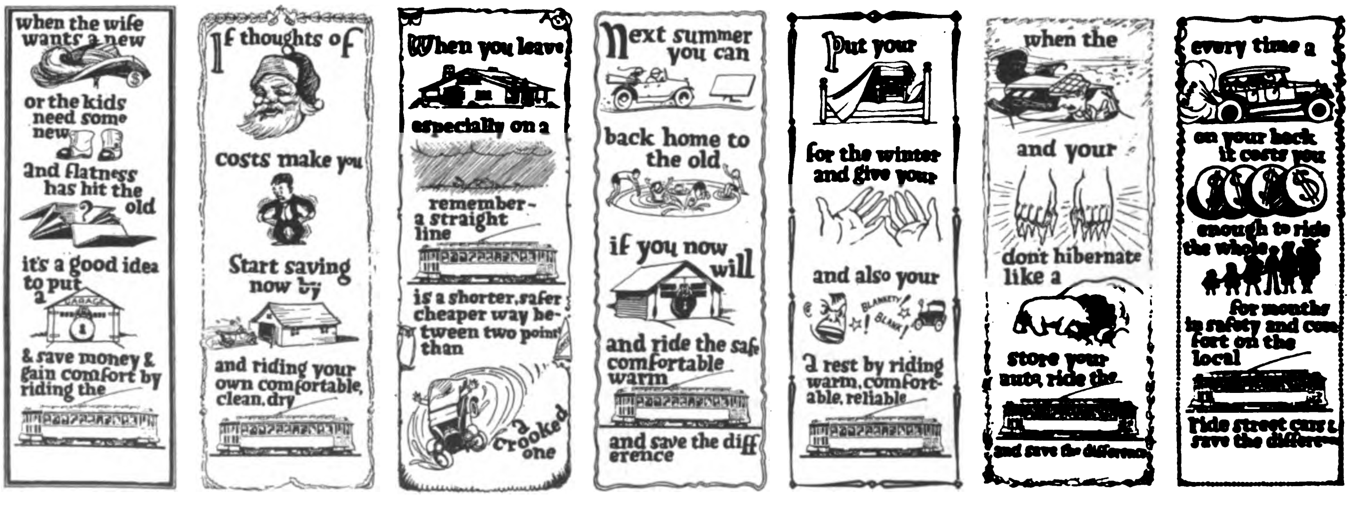
The cards are of uniform size, 2 in. x 6 in., or suitable to use in a daily newspaper column, and the association is prepared to furnish mats for these cuts without charge to member companies. The drawings are designed so that it is possible to mortise out room enough at the bottom of most of them for the company's name, if desired. It is suggested, however, that the "ads" had better be run without signature. A few of these are reproduced.

Pamphlets Issued

THE American Electric Railway Association has recently sent to member companies five printed addresses or reports in pamphlet form. One is the address of President Jackson at the annual convention of National Association of Railway and Utilities Commissioners in Detroit, Nov. 14. The second is the report of the committee on motor vehicle transportation, presented at the same convention. Two others are papers or reports presented at the recent Chicago convention; one the report of the committee on uniform motor vehicle regulation, the other the paper on the preparation and administration of a budget, read before the Accountants' Association by Harry A. Snow. The fifth pamphlet is a reprint of an address on the responsibility for the cost of paving read by A. T. Davison, Third Avenue Railway System, before the Engineers' Club of Philadelphia. This reprint is distributed with the compliments of the Third Avenue Railway.

Distribution of 1922 "Proceedings"

IT IS expected that the 1922 *Proceedings* will be available for distribution on or about Jan. 1, covering the American and the four affiliated associations. In view of the fact, however, that the manufacturer members, as a rule, do not care to receive the *Proceedings* of the Accountants, the Claims and the Transportation & Traffic Associations, only the American and Engineering Association *Proceedings* will be sent them unless they specifically request the others. Railway members will receive one copy of the *Proceedings* of each association and individual members will receive copies of the *Proceedings* of the association with which they are respectively affiliated.


when the wife wants a new
or the kids need some new
and flatness has hit the old
it's a good idea to put a
GARAGE
& save money & gain comfort by riding the
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Start saving now by
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When you leave
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and ride the safe comfortable warm
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for the winter and give your
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BLANKETY! BLANK!
a rest by riding warm, comfortable, reliable
when the
and your
dont hibernate like a
store your auto, ride the
and save the difference
every time a
on your back it costs you
enough to ride the whole
for months in safety and comfort on the local
ride street cars & save the difference

PUBLICITY MATTER PREPARED BY THE A. E. R. A. ADVERTISING SECTION TO ENCOURAGE AUTOMOBILE OWNERS TO USE THE TROLLEY

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Arrests and Convictions in Buffalo —No Results from Fare Conference

Ernest J. Jaggard, president of the Buffalo Jitney Owners' Association, charged with conspiring with officials of the Manhattan Transit Company of New York to evade the transportation corporation law in the operation of jitneys in Buffalo, was found guilty by a jury in City Court and was fined $100. After the conviction he resigned from the organization. Joseph H. Hoadley of New York, president of the Manhattan Company, was discharged in City Court following a trial on a charge of conspiracy growing out of the same case. The prosecution failed to show any criminal intent. Henry D. Chapin of New York, vice-president of the Selden Motor Truck Company, Rochester, and the company's New York manager, also was discharged after trial on a conspiracy charge. It was not proved that Chapin was an official of the Manhattan Transit Company.

The trial and conviction of Jaggard is the result of evidence obtained by the International Railway, Buffalo, in connection with its intensive campaign to rid the city of jitneys which are running in defiance of court injunctions and the state law. It is estimated by officials of the International in charge of the jitney service investigation that close to 2,500 jitneys are operating daily over scheduled routes in the city of Buffalo. Many officials of the claims department of the Philadelphia Rapid Transit Company, Philadelphia, have been detailed to the work of getting evidence and checking jitney drivers throughout the city. Arrests are being made daily but nominal fines are being imposed by the City Court judges. Few are getting penitentiary sentences, except in contempt of court cases and the evidence in these cases is exceptionally difficult to obtain.

The police guard has been withdrawn from all local and interurban cars on the lines of the International Railway with the exception of the "owl cars" on the local lines in Buffalo. Police authorities stated that the emergency now has passed and there is no more danger of rioting although loyal employees of the company are being assaulted, dragged off their cars and stripped of their clothing every few days. Cars also are being stoned in outlying sections of the city.

As a result of a conference held in the Mayor's office it was disclosed that the law covering public utilities prohibits a charge for transfers. The Mayor had proposed to the International the restoration of the 5-cent fare and a 1-cent transfer. Among those who attended the conference on behalf of the International were Thomas E. Mitten of Philadelphia, chairman of the board of the International; Herbert G. Tulley, president, and Edgar J. Dickson, vice-president in charge of operation. Mr. Mitten promised to present a new plan on or before Jan. 10.

The conference was the second of a series between three members of the City Council and three representatives of the International. It was productive of no results although it continued almost all day. Officials of the International were asked by the Mayor to drop the prosecution of jitney drivers but this was flatly rejected. The conference was behind closed doors. The Socialist member of the City Council is making a fight to have the negotiations in the open.

Resolution Adopted for Investigation of Return to Five-Cent Fare

Crops have started to mature from the seed sown at the election in November, so far as the Schenectady situation is concerned. With Mayor George R. Lunn of Schenectady, elected Lieutenant-Governor on the Democratic ticket, having decided to continue to hold the office of Mayor also, the Common Council of Schenectady on Dec. 4 passed a resolution without a dissenting vote to make a searching investigation of the feasibility of abolishing the 7-cent fare granted by the Public Service Commission and restoring the 5-cent limit contained in franchises under which the railway lines are operated.

The resolution was presented by Alderman Frank X. Shay, president pro-tem. He preceded presentation of the resolution with a brief review of the Council investigations and of legislation in May, 1920, at the time Edward M. Bemis was employed by the city to investigate the advisability of allowing the company an increase in fare from 6 to 7 cents to permit it pay increased wages.

The resolution provides for an immediate investigation by the Council and will include, in addition to the fare question, inquiry into the safety and convenience of one-man cars and the adequacy of the service.

"The great probability of legislative action soon after Jan. 1, restoring power to the Common Council and the city authorities to compel compliance with franchise provisions," is the reason given in the resolution for the immediate action.

Thus time is apparently being seized by the forelock, for in the event that the public service commission law is amended to confer regulatory power upon municipalities, Schenectady will be ready and waiting so far as street railway regulation is concerned.

Arbitrators for Rental Issue Named

An arbitration board has been named to decide the rate of rentals to be paid to the city of Detroit by the Detroit (Mich.) United Railway for the use of the city-owned tracks by the corporation's interurban cars. The arbitration proceedings will be confined to the question of rentals alone and will not include the several points which the Detroit United Railway officials had desired arbitrated.

Professor Henry E. Riggs of the University of Michigan has been named by the Detroit United Railway as its representative; H. M. Gould, electrical engineer of the Department of Street Railways, will represent the city and William E. Davis of Cleveland, Ohio, has been agreed upon by the first named arbitrators as the third man to complete the board.

Elliott G. Stevenson, president of the Detroit United Railway, had announced that the company would contend that the same board of arbitrators should decide a number of other questions, including the matter of the amount the city should pay to the company for a quantity of miscellaneous equipment taken over by the city on May 15, last, when the city purchased the company's lines and equipment.

Another point which the company contended should be settled at the same time concerned the differences over the day-to-day agreement under which the city operated cars over certain of the company's lines prior to May 15.

Investigation to Be Resumed

Mayor George P. Carrel's Street Railroad Committee of Cincinnati, Ohio, will resume its investigation into the affairs of the Cincinnati Traction Company and its affiliated corporations, while awaiting a definite report from the conference committee of the traction company and the Cincinnati Street Railway on negotiations between them for a financial reorganization of the former company.

This point was one decided upon by the Mayor's committee on Dec. 1, after representatives of the two companies, meeting with the Mayor and his committee, had asked for further time. The hearings of the Mayor's committee will be resumed on Monday, Dec. 11.

Walter A. Draper, vice-president of the Cincinnati Traction Company, expressing himself at the meeting, said he felt confident it would be possible to inform the committee definitely "before the end of this year" whether an agreement between the two companies is possible.

Boston Must Pay Traction Deficit

United States Supreme Court Rules City Is Liable for Assessment to Meet Costs of Public Operation—City Contended $2,000,000 Depreciation and $2,000,000 Maintenance Charges Were Excessive

THE taxpayers of Boston must pay the $4,000,000 deficit from the 1919 operation of the Boston Elevated Railway, including the city-owned subways and other traction properties. This in effect is the ruling of the United States Supreme Court in the case decided by it on Dec. 5 against the city in its suit against State Treasurer James Jackson and the trustees of the railway to test the legality of an assessment under the special act of 1918 to meet the deficit. The case was up on an appeal from the Massachusetts Supreme Judicial Court, which had reversed the decision of the court below in favor of the city. The United States Supreme Court affirmed the ruling of the Massachusetts Supreme Court, the decision being handed down by Chief Justice Taft.

Chief Justice Taft, in delivering the opinion, said:

This is a writ of error to a decree of the Supreme Judicial Court of Massachusetts sustaining a demurrer to a bill in equity against the treasurer and receiver general of the Commonwealth of Massachusetts, the Boston Elevated Railway and the trustees who are operating the railway under a special statute of the Commonwealth, and dismissing the bill for want of equity, the defendants not wishing to plead further. It now comes before us on a motion by the Attorney General of Massachusetts to dismiss or affirm.

The case as made by the bill is an impeachment of the validity of the special act of 1918. By acts of 1902 and 1911 the city of Boston was given power to construct and did construct subways and tunnels at a cost of $31,000,000 and by the same authorities leased these and also others built by it under earlier statutes to the Boston Elevated Railway for a fixed rental until July 1, 1936, and the whole property and its rents and profits are by the express terms of the statute held by the city, "in its private or proprietary capacity, for its own property," never to be taken by the commonwealth except upon payment of just compensation. The railway got into financial difficulty. It served the residents of Boston and other towns of the commonwealth.

Act to Relieve the Situation

The General Court in the public interest passed the special act of 1918 to relieve the situation. In general, the act provided for the appointment of trustees who were to take the railway out of the hands of the company and operate it under the leases to the company by the city of Boston on condition that the stockholders of the railway accepted the provisions of the act.

These provide for the payment of dividends on the stock of the company, the repair and maintenance of the railway, the raising of $3,000,000 by the company for the improvement of the property and a reserve fund, and the payment of any deficit in operation out of the treasury of the commonwealth.

If the commonwealth is called upon to make payments, to meet deficits or diminution of the reserve fund, such amounts are to be assessed upon the several cities and towns in which the railway operates, as an addition to the regular state tax, in proportion to the number of persons in said cities and towns using the service of the company at the time of the payment as determined by the trustees. The trustees are to fix the fares to meet the cost of service, including taxes, rentals and interest on the indebtedness of the company, fixed dividends on the preferred stock, and 5 per cent on the common stock for two years, 5½ per cent for the next two years and 6 per cent for the remainder of public operation, which is for a period of ten years and thereafter, as the commonwealth shall determine.

Trustees Take Charge

The company's stockholders having accepted the act, the trustees took over the possession and operation of the railway. They found the railway in bad repair and charged $2,000,000 depreciation and $2,300,000 for maintenance and repair in the year 1919. This led to a deficit for that year of $4,000,000, although in previous years the company had not expended more than $100,000 a year on such account. The treasurer and receiver general under the act of 1918 paid the deficit out of the treasury of the commonwealth and was about to include the same in the state taxes to be collected by the city of Boston and the other towns through which the railway runs in the proportion fixed by the act. The object of the bill was to prevent this levy and collection and further proceedings under the act.

The motion to dismiss is urged, first, on the ground that Charles L. Burrill as treasurer and receiver general was the defendant in the original bill and that the present defendant, Jackson, his successor in office, has been substituted without legal sanction. The substitution took place in the Supreme Judicial Court of Massachusetts before that court considered the case on its merits and in the court's opinion the objection to the substitution was noted and overruled. This settles conclusively so far as we are concerned that the state law authorized the substitution.

The second ground urged for dismissal is that the tax for 1919 sought to be enjoined has been collected from the taxpayers of the city by the city and paid over to the treasurer of the commonwealth so that the case here becomes a moot one. The action of the state court upon such a matter relieves us from its consideration.

What the State Did

Having disposed thus of the ground presented for dismissing the writ of error, we come to the alternative prayer for affirmance. The plaintiff in error comes to this court because, as it says, the statute of 1918 of the commonwealth, by which the trustees took over and are now operating the railways, impairs the obligation of the contract of lease of its property in the tunnels and subways to the railroad and so violate the contract clause of the federal constitution.

As to this and other contentions the opinion says: We are relieved from full detailed consideration of these grounds urged for reversal by the satisfactory opinion of the Supreme Judicial Court in this case.

What the commonwealth did was to help the people of the towns which the railway served when the railway's finances threatened its collapse, by taking over the lease of the railway for a valuable consideration. The law provided for keeping the property in good repair and the payment of the rentals due the city. There was nothing in the contract of assignment which in the slightest degree impaired the obligation of the company to the city under the lease. Indeed, it secured the performance of those obligations.

To the contention that the contract was impaired because the law took away or impaired its beneficial interest in the profits of the contract of lease and its property, the Supreme Judicial Court of Massachusetts is quoted as saying that the tax was not imposed on Boston in its proprietary capacity in which it built the subways and leased them. The taxes were collected with state taxes to achieve a state purpose and Boston in its public and political character was a mere state tax agency for collection. The taxpayers were to be called upon to bear the burden of the public purpose of the state in furnishing this important service of transportation in and between the communities in which they lived.

State May Confer

In disposing of this objection we have in effect disposed of those objections to the act of 1918 based on the fourteenth amendment. If the constitution and laws of Massachusetts authorize the commonwealth to operate a railway for the public benefit, there is nothing in the fourteenth amendment to prevent. Nor is there anything in it preventing the State from using the trustees as agents to operate the railway and in such operation to determine the needed expenditures to comply with the obligations of the lease or the requirements of adequate public service. This is delegating to proper agents the decision of a proper administrative policy in the management of a state enterprise and the ascertainment of facts peculiarly within their field of authorized action.

In this conclusion we assume, as did the Supreme Judicial Court, that the State may confer on one of its sub-divisions like a city or town the private proprietary capacity by which it may acquire contract or property rights protected by the federal constitution against subsequent impairment by its creator, the State. We do not wish to be understood as accepting such assumption as an established rule. All we do not decide is that even if the city of Boston may invoke the contract clause of the federal constitution to protect its rights under the lease as against infringing legislation by the commonwealth, the act of 1918 does not infringe.

As indicated in the Supreme Court decision the city of Boston, under legislative acts of 1902 and 1911, was given power to construct subways and tunnels at a cost of $31,000,000, and leased these and others already built to the Boston Elevated Railway for a fixed rental until July 1, 1936. The railway got into financial difficulties during the war period, and the Massachusetts General Assembly passed a special act in 1918 to relieve the situation by placing the railway properties under control of a board of five trustees, the State to pay any operation deficit, and assess it against the communities served by the railway lines.

The trustees declared a deficit of $4,000,000 for 1919, after charging up $2,000,000 for depreciation and $2,300,000 for maintenance and repair. The State paid the deficit, and was preparing to assess it against Boston and other cities served, when the city brought suit to enjoin its collection. The city contended the depreciation charge was "excessive, unreasonable, unnecessary and illegal," pointing out that the railway under private control had charged off only $98,000 a year. To be assessed with this deficit, the city claimed, was a violation of its lease to the railway.

Rejects Municipal Offer

The New Brunswick Power Company, controlling the electric light and power, electric railway and gas services in St. John, N. B., has rejected the municipal offer of $2,577,655 for its plant and equipment, according to an announcement of Mayor Fisher. This figure was set by the Supreme Court as the value of the company's property in 1920.

The power company offered four alternative propositions: To sell the property to the city on a basis to be determined by arbitration; to arbitrate the rates to be charged; to elect two members of the board of directors of the company on appointment by the city; or to sell the electric light and power department to the city, retaining the street railway and gas departments.

The company's bonds are held largely in the United States.

The New Brunswick Government approved recently a contract between the Provincial Electrical Power Commission and the city of St. John for delivery of hydro power to the city from the Musquash plant. The signature of Lieutenant-Governor Pugsley, who is visiting New York, remains to be affixed to that contract.

Charles A. Coffin Foundation Set Up

General Electric Company Creates Fund of $400,000 in Honor of Its Founder to Provide Rewards for Its Employees and for Utility Companies and Aid for Education and Research

By action of its board of directors, the General Electric Company has set aside a fund of $400,000, to be known as the "Charles A. Coffin Foundation," the income from which, amounting to approximately $20,000 per year, will be available for encouraging and rewarding service in the electrical field by the award of prizes to the company's employees and by giving recognition to lighting, power and railway companies for improvement in service to the public, fellowships to graduate students and funds for research work at technical schools and colleges.

The foundation will be controlled and administered by a foundation committee appointed by the board. This committee, within the limits of the purposes for which the foundation is created, will have power to charge the conditions applicable to the distribution of the fund and the amounts for each purpose.

HOW THE INCOME WILL BE USED

The committee proposes to distribute the income of the foundation as follows:

1. Eleven thousand dollars in prizes for the most signal contributions by employees of the General Electric Company toward the increase of its efficiency or progress in the electrical art. Particularly, the prizes are further to encourage suggestions from workmen. With each prize the company will give a certificate of award. Foreman's prizes are to be awarded for the best department, taking into account its appearance, efficiency of operation and conditions which add to the better conduct of the work and the welfare of the employees. All employees of the company, except executive officers, heads of departments, works managers, superintendents, district office managers and similar executives, are eligible for such prizes. In works where employees' representation has been adopted such representatives will co-operate with the prize committee in awarding prizes.

2. A gold medal, to be known as the Charles A. Coffin medal, will be awarded annually to the public utility operating company within the United States which during the year has made the greatest contribution toward increasing the advantages of the use of electric light and power for the convenience and well-being of the public and the benefit of the industry. The company receiving the medal will also receive $1,000 for its employees' benefit or similar fund. A committee to be named by the National Electric Light Association and known as the Charles A. Coffin prize committee of the National Electric Light Association, which shall consist of its president, the chairman of its public policy committee and a third member nominatel by them, will award this medal, acting with the advice and co-operation of a committee appointed by the foundation committee. The expenses of the committee are to be paid out of the income of the foundation.

3. A gold medal, to be known as the Charles A. Coffin medal, will be awarded annually to the electric railway company within the United States which during the year has made the greatest contribution toward increasing the advantages of electric transportation for the convenience and well-being of the public and the benefit of the industry. The company receiving the medal will also receive $1,000 for its employees' benefit or similar fund.

A committee to be named by the American Electric Railway Association and known as the Charles A. Coffin prize committee of the American Electric Railway Association, which shall consist of its president, the chairman of the committee on policy and a third member nominated by them, will award this medal, acting with the advice and co-operation of a committee appointed by the foundation committee. The expenses of the committee are to be paid out of the income of the foundation.

4. Five thousand dollars is to be awarded annually for fellowships to graduates of American colleges and technical schools who, by the character of their work and on the recommendation of the faculty of the institution where they have studied, could with advantage continue their research work either here or abroad; or some portion or all of the fund may be used to further the research work at any of the colleges or technical schools in the United States. The fields in which these fellowships and funds for research work are to be awarded are: electricity, physics and physical chemistry. A committee appointed by the foundation committee will award such fellowships and funds for research work, with the advice and co-operation of a committee of three, one to be appointed by each of the following: National Academy of Sciences, American Institute of Electrical Engineers and Society for the Promotion of Engineering Education. This committee is to be known as the Charles A. Coffin fellowship and research fund committee, and the fellowships are to be known as the Charles A. Coffin fellowships. The expenses of the committee are to be paid out of the income of the foundation.

5. In each annual report of the General Electric Company a statement will be made of the awards under the Charles A. Coffin Foundation, and other publicity will be given to such awards.

The board of directors of the General Electric Company has appointed as the Charles A. Coffin foundation committee the following officers of the company: A. W. Burchard, J. R. Lovejoy, E. W. Rice, Jr., Gerard Swope and O. D. Young.

The advisory committee of the General Electric Company will administer the fund within the organization of the General Electric Company. The following committees to administer the fund and to act with organizations outside the General Electric Company have been appointed:

Committee to co-operate with the National Electric Light Association—A. H. Jackson, vice-president; J. R. Lovejoy, vice-president.

Committee to co-operate with the American Electric Railway Association—J. G. Barry, vice-president; A. H. Jackson, vice-president.

Committee to co-operate with the National Academy of Sciences, American Institute of Electrical Engineers and the Society for the Promotion of Engineering Education—E. W. Rice, Jr., honorary chairman; A. H. Jackson, vice-president; W. R. Whitney, director of research laboratory.

Under date of Dec. 2, the president of the General Electric Company issued a letter in explanation of the Charles A. Coffin Foundation. This letter states that Mr. Coffin was the founder and creator of the General Electric Company, of which he has been the inspiration and leader for thirty years. As an expression of appreciation of Mr. Coffin's great work not only for the General Electric Company but also for the entire electrical industry, and with the desire to make this appreciation enduring and constructive, as Mr. Coffin's life and work have been, the board of directors of the General Electric Company created on his retirement and now desire to announce "the Charles A. Coffin Foundation."

Home Rule Measures in Contemplation

Tentative Legislative Program for New York State Expected to Be Agreed Upon at Conference for Which Call Has Been Issued—Program Expected to Be Put Through

As the time approaches for the New York State Legislature to convene speculation is shaping itself over the question of what may be expected to happen. The newly elected administration in New York State is Democratic in its entirety with the exception of the lower house of the Legislature. That body stands sixty-nine Democrats to eighty-one Republicans, with five of the Republican members from Greater New York who may reasonably be expected to vote with the Democrats on many matters of party policy. Besides this several up-state Republicans are pledged to radical measures.

Had the election been a close one instead of a landslide, the lower house might reasonably be expected to exercise a check on the activities of the Senate and block many of the administration measures, but political leaders of both parties are inclined to believe that in the face of 400,000 majority the lower house will hardly assume to place itself in the position of blocking legislation for which in the final analysis the Democratic administration must assume responsibility.

In the matter of public service commission legislation, measures are expected to be introduced giving to municipalities the regulation of public utilities located within their boundaries. This will probably mean that the present Public Service Commission will be permitted to continue to function as a state body, but that the part of the law will be eliminated which permits the commission to raise or lower a rate or charge regardless of the existence of any general or special law franchise or ordinance. The centralized power of the commission may also be lessened.

In the electric railway field, to cite two instances, this would mean the restoration of 5-cent fare in the city of Troy, where a local franchise exists, and a similar fare in the city of Rensselaer, where there is a special statute to that effect which has never been repealed, except by inference.

Should the change in the public service commissions law limit the regulation by municipalities to those public service corporations wholly within their bounds, little jurisdiction would be exercised by such municipalities and a corporation so serving would be able to evade local and secure state regulation by simply building a spur into outlying territory. It is reasonable therefore to suppose, if the policy of local regulation is finally agreed to, that local authorities will be given the power of regulation over public service corporations located principally within the boundaries of their localities.

Such a program means the creation of cumbersome local administrative machinery with the ultimate cost to many localities greater than the benefits which may be expected to accrue. Still it seems to be the policy of the administration to go ahead with the plan "because the people voted for it." Certain it is that during the transitory period of a change from state to local regulation a perfect hodge-podge will exist with the chance remaining that the courts will declare the entire scheme incompatible with public interests.

In the matter of labor legislation one of the first things which will be attempted is an amendment to the compensation law making insurance in the state fund exclusive except in the case of municipalities which may elect to become self-insurers. While such legislation will have the backing of the State Federation of Labor, the Lockwood committee and the administration a most bitter fight is anticipated before it is passed. The casualty and mutual companies now writing workmen's compensation insurance will insist—and not without a show of reason—that they receive an opportunity to effect a gradual withdrawal from business in order to protect their investments and it is not altogether certain that the most radical propositions in this respect will eventually become part of the law.

New Franchise Provisions in Vancouver

Existing Franchise Amended in Many Particulars—New Arrangement Provides Bus for Operation

After prolonged negotiations, a new agreement has been made between the British Columbia Electric Railway and the city of Vancouver, amounting virtually to a new franchise. It amends the existing franchise, dated 1901, in several important respects, especially in providing for the continuance of the 6-cent fare and for new motor bus routes. It further provides for a reduction in lighting rates within the city limits from 6 cents to 5 cents a kilowatt-hour.

The 6-cent fare charged in Vancouver has been the subject of negotiation and temporary measure for three and a half years. The last permit was due to expire on Dec. 15, by which time the city was to make a new agreement or the provincial government form a board of some nature to adjudicate the matter. This is not the first time recently that a new franchise has been proposed. On two former occasions the City Council failed to come to any agreement and it was believed that no agreement could be found suitable to it. To the last, some members were inclined to put the agreement to the voters, but a declaration by the company that it would withdraw its concessions deterred them.

The provincial government has announced its intention to pass an act providing for a board of arbitration to decide passenger rates of the British Columbia Electric Railway, but the new agreement with the city of Vancouver stipulates that both parties shall not apply to such a board to modify its terms.

The provisions of the new agreement briefly are these:

The 6-cent fare within the city is continued for three years, at the end of which time the fare is to be decided by agreement or, failing that, by arbitration.

The domestic lighting rate in Vancouver is to be reduced on Jan. 1, 1923, from 6 cents to 5 cents a kilowatt-hour.

Where transportation is not adequately provided, the company is to operate buses, provided reasonable roadways are available. The unique feature of this proviso is that the city is to contribute toward any deficit in the operation of such lines.

The company agrees to stand one-half the deficit on these lines up to the amount of $5,000. The remainder is to be deducted from the percentages paid to the city out of the gross annual receipts of the system. Only two lines are at present proposed, and it is likely under this arrangement that the city will scrutinize the possible traffic before ordering the company to provide service.

The company is to replace several portions of temporary track with permanent track within one year, the cost being estimated at about $100,000.

Several other clauses call for further contributions by the company for the maintenance of pavement between the car tracks. The company is required to provide granite blocks for each side of the rails, to pay to the city $5,000 for maintaining pavements and construct and maintain the sub-base between the tracks in future permanent construction.

Within the next five years the company is to spend $250,000 in placing light and power wires underground.

As the city of Vancouver is only a small portion of Greater Vancouver, with only two-thirds of the population of the greater city, this agreement affects only a part of the city system. But agreeemnts are in existence with the municpalities of South Vancouver, Point Grey and North Vancouver and the city of New Westminster which make fare permissions contemporaneous with those in the city of Vancouver. The commutation fare to the suburbs of Vancouver is 7 cents, and this will therefore remain until amended by the proposed provincial board.

Vote Against Municipally Owned Bus System

The proposition to establish a municipally owned bus system in Pasadena, Calif., a bond issue for which was voted on at an election held on Dec. 5, failed by 800 votes to gain the two-thirds majority necessary to carry. The official count was 5,555 yes and 3,930 no. The week prior to the election the Pacific Electric lines negotiated with the present operating bus lines to purchase their interests. This offer was acceptable to the bus operator.

$101,410,000 Transit Proposal

Philadelphia Mayor Presents Outline of Comprehensive High-Speed Line—Program for P. R. T. Company

A comprehensive high-speed system, involving, in addition to the Broad Street subway, two elevated roads, was outlined on Nov. 5 by Mayor Moore of Philadelphia in a letter to Thomas E. Mitten, president of the Philadelphia Rapid Transit Company. The cost of constructing and equipping the system is placed at $101,410,000.

The Mayor's letter to Mr. Mitten embodied the following links in a high-speed program:

1. The Broad Street subway proposition, subdivided into five sections, comprising a four-track subway from Christian Street to the point where the railroad tracks tunnel beneath Broad Street just south of Hunting Park Avenue, and a two-track subway from Hunting Park Avenue to Olney Avenue and from Christian Street to League Island.
2. Construction of an elevated road extending westward from Broad on Christian Street, thence over Gray's Ferry Avenue to Woodland Avenue and up Woodland Avenue to city line.
3. An elevated road from the intersection of Germantown Avenue with Broad Street, north on Germantown Avenue as far as Chelten Avenue.

The Mayor in replying to Mr. Mitten's request for specific information as to cost and probable date of completion, said he was prepared to begin work on the first section of the Broad Street subway, running from City Hall to Hunting Park Avenue, on March 1, and that if money is made available for the purpose, he would begin work at the same time on the lower four-track section, from City Hall to Christian Street.

Director Twining in a letter to the Mayor said he saw no reason why the four-track portion of the Broad Street tube, the two-track strip up to Wyoming Avenue and the three-track elevated running out Christian Street and down Woodland Avenue as far as Forty-ninth Street couldn't be finished by July 1, 1926.

The Mayor also said he thought those portions of the high-speed program could be equipped and placed in operation in 1926, while the remainder could be finished as soon as possible and tied in with the completed portions as the sections became available. Construction and equipment of the Broad Street subway from Christian Street to Wyoming Avenue, with the feeding elevated line extending as far as Forty-ninth Street and Woodland Avenue, would cost $66,920,000, and that is the estimated sum upon which the Philadelphia Rapid Transit Company would have to pay a return at the time operation was begun of the subway-elevated.

The Mayor announced he was prepared to discuss an operating lease with Mr. Mitten at once, but he evinced a determination to begin construction anyhow of the North Broad Street end of the road on March 1, 1923.

Financial and Corporate

Operating Income Increases

Eleven Months Operation in Bridgeport Shows Net Income of $119,450—No Provision for Stockholders

Results of the Connecticut Company's operation in Bridgeport from Nov. 20, 1921, to Nov. 1, 1922, show that the 5-cent fare with restricted jitney service is increasing the trolley fund and is apparently a better investment than the 10-cent rate with unrestricted jitney competition. The company is now meeting operating expenses and taxes. Figures for the eleven months operation were recently compiled by Edward Field, auditor for the commission, from the books of the Connecticut Company.

Although the company shows a gain in its operating income no provision is made for depreciation nor a return to the stockholders on the investment. When the commission fixed an appraisal of the Bridgeport division an amount of $63,700 was decided upon as a fair monthly return if the division was operated by an independent company with private stockholders. For the entire period represented in the accompanying table this would make a fair return of $724,059. As a matter of fact, it will be noted from the figures that the Bridgeport division suffered a deficit for the eleven months period of $605,618 after allowing for the return on property.

Since Nov. 20, 1921, the Bridgeport division of the Connecticut Company has been operated as a separate undertaking. At that time the commission ordered a test period of ninety days to continue until changed by the commission. The commission has not yet ordered any change.

It is noted in the figures shown that for the first two months the operating income was a deficit, but that thereafter, except in the month of October of this year, the company was able to meet expenses. The net income for the eleven months period amounted to $119,450. This profit in operation, it was brought out by the commission and the Connecticut Company, had been made with continued jitney competition and that Bridgeport was the only city in the state where jitneys were still allowed to operate independently of the Connecticut Company.

An absorption of the jitney lines by the Connecticut Company has been suggested as a solution of the transportation problem in Bridgeport under a purchase arrangement with the present owners and company operation of bus lines to supplement existing railway lines. It is said that some company officials believe that a 5-cent fare in Bridgeport would be successful from the point of view of return provided jitneys would be eliminated on parallel lines and service rearranged to cover territory now covered by both trolleys and jitneys.

Richard T. Higgins, head of the utilities board, stated that no immediate change in the Bridgeport situation was contemplated. He said that the commission had made a study of the Bridgeport case and that numerous details had occupied the attention of that body and resulted in a continuance of the trial of the radial 5-cent fare.

	Passenger Revenue	Other Revenue	Total	Operating Expenses	Net Operating Revenue	Taxes	Operating Income	Return on Property	Gain or Loss
Nov.	$ 51,192	$1,719	$52,911	$ 59,679	*$ 6,768	$2,851	*$ 9,619	$23,358	$32,978
Dec.	161,619	4,855	166,475	177,216	* 10,741	8,273	* 19,015	63,700	* 82,715
Jan.	159,945	4,960	164,905	146,665	18,240	4,947	13,293	63,700	*50,4066
Feb.	142,306	4,089	146,396	130,849	15,546	4,391	11,154	63,700	* 52,545
March	159,075	5,158	164,233	143,326	20,906	4,927	15,979	63,700	* 47,720
April	153,437	5,376	158,813	136,342	22,471	4,764	17,706	63,700	* 45,993
May	159,786	5,014	164,800	143,173	21,627	4,944	16,683	63,700	* 47,016
June	153,046	5,486	158,532	137,082	21,450	4,755	16,694	63,700	* 47,005
July	175,134	5,388	180,523	143,384	37,138	5,415	31,722	63,700	* 31,977
Aug.	171,002	5,455	176,458	148,385	28,072	5,293	22,779	63,700	* 40,920
Sept.	159,903	5,249	165,153	146,843	18,309	4,954	13,355	63,700	* 50,344
Oct.	153,955	5,710	159,666	167,169	*7,503	4,789	*12,293	63,700	* 75,993
Totals	$1,800,406	$59,463	$1,859,870	$1,680,120	$178,750	$60,309	$119,450	$724,058	*$605,618

*Indicates deficit.

Protests Higher Assessment

A delegation representing the Louisville (Ky.) Railway appeared before the Board of Equalization on city tax matters at the City Hall recently and launched a protest against an increase in figures for assessment of company property. This year City Assessor E. E. Bristow placed the net franchise and property valuation of the company at a tentative figure of $18,000,000, as against $10,000,000 last year. The company holds that new improvements do not justify any such increase in assessment figures.

The company also held that with an increased assessment increased taxation would make it impossible for the company to make the profits allowed in its contract with the city, which would force an increase in fare, under the contract agreement, in course of time, as it would represent increased operating cost and prevent the barometer fund from growing.

General opinion is that final figures will not be much higher than those of last year. The Board of Equalization took the matter under advisement.

Representing the company at the conference were Attorneys Churchill Humphrey and Ed Humphrey, President James P. Barnes of the company and Auditor Frank Belleville.

Directors Ratify Sale

Rochester & Syracuse Purchases Empire Railroad Stock—Application to Go Before Commission

The control of the Empire State Railroad Corporation was recently purchased by the Rochester & Syracuse Railroad Company, Inc., after the board of directors of the latter corporation held a special meeting to ratify a contract entered into on Nov. 20 by representatives of the two railway interests.

The Rochester & Syracuse line acquired control of the Empire State by purchasing approximately 20,000 of its 29,500 shares of stock. Officers of the Rochester & Syracuse road declined to disclose the purchase price.

An application for approval of the purchase will be filed immediately with the Public Service Commission at Albany, and the sanction of that body is expected by the first of the year, due to the benefits both electric roads will derive through reductions of operating costs to be obtained by placing both lines under one management.

Properties acquired by the Rochester & Syracuse line are: Syracuse to Oswego interurban electric road; Oswego city lines; Auburn and Port Byron interurban line and branch lines in Auburn.

Although the Rochester & Syracuse and Empire State lines will retain their present identities, they will be under one management. The Rochester road is being operated by Peck-Shannahan-Cherry, Inc., with active management in the hands of Talmadge C. Cherry, first vice-president and general manager. The same organization will assume management of the Empire State Railroad, which will give up its present offices and the two roads will be combined in the present Rochester & Syracuse offices in the Syracuse Savings Bank building.

Directors expressed confidence that the material reduction in operating costs due to joint operation, to be effective as soon as the Public Service Commission approves the purchase of the Empire State road, will result in the class B preferred stock of that line reaching a dividend paying basis. The B stock of the Empire State road has paid no dividend to date, while the Rochester & Syracuse line has paid 4 per cent on its preferred stock for two years.

The Rochester & Syracuse Railroad was organized several years ago. When the Empire United went into the hands of receivers on Nov. 1, 1915, holders of bonds issued on the mortgage covering the unit from Syracuse to Rochester organized a bondholders' protective committee. Mr. Loasby was chairman and Mr. Settle and Mr. Harvey were the other members. Mr. Cowie served in the capacity as counsel for the committee.

When the mortgage was foreclosed, the protective committee bid in the Rochester line for approximately $1,000,000. The Rochester & Syracuse Railroad Company, Inc., was then organized, and in the recapitalization the corporation issued $2,500,000 in bonds; $2,500,000 in preferred and $1,500,000 in common stock.

Arthur W. Loasby was the first president of the reorganized corporation. When Mr. Loasby accepted the position as a vice-president of the Equitable Trust Company of New York, of which he is now senior vice-president, Mr. Cowie was elected president of the Rochester & Syracuse road. Mr. Cherry has held the office of first vice-president and general manager since the reorganization in 1915. Mr. Chase, president of the First Trust & Deposit Company, is second vice-president.

Another bondholders' committee made up of persons interested in the Beebe enterprises bid in the units now included in the Empire State Railroad Corporation, which is now managed by Ford, Bacon & Davis of New York, with J. C. Nelson as president. The road has $2,750,000 worth of bonds outstanding. It also has 2,500 shares of A preferred stock, par value $250,000; 12,500 shares B preferred, par value $1,250,000, and 14,500 shares of common stock with a $1,450,000 par value.

First Report Since 1914 Submitted

The eighth annual report of the board of directors of the Mexico Tramways, Mexico City, Mexico, has been submitted to the shareholders with an appendix report by G. R. G. Conway, managing director, on the company's operations and undertakings for the year 1921. This is the first report since 1914. At that time conditions in Mexico were disturbed. Upon their growing worse the tramways was seized by the government, which continued to operate them until May, 1919, when the property was returned to the company in a very run-down condition.

The gross earnings for 1921 amounted to $13,075,291 (pesos), an increase over the year 1920 of $2,069,160 (pesos). The net earnings after allowing for taxes and depreciation were $2,335,436 (pesos), an increase of $681,844 (pesos) over the previous year. The report makes mention of the "unorganized competition" which had to be encountered owing to the introduction of small "camiones" (jitneys), which number about 1,550, operating daily and carrying approximately 132,000 passengers per day.

The report says that in considering the operating results for the year 1921 the special condition under which the company had been operating must be taken into account, and particularly those which obtained when the properties were returned to the company in May, 1919, after having been administered by the Mexican Government since Oct. 12, 1914. The run-down condition of the property will continue to affect the net earnings of the company even for the next few years. Since the return of the property wages have been increased nearly 100 per cent, with an increase in the number of employees, chiefly in the traffic department.

However, in the opinion of the managing director, the company's property is now in good condition, since the most urgent and necessary reconstructions have been carried out. He added that maintenance expense would probably continue high, as much had to be accomplished during the next few years.

I. R. T. Doing Well on Basis of Readjustment

If the Interborough-Manhattan readjustment plan had been effective during the year ended June 30 last the Interborough Rapid Transit Company, New York, N. Y., would have shown a balance of $4,011,523 instead of a deficit of more than $2,000,000, according to information presented on Dec. 5 by Frank Hedley, its president and general manager, in a letter to the bondholders' and noteholders' committee.

Mr. Hedley stated that the company under the terms of the agreement was about to issue $34,330,000 ten-year secured convertible 7 per cent notes to retire and refund 90 per cent of the outstanding three-year issue. His comment was that under the new plan the company's fixed charges had been materially reduced. He showed the effect of the plan graphically by deducting from the known results of operation for the last fiscal year the interest (but not sinking fund) on the I. R. T. bonds, the interest on the new I. R. T. notes and on the Manhattan Railway bonds. Such a statement follows:

YEAR ENDED JUNE 30, 1922	
Operating revenues	$53,540,859
Operating expenses, etc.	37,557,965
Operating income	$15,982,894
Non-operating income	652,875
Gross income	$16,635,769
Interest on I. R. T. bonds, new notes and Manhattan Railway bonds	12,624,246
Balance	$4,011,523

Mr. Hedley said that 1923 results should be at least as favorable as those indicated for 1922 in the table he presented.

The letter continues:

> In view of the substantial increase in the number of passengers carried on the system during the first five months of the fiscal year and also because of the greater economies of operation which are being obtained, there is every reason to believe that the actual results for the fiscal year ending June 30, 1923, will be at least as favorable as those indicated in the table above.

Planning to Operate Recently Sold Line

Following a mass meeting at Weaverville, N. C., efforts are being made to form a stock company to take over and operate the Asheville & East Tennessee Railway Company, an electric line extending from Asheville to Weaverville. The road was sold on Nov. 28 by receivers to S. Sternberg of Asheville and service was suspended the next day. Mr. Sternberg paid $19,000 for the property and is offering it to the proposed new company for $20,000. He has given an option on the property until Dec. 11.

If the new company fails to raise the desired amount and the plan fails the road will be junked. The road made money above operating expenses during the receivership, according to J. S. Coleman, receiver. If the new plans are completed the offices of the road will be moved from Asheville to Weaverville and the cars will not be run into the center of Asheville, but only to Grass, a suburb of Asheville, which has the city car service.

Securities at Auction

Electric railway securities sold by Adrian H. Muller & Company on Dec. 6 at the Public Auction Room, 14 Vesey Street, New York, were as follows:

$7,000 Second Avenue Railroad first consolidated mortgage 5 per cent bonds, due 1948, Guaranty Trust Company certificates of deposit, 1⅜ per cent.

$59,000 Dry Dock, East Broadway & Battery Railroad registered refunding mortgage income gold bonds, series C, due 1950, with $10 scrip, $300 lot.

$24,000 Denver Tramway Terminal Company thirty-year 5 per cent bonds, due December, 1933, 85 per cent.

Financial News Notes

Property Valued.—In the report of Engineer A. E. K. Bunnell of the Toronto Transportation Commission the valuation of the London (Ont.) Street Railway is fixed at $1,000,000. The report says that this figure refers to its physical value.

Hearing Postponed.—The hearing on the application of the Continental Securities Company for the appointment of a receiver for the Interborough Rapid Transit Company, New York, N. Y., because of a threatened default in interest on securities was recently deferred by Judge Mayer until Jan. 26.

Stockholders to Decide Two Issues.—Stockholders of the Public Service Corporation of New Jersey, Newark, N. J., will vote at a special meeting Dec. 18 on the recent recommendation of the directors that the preferred stock be divided into two classes and that the corporation relinquish its option to redeem the stock at 110.

Traffic and Transportation

Reasons for Removing Toledo's One-Man Cars

Council, Exercising Rights Invested in It by Service-at-Cost Franchise, Swayed by Packed Union Meeting Into Ruling Cars Off Streets

NOW that one-man cars are definitely removed from the streets of Toledo, Ohio, the next problem is to meet the constantly increasing demand for improved service, for which the necessary finances are not available. There have been many angles to the one-man car issue in this city and they have been dealt with previously in these columns. Chronologically, the story of the one-man car dates back to July 1, 1922, when the Community Traction Company, acting upon a suggestion of the City Street Railway Commissioner, equipped its Bancroft belt line with rear-entrance, pay-leave, one-man turnstile cars, using for this purpose ten double-truck pay-enter cars. These cars were equipped with all safety features and Syracuse turnstiles on the rear platforms. After three months of continuous service a check of the results obtained indicated that service had been improved about 6 per cent in frequency, that regularity of schedules was quite as good as had prevailed with two-men cars, that riding had increased on the Bancroft line in greater proportion than on the balance of the city system and that a net saving of approximately 22 per cent was being made in platform expense.

These results seemed to justify a more extensive use of this type of equipment. On Oct. 16 two other and more important lines, Cherry and East Broadway, were equipped with Peter Witt cars operated by one man. Unfortunately, the attempt to load and unload passengers at the front door developed serious congestion that could have been relieved by loading through a turnstile at the center door. However, as a protest against the use of one-man cars had developed in the City Council, it was deemed inadvisable to confuse the issue by installing turnstiles.

Right at this point it ought to be explained that under Section 14 of the Toledo service-at-cost grant, in effect since Feb. 1, 1921, the city has reserved to itself, to be exercised through the City Council, the entire control of service, including the right to fix schedules and routes, the character of cars and the right to increase or diminish service.

On Aug. 21 there was introduced into the Council a resolution providing: "That Council go on record as against the installation of any more one-man cars until such body is convinced that that is the proper way of handling street car traffic in the city of Toledo."

This resolution was referred to the Council committee on railroads and telegraphs and by that committee referred to a special sub-committee of three, who were instructed to investigate and report back to the committee on railroads and telegraphs. This sub-committee, on Sept. 11, after carefully considering the matter, recommended that the cars be continued for a further trial. On the strength of this recommendation the two lines above noted were equipped with one-man cars. The next step was the entrance of the local carmen's union. Section 43 of the wage agreement with the platform men, effective May 21, 1922, to May 21, 1923, after providing for the immediate continuance of the 1921 wage scale, recites:

> It is further provided that should the stabilizing fund as prescribed in the Community Traction Company franchise ordinance be less than the sum of one hundred twenty-seven thousand three hundred dollars ($127,300) on Nov. 30, 1922, the present wage scale will then be automatically reduced to the scale in effect under the 1919 agreement between the association and the Toledo Railways & Light Company, which wage scale will then be operative until May 21, 1923.
>
> One-man car operators to receive 5 cents per hour additional.

While in the early stage of their use some criticism of these cars on the part of the public arose but gradually died down, no protest against the use of one-man cars developed from the union, according to Commissioner Cann, until it was evident that the fare stabilizing fund would on Nov. 30 materially exceed the specified amount of $127,300.

As a result of this well organized and vigorous protest, on Oct. 11 the question of continuing the use of one-man cars was reopened and the members of the local street car union were invited to meet with the committee on railroads and telegraphs one week hence and at that time present their objections to this type of equipment. The subsequent meeting resulted in the Council chamber being packed to capacity with a lobby, 90 per cent of whom were car men and their sympathizers. At this meeting several operators of one-man cars voluntarily appeared before the committee, were questioned as to their length of service and asked for their opinion as to the practical utility of the one-man car. In each case these men, of long experience as electric railway employees, positively stated that, in their opinion, one-man cars could be operated in Toledo with safety and convenience to the public.

After hearing the remarks of the business agent of the local union the committee indorsed a resolution condemning this type of equipment. On Oct. 23, at the regular meeting of the Council, fifteen of the twenty members of that body voted to prohibit the further use of these cars.

One week later Mr. Cann, the City Street Railway Commissioner, appeared before the Council and recommended that cars be continued in operation for the full thirty days permitted by the city charter before the resolution would become effective, and that in the interim a special committee of five be appointed to accompany him on a trip through the East to observe and investigate the operation of similar equipment in Eastern cities. This suggestion was adopted and the special committee appointed. A local election delayed the departure of this committee and at the next regular meeting of the Council the action authorizing the Eastern investigation was rescinded, thirteen of the nineteen Councilmen present voting against any further consideration of the matter. This action met with the heartiest approval of the packed lobby that attended the meeting.

The following week the Street Railway Commissioner exhibited to members of the Council a Peter Witt car equipped with a turnstile in the center door, carefully explained all of the features of the car and suggested that the previous action of Council be rescinded so as to permit a trial of that particular type of car on the Bancroft belt, the line upon which the initial installation of one-man cars had been made and from which no public protest had been heard. Fourteen members pledged their support of this recommendation, but at a meeting of the Council that same evening a packed lobby again stampeded their good intentions and all but three of them voted against any further use or experiment with one-man equipment.

Reduced Fares for Wheeling

Fare reductions ranging from 6 to 25 per cent will be put into effect by the Wheeling (W. Va.) Traction Company on Dec. 17, according to G. S. Wills, general manager of the company, who stated that the cut would bring the "nickel ride" to Wheeling again after an absence of two years. Mr. Wills declared the fare cut was an experiment to stimulate traffic and that in the event of it failing the company would have no alternative but to swing back to the basis it is now abandoning.

Mr. Wills' statement follows:

> The new tariffs will eliminate the present major and minor or short zoning plan, as now in effect, and return to longer unit zones, somewhat the same as were in effect between May 29, 1919, and Dec. 26, 1920. Under the new zoning, universal tickets at 5 cents each, good for a one zone ride on any part of the system, will be placed on sale at our ticket offices and by conductors on cars in strips of ten for 50 cents.
>
> All single zone rides paid for in cash will be 8 cents, while rides in excess of one zone will have a cash fare rate, not a multiple of 8 cents, but either practically the same as the universal ticket rate or 5 cents in excess thereof, depending entirely on density of travel between the points ridden.
>
> In further recognition of the fact that the cost of street car service per passenger is less in dense riding and as an inducement to street car riders to increase their patronage, special strip tickets, purchasable in 50-cent strips, good at all hours and without restrictions, will be placed on sale at our offices and by our conductors at rates per ride lower than those obtained under the universal ticket rate.

One-Way Traffic Recommended

A report has been submitted to the City Council of Portland, Ore., by members of the special traffic committee appointed by Mayor Baker in which one-way traffic for both vehicles and street cars is recommended as a partial solution of the traffic congestion in the city streets.

The committee in its report states that it has come to the unanimous conclusion that any solution of the congestion problem must affect not only automobile and vehicular traffic, but the electric railway system as well. Traffic conditions in the city are largely affected by the trans-Willamette River bridges and their approaches, the report points out, and urges a comprehensive change for the betterment of waterfront conditions by widening bridge street approaches and effecting permanent grades near the waterfront.

In recommending one-way traffic, certain of the wider streets have been excepted, especially for street car traffic.

The report points out that one of the largest contributing causes for the congestion during rush hours is the interurban traffic of the Portland Railway, Light & Power Company, the Oregon Electric and the Southern Pacific Company. "It is important and essential in our judgment," the report says, "that in any permanent solution of the traffic problem a feasible plan should be worked out for the routing of these trains."

The committee recommends adjustment of street railway traffic to conform to the general plan by the construction of loops and several new lines. The report points out that the cost of changes in new track construction contemplated under the plan had been estimated by the city engineer's office at $182,000 and by officials of the Portland Railway, Light & Power Company at $192,000. Additional crossovers and track changes that officials of the company declare are necessary for convenience and for emergencies would bring this cost to the railway company to a total of $231,000. Detailed suggestions for street car track changes, adoption of an automatic signal traffic control and regulations covering foot traffic are also embodied in the report, which the Council will take under consideration.

Joint Freight Service Extended

Joint arrangements have been completed, effective Dec. 6, for freight service by the Northern Ohio Traction & Light Company with the Detroit United Railway reaching the cities of Detroit, Jackson, Saline, Flint, Pontiac, Port Huron, Imlay, Algonoc, Northville and other points and by the Northern Ohio Traction & Light Company with the Nickel Plate for service to Buffalo and intermediate points. The tariff filed in the latter case is effective after thirty days. A joint arrangement has also been made with the Cleveland, Southwestern & Columbus Railroad, Columbus, Marion & Bucyrus Railway and the Columbus, Delaware & Marion Electric Company, all of which operate electric roads, for service to Columbus and intermediate points via Mansfield and Galion. The tariff filed for this service is effective in ten days. This gives freight service for the lines of the Northern Ohio Traction & Light Company east to New Castle, Pa., northeast to Buffalo, northwest into Michigan and southwest into Columbus.

These in brief are the new arrangements just made. They are in effect an extension of similar activities of the Northern Ohio Traction & Light Company dating back a considerable time. As recently as last April, however, the Northern Ohio Traction & Light Company, in conjunction with the Cleveland, Southwestern & Columbus Railway, Cleveland, Alliance & Mahoning Valley Railway, Stark Electric Company and Pennsylvania-Ohio Electric Company, entered the freight field in a joint service covering northern Ohio. The company also made an arrangement with the Detroit & Cleveland and Cleveland & Buffalo boat lines, and only recently the Lake Shore Electric Railway has come into the organization. Radiating from Cleveland, this freight service reaches the industrial cities of Akron, Cuyahoga Falls, Barberton, Wadsworth, Canton, North Canton, Massillon, Dover, Uhrichsville, Kent, Ravenna, Alliance and Youngstown, as well as Elyria, Berlin Heights, Birmingham, Wellington, Strasburg, Newton Falls, Atwater, Salem, Warren, Niles and numerous other smaller towns within a distance of 100 miles.

Declines to Cut Fare

The Public Utilities Commission on Dec. 1 denied the application of the Federation of Citizens' Associations for a reduction in fare on the lines of the Capital Traction Company, Washington, D. C. As a result of the decision the present rate of six tokens for 40 cents or 8 cents cash fare will remain in effect on both the lines of the Capital Traction Company and the Washington Railway & Electric Company.

The counsel for the association was William McK. Clayton, who argued that it was discrimination on the part of the commission to continue the same rate of fare on both systems when that rate netted the Capital Traction Company a bigger return than the Washington Railway & Electric Company.

The commission in its verdict included the opinion of Corporation Counsel Stephens, who maintained that the commissioners were entirely within the law in maintaining a uniform rate of fare. The argument of Counsel Stephens was referred to in the *Electric Railway Journal* issue of Dec. 2.

In concluding the decision the commission said that no sufficient reason had been shown to justify a change in policy which was based "upon the interest of the entire public in the preservation of efficient and dependable street railway transportation in all parts of the District."

Improvement in Glendale Railway Service in Prospect

The Riverside Portland Cement Corporation, which controls the Glendale-Montrose and La Crescenta Railroads, operating car lines in a portion of the city of Glendale, Calif., and also operating a line between Glendale, Montrose and La Crescenta, has fully completed its plans for the complete rehabilitation of the property with a view of giving better service in this locality.

The owners of the lines have acquired the right of way of the Union Pacific System on Glendale Avenue in the city of Glendale and plan the establishment of a high class transportation service at a very reasonable rate between La Crescenta, Sparr Heights, Montrose, Glendale and Los Angeles.

The citizens of La Crescenta, Montrose and Glendale have subscribed a bonus of $25,000, and the railroad has agreed to spend $150,000 in the reconstruction of the line. It is the plan to reconstruct and improve the roadbed and electrify the line from La Crescenta to the junction of Glendale Boulevard with San Fernando Boulevard. At this junction the new service will connect with and transfer, without extra charge, to the Los Angeles Railway Corporation's line, giving passengers access to all parts of Los Angeles on a single fare.

The company proposes to furnish new, modern cars and will establish a fifteen-minute service during the rush hours.

Work on Loop Temporarily Halted

Request of George P. Carrel, Mayor of Cincinnati, Ohio, that work on the rapid transit loop be stopped until a time when the city was in better finances has been complied with by the Rapid Transit Commission. At a meeting of the commission on Dec. 1 the members decided not to ask for further bond issues, because of the present financial condition of the city, but to proceed with the work until the present supply of money was consumed. The members explained that there is enough money left in the commission's coffers to continue the loop to Spring Grove Cemetery, at which point the Ohio Traction Company, Dayton division, will be invited to operate its cars into the city.

The proposed interurban line from Indianapolis to Cincinnati, of which the Connersville-Cincinnati stretch remains to be completed, is expected to run into the loop system over the Ohio Traction line and will augment the rolling stock.

Mayor Carrel's request that work be stopped on the rapid transit loop was made at a called meeting of the Rapid Transit Commission Nov. 17. There were present the heads of all the city departments and members of the Rapid Transit Commission. There was no decision reached at the meetng, but the commission took the Mayor's request under consideration.

The Rapid Transit Commission has

reorganized—E. W. Edwards, metal products manufacturer, is chairman; Attorney E. M. Dornette, vice-chairman, and former Judge William Geohegan, secretary.

Discuss Weekly Pass Plan

Members of the City Council utilities committee, Seattle, Wash., recently listened to an extended discussion of the weekly street car pass system by Councilman John B. Carroll, its only advocate in the Council, and B. H. Petley, a civil engineer, who has been interested in the plan for more than a year. Major Carroll suggested that the committee recommend to the Council the adoption of the pass system, contending that the urban street car lines are suffering more and more from the competition of privately owned automobiles. Under the pass system, he maintained, extensions could be hoped for, but not under a 5-cent schedule. Other members of the Council expressed the opinion that the weekly pass has merits, but agreed that its adoption would lead away from the city's ultimate goal of 5-cent fare for all riders.

Transportation News Notes

Five-Cent Fare Provided.—Everett, Wash., will again have a 5-cent fare provided in the filing of a tariff by the Puget Sound International Railway & Power Company for a period of ninety days. The tariff also provides for the extension of the weekly pass system for another ninety days from Nov. 25, both tariffs being permitted to become effective on less than statutory notice.

New Service Plan Given Trial.—The City Railway, Dayton, Ohio, recently put into effect a new plan for speeding up service during rush hours. In the downtown section at each of the principal street intersections employees of the company are stationed who are to go among the people about to board the cars and make change for those who have not the exact fare ready. This plan was started owing to the difficulty experienced by the motormen of the one-man cars in making change for patrons.

Petitions to Operate Buses.—The International Railway, Buffalo, N. Y., has petitioned the City Council for permission to operate double- and single-deck motor buses on Delaware Avenue from The Terrace to the Kenmore-Buffalo city line and on Bailey Avenue. Two buses of the Fifth Avenue type with the enclosed upper deck were brought to Buffalo from Philadelphia by Herbert G. Tulley, president of the International and inspected by members of the City Council. Two other similar petitions are before the Council for the operation of buses of this type in Buffalo.

New Publications

The Constitution of the United States

Its Sources and Its Application. By Thomas James Norton. Little, Brown & Company, Boston, Mass. 1922. 298 pages.

There are many great works on the Constitution, but most of them were written for the legal profession and are so formidable in appearance as to deter anybody but the law student from venturing upon a reading of them. Mr. Norton's work is, perhaps, the first of its kind to overcome all the objections which have been made in behalf of the lay reader to previous volumes dealing with the same subject. This fact alone ought to be enough to secure for it a wide vogue among business men and engineers everywhere who in the past have turned away from books bearing the legal stamp. It is not in any sense a railway book, but it is a work that the railway man can hardly afford not to list among the volumes intended to be used by him in his collateral reading.

As the author explains the purpose of this book, it has been his effort to make accessible to the citizen and his son, to his newly enfranchised wife and daughter, and especially to his children in school, such a knowledge of the Constitution of the United States as will serve in emergency as a "first line of defense." This purpose has been achieved and a great deal more. The treatment of the subject is unusual in that the book explains, clause by clause, the origin of the leading provisions of the Constitution and the Amendments and then gives their application in the great cases which have arisen from the beginning down to the apartment-house rent case in 1921.

In carrying out his purpose the author has provided a note to every line or clause that has a historical story or drama back of it, or that has contributed to the national or the international welfare of mankind during the 133 years of life under this instrument. This method leaves the text of the Constitution and the Amendments in unbroken connection, so that the whole great design is visible, and the explanation appears immediately under the part to be explained. As to the typographical arrangement of the book, the text of the Constitution and Amendments is printed in large type, while the explanations of the clauses are not mere footnotes, but are given the typographical prominence they deserve by being made part of the text.

In addition to a showing of the historic sources or causes of particular provisions of the Constitution, there are also exhibited examples of the application of the clauses in great cases which have arisen during our constitutional life. It is illustrated very clearly that the man in power has undergone no change and that without the prohibitions of the Constitution and the means of giving them immediate effect he would become as dangerous as he ever was to the safety of the government and to the rights and liberties of the people.

A New Edition of "Pender"

Handbook for Electrical Engineers. Compiled by a staff of specialists, with Harold Pender as editor in chief and William A. Del Mar as associate editor in chief. Second edition, revised and enlarged. John Wiley & Sons, Inc., New York, N. Y. 2,263 pages.

Eight years ago the first edition of what was then called the "American Handbook for Electrical Engineers" was issued, under the editorship of Professor Pender. Since that time a number of changes have occurred in the field of electrical engineering, and two years ago the publishers undertook the complete revision of the handbook.

Of the approximately 2,200 pages (excluding the index) 158 pages or about 7 per cent are devoted to electric traction. This excludes steam locomotives and electric automobiles, which while listed under Traction are not electric railway subjects. Electric traction may, therefore, be said to have been given a fair amount of space in the book. Under the subject of traction the topics given most extended treatment are energy requirements and motor equipment for electric railways, overhead trolley systems, third rail, and signaling. These take nearly two-thirds of the space. The material here seems to be accurate and as nearly up to date as is possible in a field in which practice is so rapidly changing as it is in the electric railway field at present. However, for the electric railway engineer the handbook has its principal value outside of the electric railway section. What the engineer expects a handbook to contain is primarily the fundamental principles and data of the field which it covers and the standardized items in those fields. This the "American Handbook" does in a thorough manner. Like the "Standard Handbook," the publication of the fifth edition of which was mentioned briefly in the issue of this paper for Oct. 14, 1922, page 652, "Pender" includes the complete "Standards of the A.I.E.E."

Fusibility of Ash from Coals of the United States

Fusibility of Ash from Coals of the United States. By W. A. Selvig and A. C. Fieldner, United States Bureau of Mines, Department of the Interior, Washington, D. C.

As the fusibility of the ash in coals determines the clinkering quality, information regarding fusing temperatures, etc., is of value to coal users who desire to operate their boiler or other furnaces with the maximum of intelligence. This report emanating from the chemical laboratory of the Bureau of Mines contains a wealth of data as to coals from all parts of the country.

Personal Mention

Fifty Years in Railroading in Chicago

Sixty Friends of John M. Roach Fete Him on Half Century of Work There for Local Roads—Rehabilitation of 1908 Carried Out During His Administration

JOHN M. ROACH, member of the board of operation of the Chicago Surface Lines, was the guest of honor at a dinner recently to celebrate the fiftieth anniversary of his connection with transportation companies in Chicago. Directors of the several companies, heads of departments and old time friends made up the party of sixty who took part in this testimonial event.

Only a few days before Mr. Roach was honored as the senior past-president of the American Electric Railway Association at a gathering of past-presidents during the convention in Chicago. On that occasion, the presiding officer, Gen. George H. Harries, said of him:

"Mr. Roach is a transportation man through and through, but he is by no means through."

It is a far cry from work as a cowboy and miner to that as the president of a great transportation system. That was the range covered by the subject of this sketch. It is characteristic of Mr. Roach that he learned from each experience in life the lesson it contained, and as the years have passed he has developed executive force, keen discrimination and managerial ability which today mark him as a prominent figure in Chicago's business circles.

Mr. Roach's advancement has been due to his own efforts rather than to fortuitous circumstances. He has an unusual capacity for work and for organization. His knowledge of men is perhaps his strongest characteristic, and while he has been out of active management of the street railways for the last ten years, he still is loved by thousands of the men who served under him and who are still with the properties.

Mr. Roach was born in Lowell, Ohio, in 1852. At the age of eighteen he was attracted by the story of gold discoveries in Montana and went with a party of young men from his home in Belvidere, Ill., on the long Western trip on horseback. The visions of wealth vanished after an attempt at mining, and the young man then tried his hand at ranching and newspaper work. In October, 1872, he went to Chicago and was at once attracted by the possibilities of advancement in street railway work. He had a letter of introduction which would have secured him a position in the office of the general manager of the company, but he expressed preference for employment as a conductor "so he could learn the business from the car up."

A few years later he became cashier of the North Chicago Street Railway, and then purchasing agent. In 1890 he was made general superintendent of all the North Side lines and three years later became also vice-president. In 1897 he assumed similar titles with the West Chicago Street Railway, and, when the Union Traction Company took over both properties, he continued in direct charge of the management. He was the first president of the Chicago Railways, which took over all the North and West Side lines under the 1907 ordinances. He retired from active management in 1912. With the merger of all the Chicago street railways under the name of the Chicago Surface Lines in 1914, Mr. Roach became a member of the board of operation. He also continues as vice-president and director of the Chicago Railways.

J. M. ROACH

When Mr. Roach went to Chicago, it was a city of 300,000 population, with an area of 36 square miles and with only 40 miles of car tracks. It is now a city of 2,701,000 persons, with an area of 200 square miles and has more than 1,000 miles of surface tracks.

Another instance of the growth of Chicago during Mr. Roach's service with the companies is that a single fare in 1872 would purchase a ride of only 2 miles, whereas now it is possible to ride 35 miles on one fare with unlimited use of transfers.

Mr. Roach saw the introduction of the cable system in 1882 and the trolley system beginning in 1890. It was during his administration that the properties were rehabilitated with new tracks, cars and substations, beginning in 1908. This record for reconstruction work in three years is said to have been unequaled in traction history.

Outside of business, Mr. Roach has two hobbies—golf and baseball. He enjoys watching the big league players and gets much pleasure out of the comradeship of the links. He plays a good game, too. He has an office with the executive staff in the Borland Building, but is also to be found daily at his old headquarters on the North side, where he served so many years in active management. Many an old employee calls on him there, finding the latchstring always out and securing helpful advice when the occasion warrants. An Eastern financial journal recently said:

"Roach is a great operator; nobody knows the traction game better."

It might have said with equal truth:

"Roach is a true friend; no one knows better how to make and retain friends."

Senator Couzens Wants to Help Detroit Municipal Railway

James Couzens, appointed to the United States Senate by the Governor of the State of Michigan to fill the vacancy caused by the resignation of Senator Newberry, has resigned as Mayor of the city of Detroit. While the belief has been expressed by members of the Street Railway Commission that Mr. Couzens will remain as head of the street railway department, the Senator-elect stated that he would have nothing to say on street railway matters until he had talked with Corporation Counsel Wilcox, with acting Mayor Lodge and with members of the Street Railway Commission.

Protest was made to Governor Groesbeck by citizens of the city of Detroit who saw in Couzens' appointment to the Senate the loss of his services to the city. Since the time when the Street Railway Commission granted Joseph S. Goodwin, general manager of the municipal system, a leave of absence for six months because of his illness, Mr. Couzens had been devoting half of his time to active management of the Municipal Street Railway system.

It was pointed out by supporters of the municipal system that many years devoted to the study of Detroit's transportation problem and years spent in overcoming obstacles placed in the way of municipal ownership had given Mr. Couzens an unusual insight into Detroit's needs and the solution of the city's problems.

In accepting the appointment to the Senatorship, Mr. Couzens states that if he might continue to serve the people of Detroit legally and with the consent of the new Mayor and the members of the Street Railway Commission, he was willing and anxious to do so. Citing that with the consent of the Council men have been selected to consider the further development of Detroit's transportation needs, such as subways, elevated and bus lines, he stated that if he in any way felt that Detroit would be inconvenienced by his accepting the appointment, he would decline to do so.

Celebrates Fifty Years of Business

Some sixty of the personal and business friends of Daniel M. Brady were guests of the directors of the Brady Brass Company at a luncheon at the India House on Dec. 6. The occasion was the completion by Mr. Brady of a service of fifty years in the railroad industry and of forty years in the metal trade. Gathered around the tables were many men prominent in business and steam railroad circles in New York, as well as from the electric railway companies of the city. Letters read by H. H. Vreeland, Interborough Rapid Transit Company, indicated that many other steam railroad officials would have been present if the luncheon had not occurred at the same time as the meeting of the American Railway Association in Chicago this week. As the affair was in the daytime the speeches were limited to few, but J. F. Fowler, vice-president W. R. Grace & Company; C. S. Tench, editor *American Metal Market Report*, and Henry A. Bishop, director of the company, spoke, and Judge Morgan J. O'Brien acted as toastmaster. At the conclusion of Mr. Bishop's speech he presented a gold watch to Mr. Brady, in behalf of the directors of his company. In his reply Mr. Brady said that the greatest asset which a person could have was friends, and friends could be gained best by gratitude and loyalty.

Mr. Brady was born in New York City sixty-nine years ago and in 1871 entered the employ of the New York Central Railroad in the office of General Manager John M. Toucey. He was afterward chief clerk of the car department under Leander Garey, general superintendent of the car department of the company. Mr. Brady resigned from the New York Central Railroad in 1883 to join the then newly organized Paige Car Wheel Company, Cleveland, with which he was connected for a number of years. In 1888 he established the Brady Brass Company and has been president of it since its organization. For many years he was also director of the Rochester Car Wheel Works. At the time of the reorganization of the American Street Railway Association in 1905, he had a great deal to do with the organization of the American Street Railway Manufacturers' Association, and was the first president of that organization.

Mr. Kirk Sioux City President

E. L. Kirk is now the president of the Sioux City Service Company following a consolidation with the Sioux City Gas & Electric Company on Nov. 1. Mr. Kirk was office manager for the Riverside Park Railway from 1891 to 1894 and receiver for this company until 1899, when this road and four other lines were consolidated under the name Sioux City Traction Company. He remained as general manager for this firm from 1900 until 1905, when this company was absorbed by the Sioux City Service Company, thereby bringing electric light and power service under this organization. Mr. Kirk continued as general manager of this concern until his recent promotion to the presidency.

Messrs. McIlraith, Allen, Hamilton and Aycock All Resign from P. R. T.

The resignation of G. A. Richardson as vice-president in charge of operation of the Philadelphia (Pa.) Rapid Transit Company, noted in the *Electric Railway Journal* for Dec. 2, was followed by the resignation on Dec. 3 of:

E. J. McIlraith as superintendent of rolling stock and buildings,

Elbert G. Allen as chief engineer,

F. M. Hamilton as assistant to the president, and

N. M. Aycock as superintendent of car maintenance.

Quite naturally the Philadelphia papers have expressed great surprise at the announcement of these changes. The stories some of them print of internal dissension are so extravagant as to be fanciful. Whatever the reasons may be for the retirement of officials en bloc, as it were, Mr. Mitten's searches in the past for the best available talent make the statement seem absurd that appears in the *Ledger* and credited to a reliable informant to the effect that "Mr. Mitten's policy of 'taking glorified office boys and endeavoring to create street railway officials of them by his mere say-so' proved very distasteful to the experienced street railway men."

However, some of the resignations must have been unexpected, for official departmental order No. 4 indicates as much. That order, dated Nov. 13, was signed by G. A. Richardson as vice-president and approved by Mr. Mitten. It says that F. M. Hamilton will become assistant to the president. Mr. Hamilton is one of the four who, according to the announcement of Dec. 3, has quit the service.

Recent official announcements of the company in effect on Dec. 3 follow:

"Effective Dec. 1, 1922, R. T. Senter, now assistant to the president, will become vice-president in charge of engineering, this to include such part as P. R. T. may take in city transit development.

"Until the appointment of a successor to G. A. Richardson, whose resignation takes effect this date, R. F. Tyson, assistant to the vice-president in charge of operation, will, with the aid of the undersigned, assume the duties of the position thus made vacant.

"Leon Jewell will move to 1520 Spruce Street and assume the duties of the newly created position of traffic manager of the system, in charge of timetables, traffic checks and traffic income estimates.

"W. R. Scanlin will assume the duties of the newly created position of assistant to the chief engineer.

"Effective Dec. 1, G. H. Stier is appointed superintendent of rolling stock and buildings."

Funeral Services for A. E. Duty

Funeral services for Albert E. Duty, assistant general manager of the Cleveland (Ohio) Railway, were held in Cleveland on Dec. 2. Mr. Duty died at the age of 69 following a brief illness, although he had not been in good health for almost a year.

He had spent fifty-three years in the street railway business in Cleveland, being the only executive outside of John J. Stanley, president of the company, whose services spanned the period from horse-car to electric line.

Mr. Duty began his street railway business as a driver for the Woodland and South Side Railway Company line. In 1883 he became assistant superintendent for the Cleveland City Railway. In 1912 he was made general superintendent, continuing in that post until last February, when he was promoted to be assistant general manager.

Mr. Duty was a Clevelander all his life. He is survived by his wife, a brother, who is superintendent of construction with the Cleveland Railway, and five sisters.

Peter M. Kling Dead

Peter M. Kling, for a number of years general manager of the St. Louis Car Company and later with the John Stephenson Company, Elizabeth, N. J., in a similar capacity, died at his home in Detroit on Nov. 25. He had not been in good health for the last two years.

Mr. Kling was born in Denmark on July 24, 1855, and served his apprenticeship in that country as joiner, carriage and wagon builder. At the age of fifteen he came to the United States and located at St. Charles, Mo., where he worked for a few years in a country wagon and blacksmith shop. Later he went to St. Louis, where first he engaged in the manufacture of wagons, carriages and omnibuses, but later became associated with the Brownell & White Car Company, where he worked up to be foreman and superintendent. Still later he was largely responsible for the organization of the St. Louis Car Company and had a great deal to do with the design of that company's present shops.

He resigned from the St. Louis Car Company in 1900 to become general manager of the John Stephenson Company, which had recently moved its car works from New York to Elizabeth. When this company was purchased by another corporation in 1905, he resigned to assist in the organization of the pressed steel passenger car department of the Pressed Steel Car Company, Pittsburgh, and became general manager of that department. Since leaving the Pressed Steel Car Company, in 1909, he had been associated with the Brooklyn Rapid Transit Company, the Laconia Car Company and the Indianapolis Body Company. He leaves a widow, four sons and two grandchildren.

Mr. Kling was widely recognized as a man of sterling worth, with extended knowledge of car building.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES · BUSINESS ANNOUNCEMENTS

An Example of Merchandising Electric Locomotives

The sale and shipment of a 50-ton 600-volt electric locomotive within a period of five hours was the novel record established recently by the Pittsburgh office force and shop employees of the Westinghouse Electric & Manufacturing Company. In fact, the circumstances attending the sale of the locomotive, which was taken from stock, indicate that it is one of the very few cases on record of an electric locomotive being sold in a manner similar to the merchandising of staple goods, for the locomotive was actually sold "off the shelf."

COMES TO PURCHASE MUCH-NEEDED LOCOMOTIVE

A. A. Crawford, an official of the Youngstown & Ohio Railroad, which operates in the soft coal regions between East Liverpool and Salem, Ohio, recently went to the East Pittsburgh works of the Westinghouse company to purchase a much-needed locomotive, the two Westinghouse Baldwin locomotives used on the railroad being in service continuously twenty-four hours every day except four hours on Sunday, when they were taken into the shops for oiling and inspection.

Mr. Crawford arrived at the Westinghouse plant at 10:30 o'clock in the morning and immediately entered into negotiations for the purchase of a locomotive. Upon being informed that the Westinghouse company had a locomotive whose general design and operating characteristics, though not duplicates of the locomotives then in service on the railroad, were capable of giving the same service, the railroad official, pressed by a dire need due to the fact that a breakdown of one of the locomotives in use would result in congestion of traffic, signed the contract for the purchase at 3 o'clock.

The shop force was notified and, with complete service data on the railroad where the locomotive was to be used, a corps of workers immediately examined the locomotive, testing the motors for insulation, ringing out the main and control circuits and clearing up the other necessary items of inspection. At 4:30 o'clock, after the messenger had made his bunk in the cab, the locomotive was in the Pitcairn yards of the Pennsylvania Railroad.

PLACED IN SERVICE ALMOST IMMEDIATELY

The day after the sale the locomotive was at Leetonia, Ohio, and the following day was placed in service in hauling coal on the Youngstown & Ohio Railroad between Leetonia and East Liverpool, Ohio. It is believed also that the sale, shipment and placing in service of the locomotive within a period of less than three days established a record in this phase of railroad work.

$200,000 in Improvements

The Pittsburgh (Pa.) Railways, through Receivers Fagan, Tone and George, have filed a petition in the United States District Court asking permission to spend $211,300 for improvements to the system. The betterments and estimated costs are as follows:

Passing siding on West Liberty Avenue, $22,500; transformer at Library, $3,000; additional feeders on Brighton Road, $1,200; track reconstruction on Western Avenue, $57,500; track reconstruction on Eighth Avenue, Homestead and West Homestead, $40,000; crossing on East McKeesport division, $2,500; crossing over Braddock Avenue, Pittsburgh, $2,500; additional feeders on Eighth Street, Braddock, $750; heating boiler Ardmore carhouse, $1,500; additional poles on Electric Avenue, East Pittsburgh, $850; track reconstruction on Hamilton and Brushton Avenues and Tioga Street, $62,500; additional feeders and lights at the Tunnel yards and shops, $7,000, and additional vacuum boilers, $9,500.

Metal, Coal and Material Prices

Metals—New York	Dec. 5, 1922
Copper, electrolytic, cents per lb	13.90
Copper wire base, cents per lb	15.625
Lead, cents per lb	7.10
Zinc, cents per lb	7.50
Tin, Straits, cents per lb	36.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7.50
Somerset mine run, Boston, net tons	3.875
Pittsburgh mine run, Pittsburgh, net tons	2.625
Franklin, Ill., screenings, Chicago, net tons	2.50
Central, Ill., screenings, Chicago, net tons	1.675
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	6.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	90.00
White lead, (100-lb. keg), N.Y., cents per lb.	12.125
Turpentine, (bbl. lots), N.Y., per gal.	$1.51

Rolling Stock

Cleveland (Ohio) Railway has purchased Eclipse trolley catchers and Eclipse fenders for fifty new cars now under construction in the plant of the Kuhlman Car Company.

Kansas City (Mo.) Railways will purchase, it is reported, three new Differential dump cars with three compartments each. The total cost will not exceed $29,000.

Pittsburgh (Pa.) Railways has started the operation of eight new modern cars of steel construction to replace a similar number of the older and smaller type of cars on the Homestead and McKeesport routes.

City Railway, Dayton, Ohio, equipped its new cars with Eclipse trolley catchers. The cars were described in the *Electric Railway Journal* for Oct. 28 and the statement made that these catchers were of another type was in error.

Washington Railway & Electric Company, Washington, D. C., has ordered ten new one-man cars costing $75,000 and is remodeling seven more of its existing cars for one-man operation. The company already has fifty-five single-man cars so that the additional seventeen will give a total of seventy-two.

Track and Roadway

Fresno (Calif.) Traction Company will start within the next three months extending its lines to the city limits on both McKenzie Avenue and on Fresno Avenue. The McKenzie Avenue extension calls for 6,900 ft. of track for 1½ miles of new trackage.

Ephrata & Lebanon Traction Company, Lebanon, Pa., has been authorized through Henry A. Albin and Walter C. Graeff, receivers, to spend a sum not exceeding $3,100 for track and car improvements to enable the company to operate one man cars.

Chautauqua Traction Company, Jamestown, N. Y., and the **Buffalo & Lake Erie Traction Company** jointly will construct a short piece of track connecting the two lines in Westfield, N. Y. The commission holds that it is desirable in the public interest that the connection be made so as to facilitate the interchange of freight.

Power Houses, Shops and Buildings

Boston (Mass.) Elevated Railway will award the contract for building the new Harvard Square station of the Cambridge Subway to the Coleman Brothers. Owing to a controversial interpretation of bids the company was compelled to appeal to the Massachusetts Public Utilities Department to decide. The department awarded it to the Coleman Brothers.

Trade Notes

Republic Railway & Light Company, New York, N. Y., Pennsylvania-Ohio Electric Company and the Pennsylvania-Ohio Power & Light Company announce the removal of their New York offices to suite 2626, Equitable Building, 120 Broadway, New York City.

J. E. Slimp, for many years identified in the South and West with the railway and transmission field, has opened an office at 50 Church Street, New York. This will be the Eastern agency of the Pacific Electric Manufacturing Company of San Francisco, makers of high-tension oil circuit-breakers, air-break switches, choke coils, lightning arresters, fuse equipment, etc., for high-voltage transmission lines, Mr. Slimp later may take other lines of apparatus in the transmission field. For eighteen years he was connected with the Ohio Brass Company.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review
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Volume 60 New York, December 16, 1922 *Number* 25

The Panacea for Railway Troubles Is Here

ANY ONE who read the interview with C. D. Emmons in last week's issue of this paper with the expectation of finding some great outstanding purpose which might account for his rise to the leading position in the industry, as well as chief executive of one of the prosperous utility companies, was doubtless disappointed. In fact, one of the important lessons that may be drawn from Mr. Emmons' remarks is the fact that there is no one great engineering or management feat that determines the prosperity or poverty of a railway system. The success of the undertaking lies rather in the accumulative effect of numerous small betterments and economies—the result of pursuing a policy of constantly striving for improvement with respect to every detail of operation all through a company. Mr. Emmons' success typifies that policy, for he has been open-minded about developments and agreeable to a trial of any suggested improvement that seemed at all practical and worthy.

The *Journal* has spoken many times before about the unfortunate attitude of some railway men in seemingly closing their eyes and minds to the detail advances of the art. They appear to be waiting for some panacea for all their troubles to take them out of their difficulties. Meantime they ignore or neglect the numerous things that are within reach, practical and proved, that would each play a part, if grasped, in modernizing and providing better service, reducing costs and attracting greater patronage. This applies both to operating methods and to equipment improvements, and devices that reduce costs.

The industry is by no means standing still. There may not be much expansion of track mileage going on, but there is an intensified activity with respect to developments that will surely keep the railways away from obsolescence and put them in line for profits, if the managements keep alive to progress and make the most of it. It is almost wholly a matter of a little improvement here and a little there, each in itself of no great moment, but summed up they make the panacea sought after.

National Standardization Will Not Reduce Engineering Committee Activities

NOW that the American Engineering Standards Committee is functioning, a question naturally arises as to its probable effect on Engineering Association committee work. Will the activities of the national committee supplant those of the several well-organized and effective committees which are now vigorously trying to improve the quality of electric railway construction and operating practices? They will not; in fact, the committee work, in the future, while it will be somewhat different in character from what it has been, will be similar in purpose and scope, and at least no less in volume. It would be unfortunate if this was not to be the case.

The A.E.S.C. is essentially a balance wheel. Its function is to insure steady progress, but not to supply initiative and motive power. Its stamp of approval of a design or practice will give prestige to that upon which it is placed, but no more. It will supply assurance that the subject has been thoroughly reviewed and will give to the users of a national standard the confidence in its value that comes from its all-round consideration by various experts.

It is true that at the Chicago convention certain topics were, in a sense, laid upon the table pending the inauguration of work under them by the A.E.S.C. This, however, was not done with the idea that the national committee would shoulder responsibility for them, but rather to prevent duplication of effort. The elimination of such duplication will certainly be a relief to the Engineering Association committees and will give them more time for research. It will not, however, render any of them superfluous. The Engineering Association will require representation upon all national committees which will consider its proposals, as well as proposals from other interests which affect even remotely the electric railway industry. Behind these representatives will need to be well-qualified committees to give them technical and moral support.

The Unlimited Transfer—Unlimited as to Variety

TRANSFERS present an ever-old yet ever-new problem in electric operation. Although the purpose of all transfers is the same, namely, to require the passengers to make a continuous journey in the same general direction so that he cannot use the transfer as a return ticket or as a stopover to transact business on the way, there is a great difference in the forms of transfer used. For instance, here are some of the methods which have been used, or are being used, to indicate the route to which the passenger is limited in making his trip on the car to which he transfers: A skeleton map or printed list of the lines with the route to which he can transfer punched, a skeleton map or printed list of the routes with the line to which he is not allowed to transfer punched, color of ticket to indicate the general direction combined with printed list of the routes over which the ticket is available.

A still greater variety exists as to the way of indicating the time limit on the ticket. Where there is a time limit there must be some way of marking the ticket as to its expiration for the year, month, day of the month, hour and minute and whether the hour is in the morning or afternoon. Of course, the year and the day of the month do not have to be punched by the conductor. They can be printed on the ticket or punched at the carhouse. Where the day of the month is printed on the transfer, there is a possible greater waste of stock, but large companies can afford this waste to make the day of issue more easily read by the receiving conductor. The device of the p.m. coupon (a comparatively modern idea) pretty well identifies the transfer as to issue before or after noon, but the ways of indicating the hour and the minute are legion. They have been shown by punching the hour and using different colors for the four fifteen-minute periods, by punching both the hour and the minute in a miniature clock dial or in numbers printed on the ticket and by tearing the ticket from a stub which is graduated according to the hours from 1 to 12.

Finally, practice varies as to whether the conductor should punch the time within which the transfer is valid or the time at which the car left its terminus. In the latter case the time during which the transfer is valid is shown by the time punched, plus the number of minutes printed on the front of the transfer opposite the name of each intersecting route.

Many other varieties of transfer have been devised for various purposes, even for trying to indicate the appearance of the receiving passenger, but space will not permit an enumeration of all of them. Enough has been said to show the enormous and probably the unnecessary variety in practice. There is, of course, not the same necessity of standardization in forms of transfer as in other electric railway equipment and methods. As the routes necessarily differ in name in each city, transfers are not interchangeable and have to be printed separately. Hence no great harm is occasioned by having a different arrangement and form of ticket. Nevertheless, it is evident that some forms and arrangements must be better than others, and it would be well for each company to study its own form to determine whether some improvement cannot be made. The mere fact that a transfer has been in use for five years or more without being subject to conspicuous abuse is not a valid reason for its continuance.

Interest and Initiative in Education Must Begin at the Top

THERE is little use in trying to push an educational program on any electric railway property unless the men who direct its affairs have strong convictions regarding the value of post-school training in the industries. The first task, therefore, which confronts the enthusiast who would like to have such a program started is to insure co-operation from headquarters. It may be that the manager will need to be convinced regarding such points as these: First, in its own interest every electric railway should supply special educational facilities to the men in its employ; second, the educational program should provide (1) for better performance of present tasks, (2) for training for promotion and (3) for education along the lines of general good citizenship. The need for special training in industry is urgent, partly because boys drop out of school on the average very young, and partly because nothing has as yet been developed to take the place of the old-fashioned apprentice system.

Provision of an educational program does not mean, necessarily, that a railway should run a school, although that is desirable in some cases. All that it does mean is a co-ordination, for the benefit of employees, of the facilities provided by organized educational agencies, supplemented by such special facilities as are not otherwise available. The awakening interest in vocational education in electric railway circles is a sign that these facts are becoming evident. The efforts of the American Association to stimulate the interest, therefore, ought to be encouraged.

On every electric railway property there should be some one qualified person who is assigned the task and privilege of organizing the educational work. This person can study the individual and group needs and desires of the employees, can advise them as to procedure in meeting these needs, can co-ordinate the local educational agencies in so far as they relate to his own company's needs, and can plan for the special activities which his company should undertake. The work of this man will be fruitful, however, only if the management backs him up.

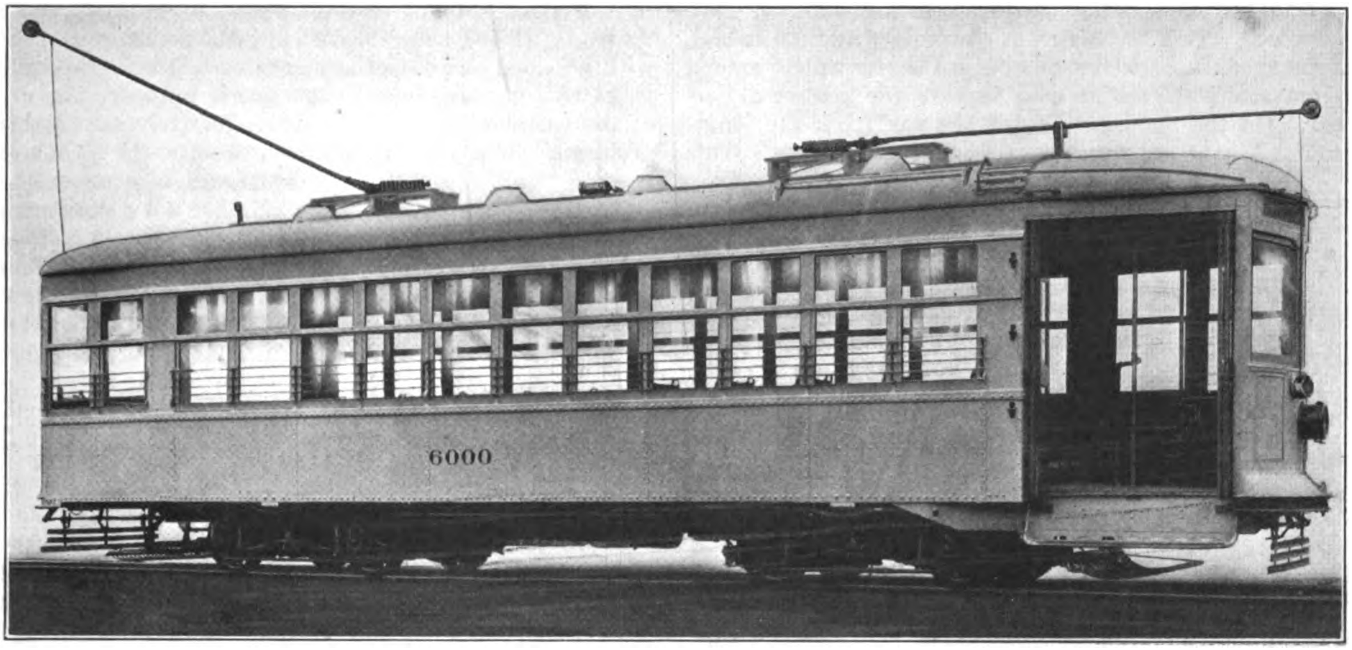
Statistics and Experience as Bases for Decisions

A CHARACTERISTIC of modern methods in electric railroading is the much more extended compilation and use of statistics than ever before. The full benefit is not always had from these statistics because the most important facts are not compiled or full use is not made of those obtained. Nevertheless, it is undoubtedly true that much more time and attention is being given to this matter than formerly, and in recent comments in these columns and in the "Letters to the Editors" in this paper some valuable suggestions have been brought out as to how the real worth of statistics may be measured.

To some of the older men in the business the attention paid to statistics in these days seems hardly worth while. At the same time, although they may not realize it, these older men really use the same process as that which they criticise where they decide a question on the basis of their experience. The only difference is that they keep the facts and figures in their heads rather than on paper.

Another element required to decide a business question correctly, besides experience or statistics, is intuition. This is power to draw conclusions from given facts, and while experience may sometimes be considered to include intuition, it is entirely correct to say that no written statement of facts or clear memory of them minimizes the value in business affairs of good intuition or judgment. This is particularly true in electric railroading on questions which concern persons rather than things. A good example is the matter of promotion in the service. Here statistics mean little, intuition much. On the other hand, there are many engineering questions where with sufficient facts future results can be predicted with absolute certainty. Here no intuition is required.

The conclusion to be reached in this matter is that it is not wise to generalize from very narrow experience and that the more extensive or complicated the facts on which to base a decision, the more important it is that these facts should be in definite—and preferably written—form. A statistician should not be allowed to manage a property unless he has other qualities than those of a statistician. Nevertheless, he can supply data on which a wise manager is able to base a sound judgment. In preparing this information the statisticians do a great deal of the grinding work and leave the manager more free to carry out his duty, which is to interpret these figures and apply them in the solution of problems for which he is responsible.



WIDE DOUBLE-DOOR OPENINGS FACILITATE ENTRANCE AND EXIT

Light-Weight One-Man Cars for Eastern Massachusetts Street Railway

Double-Truck Cars Weighing Less than 16 Tons and with a Seating Capacity of Forty-eight Have Been Placed in Operation—Several New Features

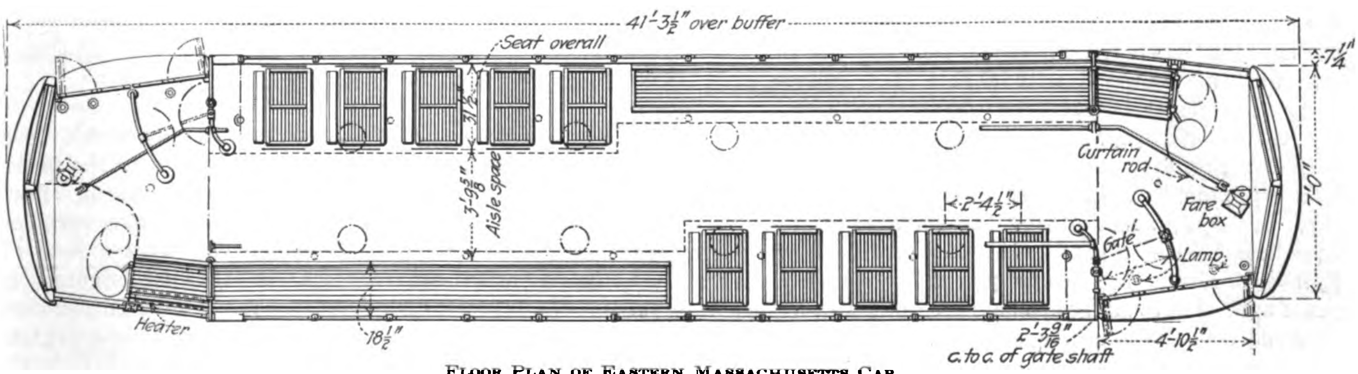
TWENTY-FIVE new light-weight, one-man, double-truck cars have been placed in service recently by the Eastern Massachusetts Street Railway. Completely equipped, these cars weigh 31,883 lb., which is from 12,000 to 16,000 lb. lighter than other double-truck cars which the company has in service. The cars were built by the J. G. Brill Company and have a steel underframe and semi-steel body construction. The underframe and superstructure were evolved from the light-weight Birney safety car type, with provision to meet adequately the larger passenger load requirement. Corner and side posts are of $1\frac{1}{2}$x$1\frac{1}{2}$x$\frac{3}{16}$-in. angles, which are continuous and form the carlines to support the poplar roof. The side sheathing is of $\frac{3}{32}$-in. sheet steel. Dimensions are shown in an accompanying table.

An essential feature of the construction is the use of two extra wide folding doors operated by air so as to provide two passageways, one for entrance and one for exit, thus permitting the simultaneous flow of passengers inward and outward. The door openings are at diagonally opposite corners of the car, and the two-leaf folding doors inclosing these openings swing outward. Stationary steps are used in place of the customary folding type.

All side window upper sash are framed in one piece and the lower sash are arranged to raise 25 in. in clear. The single sash on the left-hand side of the vestibule directly in front of the operator is stationary, while that on the operator's right is arranged to drop.

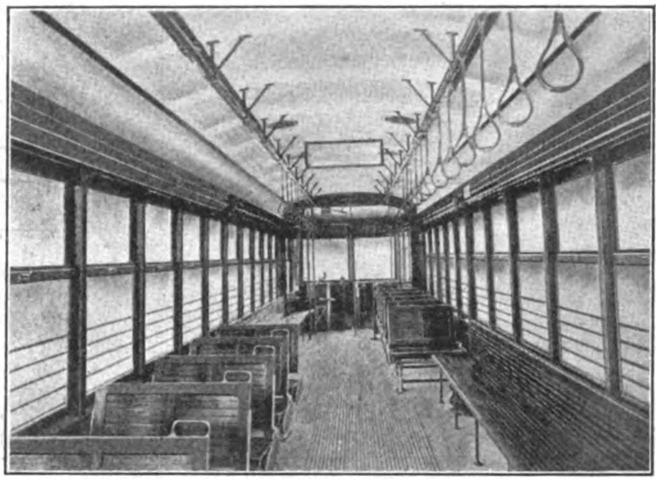
PRINCIPAL DIMENSIONS OF EASTERN MASSACHUSETTS STREET RAILWAY LIGHT-WEIGHT CARS

Length over corner posts	28 ft. $1\frac{1}{2}$ in.
Length over platforms	39 ft. $9\frac{1}{2}$ in.
Length over bumpers	41 ft. $3\frac{1}{2}$ in.
Width over sides	8 ft. $2\frac{11}{16}$ in.
Extreme width	8 ft. $4\frac{5}{16}$ in.
Height rail to side sills	2 ft. $1\frac{13}{16}$ in.
Height rail over trolley board	11 ft. $7\frac{1}{2}$ in.
Height rail to step	15 in.
Height, step to platform	$14\frac{1}{2}$ in.
Seating capacity	48



FLOOR PLAN OF EASTERN MASSACHUSETTS CAR

Another interesting feature is the seating plan adopted. This consists of two longitudinal seats, accommodating twelve passengers each, which extend from the platform at each end to the center of the car. On the opposite side of the car from the longitudinal seats are five two-passenger cross-seats. This seating arrangement provides an aisle throughout the entire length of the car of twice the width which would have been possible if the cars were equipped exclusively with cross-seats. The staggered arrangement of the seating gives uniform loading conditions. While this type of car has a seating capacity of forty-eight passengers, the seating arrangement adopted gives accommodations to a large number of standees. The longitudinal seats extend the length of six windows in the body and one window beyond the corner posts. All seats are of a wooden slat type.


LARGE AISLE SPACE IS A PARTICULAR FEATURE OF THE INTERIOR

Pipe railings are provided at the door openings to direct the passengers and to separate the incoming and outgoing passengers. A sliding curtain is provided which surrounds the motorman in his position at the front left-hand side of the platform. The fare box is mounted just to the operator's right in a position central with the width of the car and at the front end. All electrical wiring is installed in metal conduits and the latest fireproof construction is employed throughout. The cars are provided with safety air brake equipment, as prescribed by the Public Utilities Commission, whereby passengers or the operator may, by applying the emergency cord, shut off power, apply the brakes, sand the rails and instantaneously release both front and rear doors. Weights of the various parts are given in an accompanying table.

The trucks are Brill low-level No. 77-E-1 type, with a 5 ft. 4-in. wheelbase, 26-in. diameter wheels and 3¾x6-in. journals. In motor equipment fifteen cars are equipped with Westinghouse type 508-A motors and ten cars are equipped with G.E. 264-A motors.

Another novel feature for surface car operation is the use of Westinghouse special air brake equipment with variable load compensating device. This variable load equipment is the first ever installed on surface cars, but equipments having the same general features have been in use on the cars of the New York Municipal Railways since they were placed in service several years ago. The braking problem for light-weight cars has received considerable attention. With the light weight on the wheels a low brake cylinder pressure is essential in order that slipping of the wheels may not occur with no load. If the same brake cylinder pressure is used with a loaded car, stopping distances will be excessively long, with increased danger on severe grades. The use of the variable load features has effectively solved this problem. Briefly this equipment limits the pressure passing from the operator's brake valve or from the emergency valve to the brake cylinder to a maximum amount which will not cause wheel sliding. It is thus possible to obtain an 85 per cent braking ratio with the car empty or fully loaded or with some intermediate weight. In operation when less than a full service application is desired, the motorman can make a partial application with his brake valve and then graduate the cylinder pressure to that desired. The variable load apparatus, however, prevents getting into the cylinder any more pressure than the load of the car will justify.

WEIGHTS OF CAR AND EQUIPMENT PARTS

Body, less electric and air equipment	15,583 lb.
Trucks	9,000 lb.
Electrical equipment on body	1,500 lb.
Air equipment on body	1,200 lb.
Motors and gears	4,600 lb.
Total	31,883 lb.

The operation of this equipment can best be followed by referring to an accompanying diagram. As the car comes to a stop, the opening of the doors energizes two magnet valves through a door contactor. The upper one of these magnet valves shown in the diagram exhausts air so as to unlock the pressure limiting valve mechanism, while the lower magnet valve admits air to the strut cylinder. A rocker arm is mounted on the body bolster and the admitting of air to the strut cylinder extends the push rod of this cylinder so as to bring the foot plate of this rocker arm in contact with the truck transom. The other end of the push rod is moved out at the same time corresponding to the load on the car and adjusts the limit valve to its proper position.

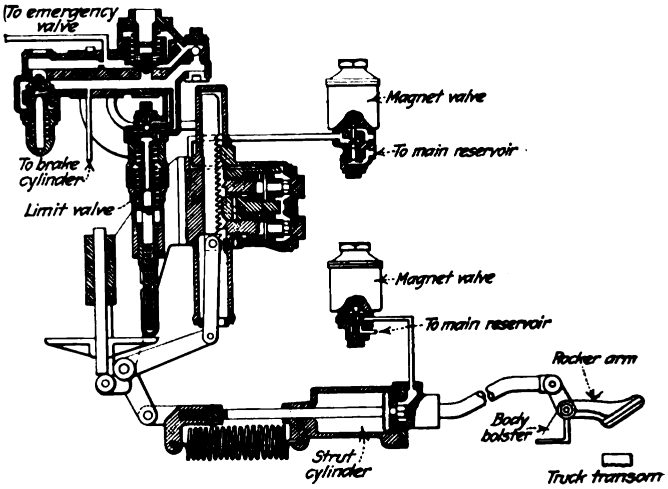


DIAGRAM OF VARIABLE LOAD EQUIPMENT

This limiting valve is in effect an adjustable feed valve and regulates the maximum pressure to the brake cylinder. With a light car 85 per cent braking effort is obtained with approximately 34-lb. brake cylinder pressure, and a completely loaded car with a load of 21,000 lb., which corresponds to 150 passengers, requires 57-lb. brake cylinder pressure to give 85 per cent braking effort. The closing of the doors de-energizes the magnet, locks the limiting valve and exhausts air from the strut cylinder. The strut cylinder spring then pulls the cylinder so as to lift the foot plate from the truck transom, and thus the vibration of the car when it is moving is not transmitted to the variable load apparatus.

All air to the brake cylinder passes through the limiting valve. As this is adjusted at each stop to the load on the car the maximum pressure going to the brake cylinder is proportioned to the load on the car. In other words, it is possible to secure a cylinder pressure that will give 85 per cent braking ratio with a loaded car and yet hold the cylinder pressure for an empty car down to a value that will not cause wheel sliding.

Other features of the equipment provided for these cars include Brill exhaust type ventilators, eight per car, with ceiling register and removable shutter, also Brill vertical-handle, geared type hand brakes and "Dedenda" alarm gongs. Hunter illuminated destination signs are provided, and the sand boxes have Ohio Brass Company's air sanders. The Farraday electric buzzer system is used, and the heaters are Consolidated No. 1522-T. The door engines were furnished by the National Pneumatic Company. Golden Glow headlights, Keystone trolley catchers and Rico No. 7 hand straps are used. A Krantz safety type switch panel is used for the mounting of switches.

Anti-Friction Bearings for Electric Cars

A Review of the Results Obtained from the Use of Anti-Friction Bearings Here and Abroad, Together with a Description of Some of the Principal Types—The Economies Effected and Troubles Experienced Are Given

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Lang-Wikander Engineering Company, New York, N. Y.

ANTI-FRICTION bearings have been applied to the armatures, axles and journal bearings of electric cars in a considerable number of instances. The conditions governing their use for the three different types of bearings are somewhat different, and in the following discussion each will be considered in detail. The use of ball bearings on the armature shafts of railway motors has been advocated by progressive ball bearing manufacturers for several years. Such applications have been tried on a large number of roads with varying degrees of success.

Among the advantages claimed for the use of ball bearings, probably the one which has received the greatest amount of attention, is that of the decrease in starting current, due to the smaller starting friction of ball bearings over plain types. A decrease in the power consumption follows as a direct result. With properly constructed ball bearings, the wear at the bearing should be considerably reduced, and the danger of the armature wearing down in its bearings so as to cause rubbing on the field pole faces is reduced. A reduction in this bearing wear also makes it practical to reduce the air gap of the motors to a considerable extent, which would produce a lighter motor for the same power or a more powerful motor of the same weight.

Another advantage claimed from the use of ball bearings is that, due to the narrow construction at the bearings, it is possible to build the whole motor narrower so that a motor of greater power could be designed for a certain width between the wheels. The use of anti-friction bearings also should produce a considerable saving in the cost of lubrication, since this type of bearing should require lubrication only about every six months instead of weekly, as is the requirement for plain bearings.

While some installations have met with considerable success, others have failed and have caused great inconvenience. Bearings with insufficient load-carrying capacity have been applied, together with improper design of the bearing housing. As a result of this last consideration bearings have been damaged while being mounted or when removed for the purpose of inspection. Other failures have resulted from stray current passing through the bearings, which may be due either to arcing at the brushes in cases of heavy overload on the motors; to a portion of the motor current passing through the housings, bearings and trucks on its way to the rails, or to local current induced in the housings and shafts in the motor. Ball bearings are very sensitive to the influence of electric current, and even a very slight amount passing continuously through a ball bearing will cause pitting and premature destruction.

Another difficulty which has been encountered in the use of anti-friction bearings is that they are subjected to heavy shocks, particularly in the case of old and worn tracks. Ball bearings are quite sensitive to shock loads, due to the fact that their capacity to carry even temporary overloads is not much larger than their continuous load-carrying capacity. While proper selection and mounting may to a considerable extent overcome such failures and while several arrangements have been proposed for overcoming them, still in spite of the great efforts made to design reliable ball bearings for railway motors, the margin of safety obtainable is not quite satisfactory.

SOME ADVANTAGES OF ROLLER BEARINGS

Properly designed roller bearings possess the same advantages as ball bearings in this application and the additional one that they do not appear to be subject to pitting by electric current to anywhere near the same degree as ball bearings. They are, furthermore, capable of sustaining comparatively heavy shock loads. It can conservatively be said that a roller bearing will carry about 60 per cent more load than a ball bearing of the same outside dimensions and stand more than double the shock load. For the above reasons the results obtained with roller bearings in electric railway service have been on the whole far more satisfactory than those obtained with ball bearings. Manufacturers of railway motors in Germany agree that precision roller bearings are by far the best solution of the bearing problem for electric railway motors.

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*Member American Society of Mechanical Engineers; formerly consulting engineer S.K.F. Industries, Inc.

Roller bearings have seldom been used for electric railway motors in America. The reason for this is that precision roller bearings, as they are termed in Germany, have not as yet been marketed to any large extent in the United States. The term precision roller bearings is applied to those which are manufactured of as high grade material as the best ball bearings, are of equal precision in the workmanship and have about the same coefficient of friction. The commercial roller bearings most widely marketed in America do not measure up to these standards. They have a coefficient of friction which is from two to five times larger than that of high-class ball bearings and do not meet the requirements for railway motor service. Several installations with such bearings have, however, been made in this country. The first one probably was that by the Interstate Consolidated Street Railway at Pawtucket, R. I., about twenty-five years ago. This is referred to again later in the article.

A short description of some of the German designs of roller bearings which have proved most satisfactory may be of interest. The mounting of a Jaeger roller bearing as manufactured by G. & J. Jaeger in Elberfeld, Germany, is shown in Fig. 1. This type of bearing is used to a large extent by the Greater Berlin Street Railway. Cylindrical inner and outer races and cylindrical rollers are used. An important feature of the Jaeger bearing is the very rigid and substantial cage which guides the rollers at both ends, thereby securing a true rolling motion and effectively preventing them from skewing. The bearing on the commutator end is provided with rollers of a very characteristic shape. Projecting from the middle of each roller is a cylindrical flange which is guided between shoulders in the inner as well as in the outer race. The object of these flanges is to carry any thrust loads. The bearing at the pinion end permits the shaft to float longitudinally and adjust itself to any expansion and contraction which may be produced by temperature changes.

Another mounting of these bearings, as used for a split-frame motor, is shown in Fig. 2. According to an article by H. Behr published in *Zeitschrift des Vereines Deutscher Ingenieure*, Vol. 49, 1921, fifty-five motor cars

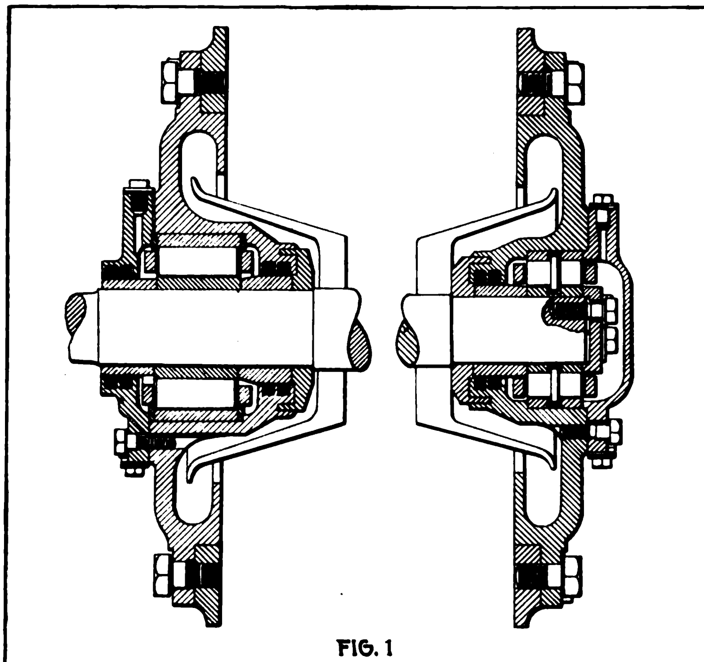


FIG. 1

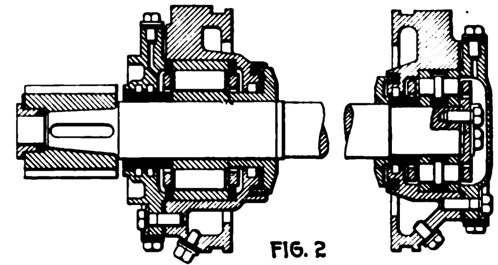


FIG. 2

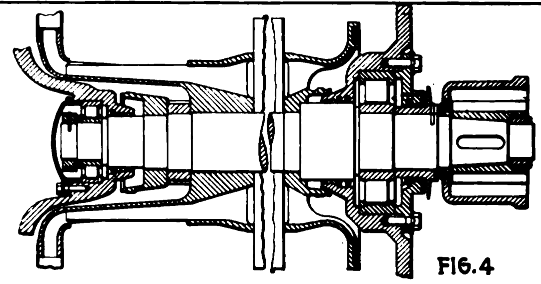


FIG. 4

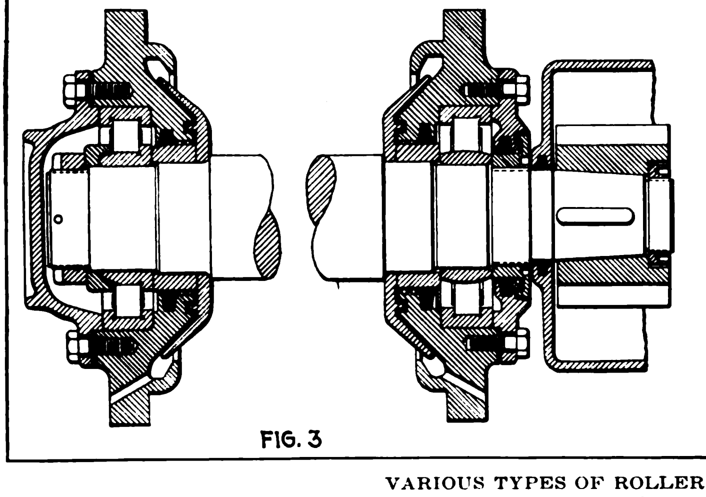


FIG. 3

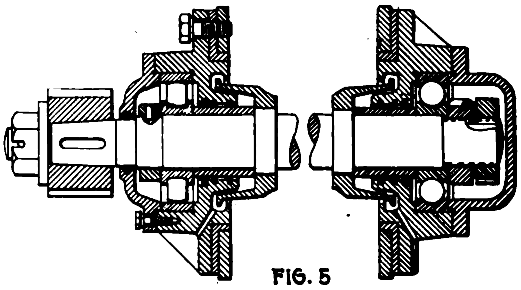


FIG. 5

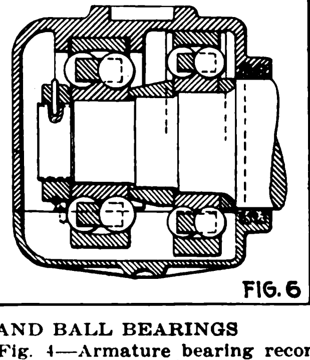


FIG. 6

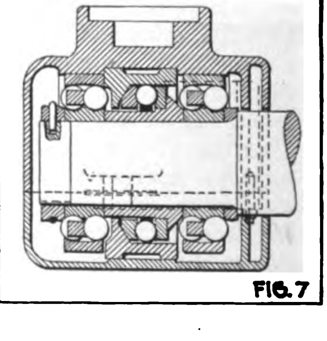


FIG. 7

VARIOUS TYPES OF ROLLER AND BALL BEARINGS

Fig. 1—Mounting of a Jaeger roller bearing as used by the Greater Berlin Street Railway.

Fig. 2—Roller bearing mounting for a split frame motor.

Fig. 3—Armature bearing mounting designed by the S.K.F. Norma Company.

Fig. 4—Armature bearing recommended by the Riebe-Werke.

Fig. 5—Armature bearing mounting with a floating barrel at the pinion end.

Fig. 6—Journal box construction used for service cars.

Fig. 7—Journal box bearing construction used for locomotives.

in Berlin have been in satisfactory operation with Jaeger roller bearings for about seven years. In the year 1921 the Greater Berlin Street Railway equipped 184 motor cars or 368 railway motors with Jaeger roller bearings, and at the time of the writer's visit, nine months later, they were giving satisfactory service.

The "Norma" bearing, which is marketed by the S.K.F. Norma, Riebe-Werke, and others, is designed with cylindrical inner (or outer) race and cylindrical rollers. The outer (or inner) ring is slightly convex in longitudinal section, so as to permit of a slight misalignment of the motor shaft. Fig. 3 shows such a bearing in a mounting, designed by the S.K.F. Norma Company, while Fig. 4 shows an armature bearing mounting, recommended by the Riebe-Werke. An important feature of the Norma roller bearing is that the rollers are guided between flanges in the ring, which has a cylindrical raceway, so as to prevent skewing and secure true rolling.

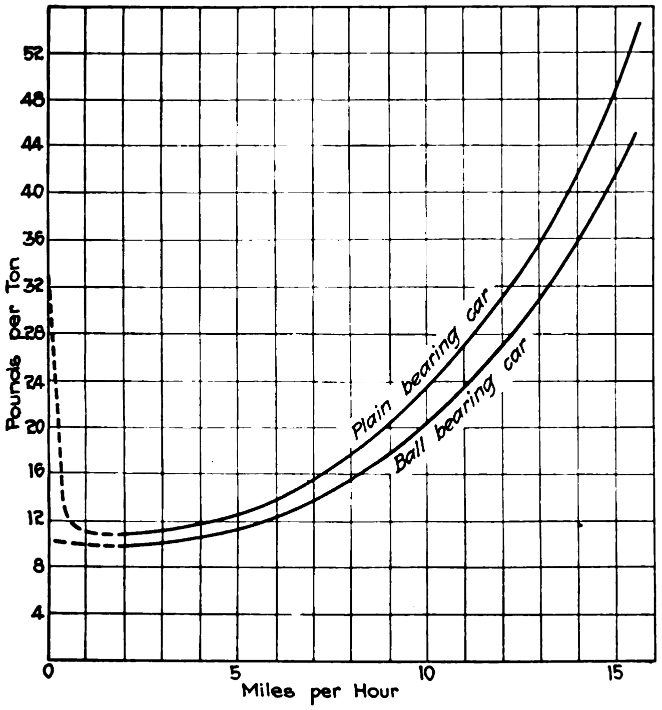


FIG. 8—GRAPHICAL RESULTS OF TESTS OF PLAIN AND BALL BEARINGS

The earlier designs of Norma roller bearings had hollow rollers running on pins, which were riveted to side rings so as to form a substantial cage, but it was found that the lubricant did not always get the proper access to the inside of the rollers, thereby causing hot bearings, and that the hollow rollers were more liable to develop hardening cracks than solid ones. For these reasons the hollow rollers have been abandoned and solid ones adopted. In the designs shown in Figs. 3 and 4 the thrust is taken up by the end surfaces of the rollers at the commutator end.

A mounting used by Kugelfabrik Fischer in Schweinfurt-am-Main, in which a floating barrel bearing is used at the pinion end, is shown in Fig. 5. At the commutator end, which has a much smaller bearing reaction, a deep groove type ball bearing takes the radial and thrust load. The bearing at the pinion end has barrel-shaped rollers, a cylindrical outer race and an inner ring with guiding flanges on both sides of the rollers and a raceway which fits the curved outline of the rollers.

With the exception of the above-mentioned company in Pawtucket, R. I., G. & J. Jaeger & Company in Elberfeld, Germany, is the only firm which to the writer's knowledge has ever attempted to apply anti-friction bearings to the axle suspension of railway motors. The bearings used by the latter firm are, of course, of the Jaeger type, and the main advantage claimed is that when anti-friction bearings are used for the axle suspension as well as on the armature shaft, the center distance of the speed reduction gear will remain constant. It is expected that the life of the pinion and gear will be considerably increased on account of this feature. In addition there are, of course, the advantages of power saving and saving in cost of lubrication and bearing maintenance. This application requires, however, either a split type bearing design or an extremely reliable bearing, because it will be necessary to remove one of the car wheels in order to replace a broken bearing of the single-piece retainer type. In view of the comparatively light load on axle bearings it appears, however, that the application can easily be made perfectly safe.

The application of ball bearings to electric car and steam-road journal boxes has been tried in Germany, Sweden and the United States. These have operated satisfactorily at low speeds and over good track. For higher speeds and with defective track the bearing breakage has become excessive due to the fact already stated that ball bearings are not capable of carrying heavy shock loads. In some cases stray electric currents have also been an additional cause of premature destruction of such bearings.

The most extensive tests of the application of ball bearings to street cars and railroad car journals have probably been carried out by the S.K.F. Company in Sweden and, due to the high grade of material and workmanship used as well as to the engineering skill exercised in the selection and mounting of these bearings, the results were comparatively encouraging. The mounting shown in Fig. 6 was used on fifty ore cars and has been in satisfactory operation for about seven years. The service has, however, been comparatively light and the maximum speed did not exceed 25 m.p.h. The yearly renewals of the bearings did not exceed 2 per cent, which may be considered a very satisfactory figure. Tests were also made by the same firm on ten passenger cars and on ten locomotives. The mounting used for the passenger cars was similar to the one shown in Fig. 6, while the one used for the locomotives was similar to the one shown in Fig. 7.

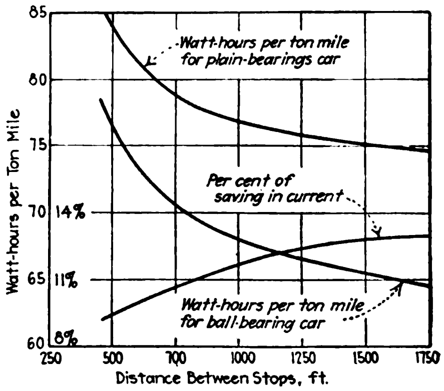
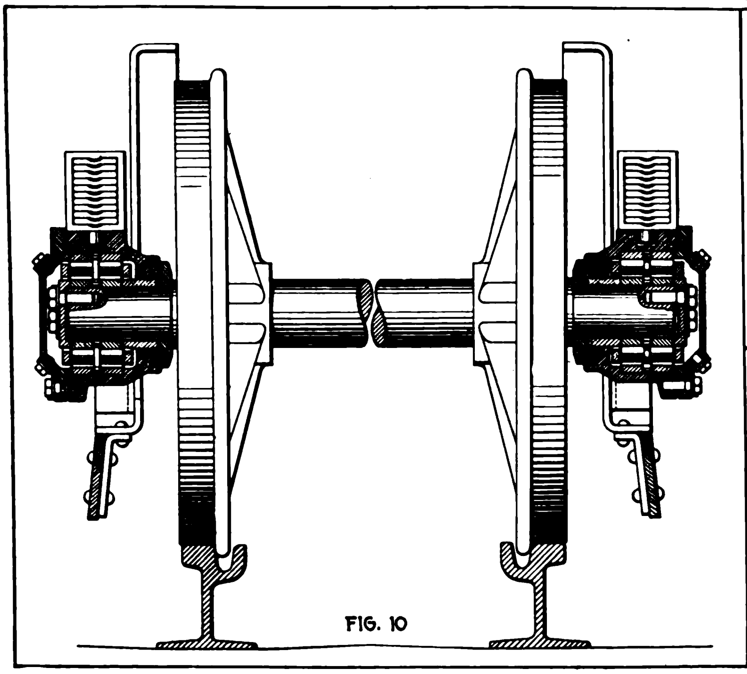
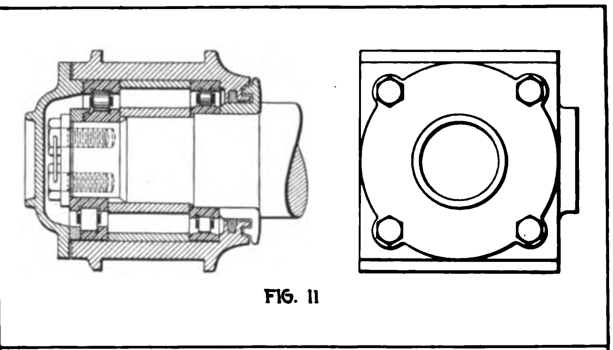


FIG. 9—POWER CONSUMPTION FOR CAR WITH BALL AND PLAIN BEARINGS

While the results were satisfactory from the point of view of operation, and fuel savings of more than 10 per cent were obtained, the annual replacements, which varied greatly from year to year, are understood to have been rather high. For the latter reason these tests have been abandoned and precision roller bearings





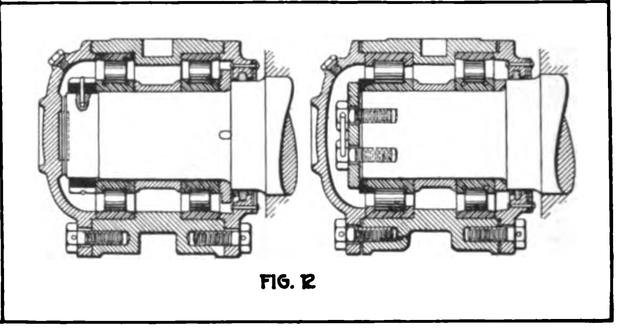


FIG. 10—ROLLER BEARING OF FLANGE TYPE APPLIED TO RAILROAD JOURNAL BEARING BOX. FIG. 11—NORMA BEARING AS APPLIED TO RAILROAD JOURNAL BOX. ALTERNATIVE DESIGNS ARE SHOWN ABOVE AND BELOW THE CENTER LINE OF THE AXLE. FIG. 12—RIEBE-WERKE DESIGN OF TWO BEARINGS MOUNTED IN A JOURNAL BOX

are at the present time being tried on the Swedish State Railways, apparently with success, though so far as the writer knows no details have been published up to the present time.

The operation of the Swedish ore trains showed that the same locomotive could pull thirty-nine loaded ball-bearing cars with greater ease than twenty-nine loaded cars with plain bearings, the fuel consumption being about the same in both cases. The theoretically possible saving in power obtainable in the express train service on the Swedish State Railways, computed on the basis of the following data, amounts to 18.4 per cent.

Distance from Stockholm to Malmö	375 miles
Schedule time for one run	11¼ hours
Number of stops	12
Starting acceleration	0.56 m.p.h.p.s.
Braking retardation	1.56 m.p.h.p.s.
Weight of total train	462 tons

The same train running as a local with sixty stops and thirteen hours schedule time would show a theoretical saving in power of about 17 per cent. The writer understands that the actual saving in fuel in express service amounted to about 13 per cent.

A number of tests of ball bearings in street car journal boxes were made by the Greater Berlin Street Railway and published by Leonard Adler in *Mitteilungen des Vereines Deutscher Strassenbahn und Kleinbahn Verwaltungen* in March, 1917, page 177. The measurements which were made on this installation are less favorable to anti-friction bearings than any other tests which have come under the writer's observation. Here are a few of the results and conclusions:

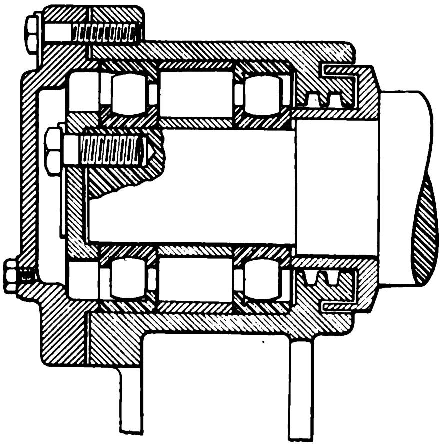


FIG. 13—FISCHER BARREL BEARING MOUNTED IN JOURNAL BOX

It was found that nearly three and one-half times greater drawbar pull (35.4 lb. per ton) was required to start a motor car with plain bearings in the axle journals than one with ball bearings (10.6 lb. per ton). In order to start a trailer with plain bearings a drawbar pull 4.15 times greater (17.3 lb. per ton) was required than when the same car was equipped with ball bearings (4.18 lb. per ton). A motor car fully loaded, weighing 18 tons, was pulled over a level track at different speeds and the corresponding required drawbar pull measured. They are graphically shown in Fig. 8. These curves show a percentage difference in favor of the anti-friction bearings of about 15 per cent up to speed of about 15 m.p.h. For higher speeds the percentage difference would, however, probably be less.

It is frequently supposed that with increasing numbers of stops the greater will be the saving in power resulting from the use of ball bearings in the journal boxes. As a matter of fact the contrary is the case; the longer the runs between stops the greater is the saving in power. The main saving in power is obtained by long stretches of coasting, it being possible to keep the power cut off a much longer time when anti-friction bearings are used. When frequent stops and starts are made a large amount of energy is used for acceleration of the moving mass, and this energy is, of course, the same regardless of the type of bearing. The percentage saving in power is therefore greater for long runs. The graphs in Fig. 9 give the power consumption for the motor car referred to above with ball and plain bearings for different lengths of run. It will be seen that the percentage power saving varies from 8.4 to 12.9 with increasing length of run.

The above data all refer to motor cars with ball bearings in the journal boxes only. If in addition the armature shafts were equipped with anti-friction bearings it is conservative to state that the above savings would be at least from 9.6 to 14.7 per cent, and if the suspension bearings were thus equipped the theoretically computed savings would at least be from 10.8 to 16.5 per cent. The actual percentage savings in power measured as averages of many runs and with different cars were as follows:

Motor car A alone	8.2 per cent saving
Motor car B alone	9.3 per cent saving
Motor car A with trailer	7.2 per cent saving
Motor car B with trailer	8.0 per cent saving
The number of stops per mile were about	6
Average running speed	8 m.p.h.
Acceleration	1.56 m.p.h.p.s.
Braking retardation	2.00 m.p.h.p.s.
Weight of loaded car	18 tons

Fig. 10 shows a Jaeger roller bearing of the flanged type applied to a railroad journal box. Such journal boxes have been installed on a number of German street car systems with success, and a number of cars of the German State Railroads are being so equipped at the present time. Fig. 11 shows the Norma bearing as applied to a railroad journal box. The design shown above the center line is particularly interesting, because it permits the pulling off of the entire housing as soon as the thrusting of the outer bearing is removed and without removing the inner rings of the bearings. About ten cars of the German State Railroads are at the present time being equipped with such bearings.

Fig. 12 shows the Riebe-Werk's design of two Norma type bearings mounted in a journal box, the general arrangement being similar to the preceding one. Fig. 13 shows the Fischer barrel bearings mounted in a railroad journal box. The bearings are both alike, one taking the thrust in one direction, the other in reverse direction.

SOME AMERICAN TEST RESULTS

The earliest experience with anti-friction bearings in electric car journal boxes in the United States must probably be credited to the Interstate Consolidated Street Railway of Pawtucket, R. I., which equipped one of its cars on the line from Pawtucket to Attleboro with roller bearings about twenty-five years ago. Bronze rollers were used, which rolled directly on the ground axles, polished cast-iron bearing sleeves forming the outer race. It is interesting to note that not only the journal boxes but the axle suspension and the armature as well were equipped with roller bearings. The test did not lead to any further use of such bearings in street car service, probably because they proved to be too short lived.

The first bearing built in the United States, which properly may be called a precision roller bearing, was designed by Julius A. Perkins about twenty years ago. Mr. Perkins was probably the first one to recognize the following fundamental conditions for the successful operation of a roller bearing: (1) Use of highest grade steel, properly heat treated and highly finished for rollers and races. (2) Greatest precision in workmanship, the rollers all being ground to the same size within very small tolerance limits. (3) The necessity of a very rigid cage, in which the rollers are positively guided so as to keep their axes permanently in parallel with the axis of the shaft, thereby securing a true rolling motion and avoiding any skewing of the rollers.

An interesting feature of the Perkins bearing is that the ends of the rollers are journaled in small ball bearings which are mounted in the cage. The load is carried by the rollers exclusively and the ball bearings are only subjected to the comparatively small loads which are required to keep the rollers in proper alignment. Fig. 14 illustrates the design of the rollers, their bearings and the cage of a Perkins bearing. The inner race is made of hardened and ground steel and forms a part of the car axle itself. The outer race is made of cast steel hardened and ground and forms a part of the housing, thereby permitting the building of the whole box so narrow that it can be made interchangeable with existing journal boxes with plain bearings, which of course is of enormous importance in order to facilitate the adoption of roller bearings for existing street or railroad cars.

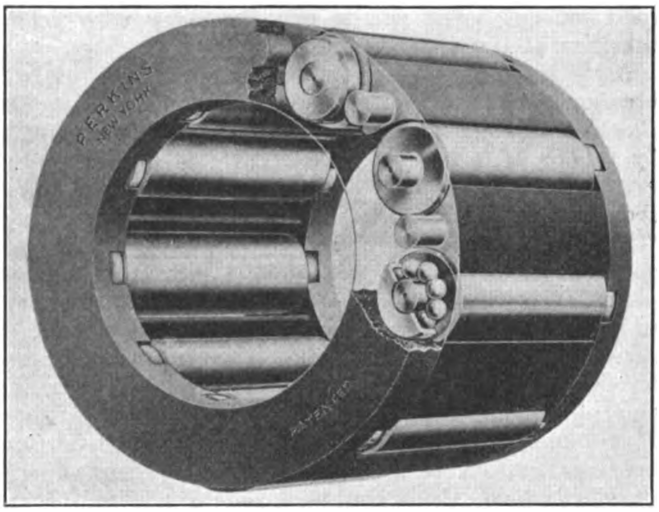


FIG. 14—PERKINS DESIGN OF ROLLER BEARINGS

Fig. 15 is a sectional drawing of a Perkins roller bearing, designed for a Birney safety car. It will be noted that double-acting ball bearings are used to carry the occurring thrust loads. Bearings of this type have been in continuous and successful operation on a number of cars of the Third Avenue Railway of New York City for over ten years.

PENNSYLVANIA RAILROAD TESTS

A most interesting test of ball bearings for railroad journal boxes was carried out by the Pennsylvania Railroad during the years 1913 to 1915. First, one 60-ton all-steel day coach was equipped with ball-bearing journal boxes and gave satisfactory service for several months. Then a complete train consisting of seven cars was so equipped and operated satisfactorily for about fifteen months, after which time the bearings began to deteriorate and were replaced by plain sleeve bearings. It is understood, however, that the railroad company became thoroughly convinced as to the great operating advantages of anti-friction bearings in rail-

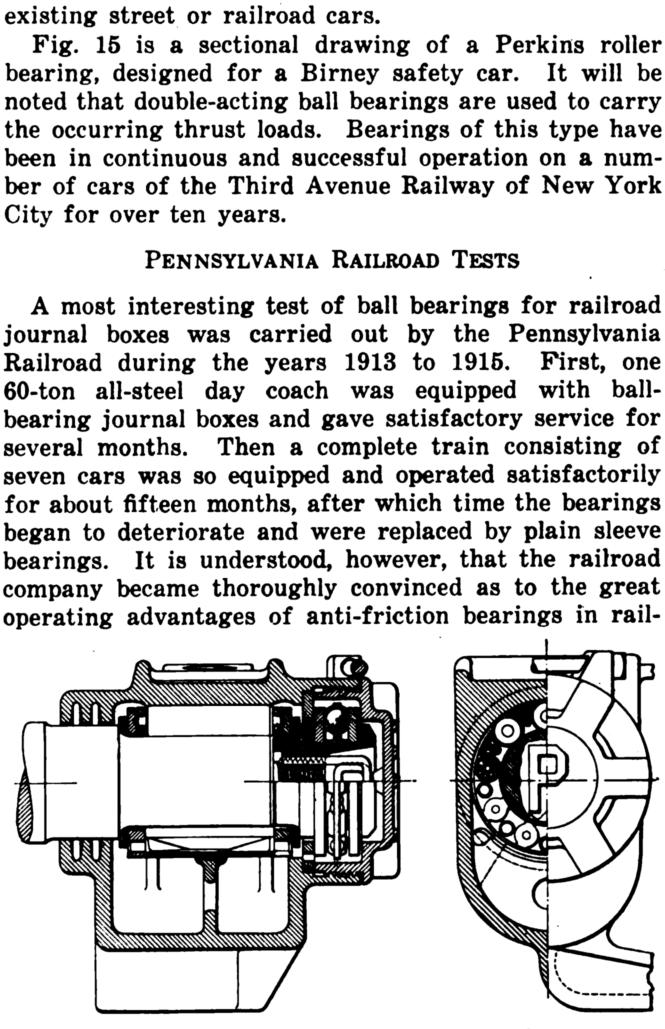


FIG. 15—SECTIONAL VIEW OF PERKINS ROLLER BEARING

road journal boxes and is experimenting with roller bearings at the present time.

A very complete report of an American test of ball bearings in railroad journal boxes was published in the *Electric Railway Journal* of Dec. 25, 1915, page 1263, by Gaylor M. Cameron. The calculated power saving in this installation was 14.9 per cent and actual tests showed a saving of 14.1 per cent.

The actual saving in dollars and cents which can be obtained by the introduction of anti-friction instead of plain bearings varies of course very largely according to the conditions of each case and can, even in specific cases, only be computed roughly on account of the many uncertain factors entering into the problem, the principal one being the life of the anti-friction bearings. If a number of cars are equipped with anti-friction bearings, experience indicates that all of them will by no means have about the same length of life. Some will have to be replaced the first year, some the second and so on. As a rule it is found that the number of necessary replacements is larger during the first two or three years and thereafter decreases. It may further be stated that an average number of replacements of more than 10 per cent is generally considered excessive and this figure may be considered the maximum which will be tolerated.

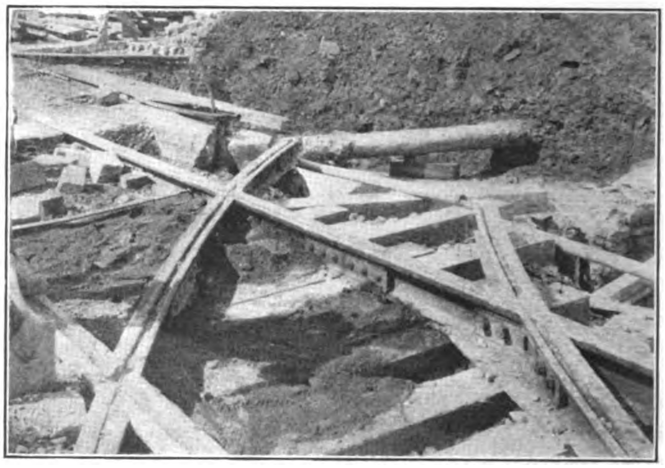
The results of tests with ball bearings on about a dozen other roads which have come under the writer's observation have corroborated that ball bearings do not, on the whole, furnish a sufficient margin of safety for this application. Recent experiences, principally in Germany, have, however, proved that modern precision roller bearings meet the requirements of railway service and the writer dares to prophesy that before very long the railroads of the United States will be equipped with anti-friction bearings to a considerable extent, not so much on account of the saving in cost of power and maintenance, but because the use of such bearings will permit hauling about one-third longer trains with the same locomotive and thus increase the carrying capacity of our railroads to a very large extent for a comparatively small investment.

Emergency Special Trackwork Made in Short Time

By L. R. Brown
Office and Field Engineer New York State Railways, Rochester Lines

RECENT construction work in the city of Rochester demanded that the New York State Railways construct a complete double-track branch-off in less than one week's time in order to maintain car service on three car lines of the city. This branch-off was needed in connection with detour tracks to carry service around a bridge in Main Street which was to be removed. Often in similar cases some old second-hand special trackwork or some new special trackwork held in stock for some other location can be used temporarily for such a purpose, but in this case there was nothing on hand except some second-hand switches and mates. Thus the only thing we could do without holding up the work was to construct the six additional frogs.

A plan was made by the engineering department to a very large scale. For convenience the design was made exactly like another layout in stock which was to be used shortly. The second-hand switches and mates were of the proper radius for use with this layout.



THERE IS GOOD JOINERY ON THIS EMERGENCY JOB

The plans and information were given to Louis Kubiak, the special trackwork foreman, who has charge of the blacksmith repair shop, and he made the required six frogs in four days. To do this he had the six new frogs brought in and bolted up in the shop for a pattern. Guard rails were bent to the proper radius for the curved portion and straight guard rails cut and fitted to form the proper devil strip. Splice bars were bent and used to bolt the rail together as shown in an accompanying illustration. Large ½-in. steel plates were placed under each frog point and the bases of the rails were electrically welded to these plates when the whole was in proper alignment. The grooves across the head of the curved rail was then ground out to permit the passage of the flanges on the straight track and the bottom of the grooves on both the straight and curved rail was filled in with manganese weld to provide flange bearing over the frog points. The frogs were then cut apart to facilitate handling and the job was all completed in less than one week.

The alignment was nearly perfect, and there have been no derailments on the branch-off up to the present time. The illustrations show the appearance of this work. The cost of the six frogs was less than one new manufacturer's frog and the time of delivery shorter by the same ratio. This branch-off will probably not see six months service, but we have had similar home made frogs in use over five years.

H. A. Abell, engineer of way and structures, Rochester lines, New York State Railways, was in charge of this work.

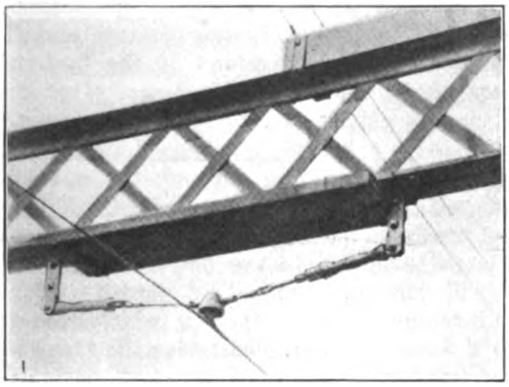
DOUBLE-TRACK BRANCH-OFF CONSTRUCTED WITHIN WEEK IN ROCHESTER, N. Y.

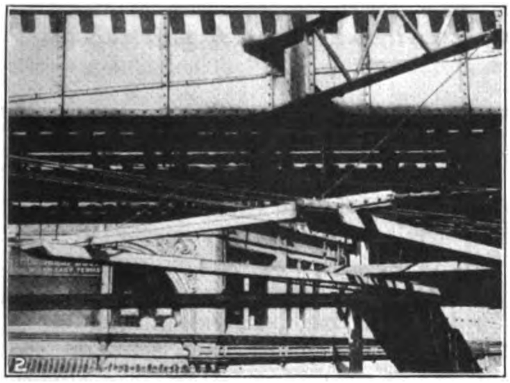
Some Practical Experience with Troughwork Construction

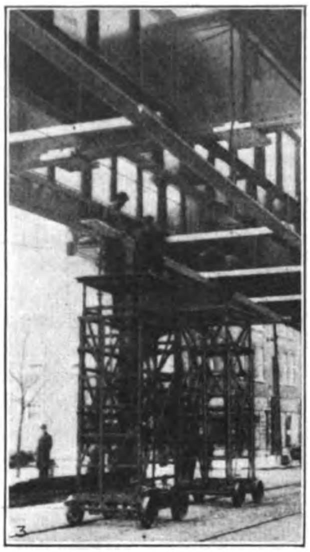
The Protecting of Metal Construction so as to Safeguard the Trolley Wire and Connections from Being Grounded Often Becomes a Serious Problem for the Line Engineer

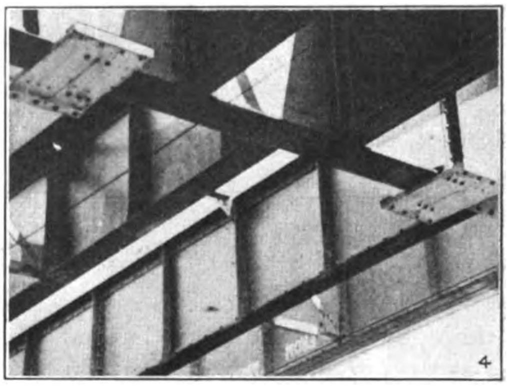
By G. H. McKelway
Engineer of Distribution Brooklyn (N. Y.) Rapid Transit Company

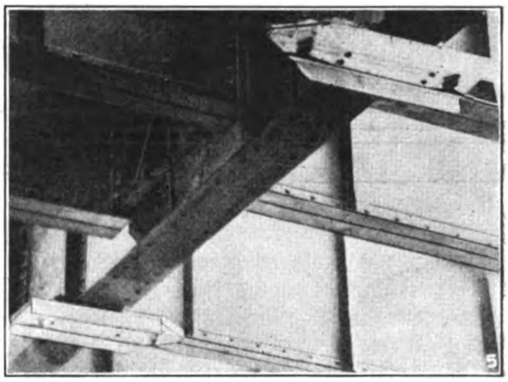
SOME form of sheathing or trough construction is quite necessary at locations where there is metal work through which the trolley wire could be short-circuited by a wild trolley pole. Such accidents occur most frequently at bridges and elevated structures and in carhouses. The positions that a trolley pole can assume and the points that it can reach are frequently quite unbelievable. A straight pole will ground to metal work within a considerable radius and a bent pole will reach almost impossible positions. The second pole of a two-pole car is another fruitful source of trouble, as this pole is sometimes raised either by accident or design while the other pole is still on the trolley wire. Exposed metal is not the only kind of construction that requires protection, as severe grounds have occurred when live trolley poles came in contact with reinforced concrete. The reinforcing rods often form very good conductors, even though they are covered with a layer of concrete.











PROTECTIVE COVERINGS FOR OVERHEAD WORK
No. 1. Wooden sheathing under girder.
No. 2. Long trough construction.
No. 3. Putting up long troughs in place of flashboards.
No. 4. Flashboard construction.
No. 5. Short troughs.

Where the metal pieces to be protected are few usually the best plan will be to sheath them with wood. This construction not only provides the greatest protection, but also is as cheap as or cheaper than a type of construction employing troughwork. When installing this sheathing care should be used to make certain that the straps used to bind the sheathing to the metal work do not touch the grounded metal. Otherwise it is quite evident that a dangerous condition will still exist, for there is a possibility of the pole striking the straps and causing a ground through them.

Where the metal to be protected is quite extensive, it will be best to use troughwork or some similar form of construction. The form adopted will be influenced to a large extent by the height of the trolley wire and the height and arrangement of the metal work. With low iron work requiring the carrying of a trolley wire at a low level and where the metal work is practically continuous, as with girders parallel to the trolley wire, or where there is a bridge floor above the wire, long troughwork should be used.

The long trough construction usually consists of one or two bottom boards with wooden sidings extending down each side of the bottom. The number, width and thickness of the bottom boards will vary with different railways. The thickness usually runs from 1 to 2 in., but a single 1-in. board will usually be found pretty thin, especially where the trough is installed in locations subject to the weather or where the distance between supports is quite long. If it is installed in carhouses, the distance between supports can be lengthened over that used outside. For outside work, the thickness should be at least 1½ in. and preferably 2 in. The width of the bottom trough should be sufficient to permit installation of the ears without the necessity for removing the siding. Some companies get along with a comparatively narrow bottom board by using short ears 9 or 10 in. in length. This enables a single board to be used of not more than 12 in. in width. Where the ordinary 15-in. ear is used the board will have to be at least 16 in. wide. Single boards of that width are quite expensive and this has led to the use of two narrower boards. When two boards are used their total width should be greater than that necessary with a single board, as the hangers should be placed slightly off center, so that any water which may leak through the cracks between the boards will not cause grounds. Water carries dust and dirt from the top of the trough and hangers of high insulating quality are an advantage.

LONG LEAF YELLOW PINE FAVORED

The kind of wood to be used is another variable, but long leaf yellow pine appears to be better than most other varieties. Oak is sometimes used, but it is not only more expensive but does not seem to weather as well as pine and warps more easily. The length of the pieces will be influenced by the price and the ease with which they can be handled. Twelve feet is a good minimum, and a better length is 16 ft. Boards longer than that will be found too costly.

The sidings should be of the same kind of wood and approximately of the same length as the bottom boards, but need not be as thick. One inch is a good thickness for the side boards. The width of the siding should be such that its bottom edge will extend down to a point slightly below the bottom of the trolley wire, otherwise there will be danger of the pole grounding on some vertical column or a low horizontal beam.

In nailing the siding to the bottom board it is best to use copper clad nails, as trouble has been experienced in some cases from the rusting of nails at points where the crack between the bottom board and the siding allowed water to run down on them.

Where the ends of the trough are left square and without protection they soon become battered out of shape by the striking of wild poles against the end grain of the wood. A satisfactory type of construction is to cut the ends back so as to form a V. With this construction the poles that hit on either side of the center of the V glance off. To prevent damage from poles striking fairly on the point, the ends should be guarded by the use of angle irons bent as shown in one of the accompanying illustrations. The use of two pieces of angle iron fastened to the end, one on each side of the point, is not a satisfactory construction, as there is a chance of the pole striking just where the two pieces of iron meet, which would force them apart. The leaving ends of the trough are not armored ordinarily where installation is on a double-track line, but the ends should be reinforced with strips of wood running across the ends of the bottom boards. The ends of the sidings are not usually strengthened, but it is well to cut them back as shown in the accompanying illustration. This prevents a glancing pole from catching between the bottom and the siding so as to pry them apart.

Where the trough is supported from transverse girders crossing just above it and with no clearance between them, it may be attached to the girders by buttons. These buttons are made of oak notched out so as to fit over the flange of the girder. Two of them are used at each girder, one on each side, the trough being bolted to the buttons which rest on top of it. In locations where the girders are too far above the line of the trough to permit fastening with buttons or where intermediate supports are needed between girders, a satisfactory type of construction is to fasten the trough directly to the blocks or crossbeams, which are in turn supported by iron hangers attached to the structure above. At one time it was common practice where the trough was suspended from longitudinal girders to place beams on the lower flanges of these girders and suspend the hanger irons from them. With this type of construction it was found that a wild pole would sometimes strike these crossbeams and knock them out of place, so that the trough would sag. This can be prevented by having the hangers themselves clamp the flanges of the steel. Where there are two tracks it is best to join the troughs by the wooden beams, as this provides a stiffer construction than with the troughs hung separately. Where the hangers are very long still more stiffness can be obtained by having braces which run down to the center of the beams, turnbuckles being cut into these braces for tightening.

For connecting the various sections of the bottom board splices are used. These usually consist of short pieces of wood, but sometimes iron plates are an advantage. These plates are bolted onto the top of the trough, half of the bolts passing through the end of one board and half through the next. In installing these bolts they are installed from underneath and are pushed up through the holes in the bottom board, so that the nuts will come on top. This permits their being tightened readily with a wrench, which would not be possible if they were installed under the trough. While the iron plates make a neater and perhaps stronger splice than wood, yet there is the objection that they may be made alive by trolley wheels touching both the wire and one of the bolts at the same time.

SHORT TROUGH CONSTRUCTION

The construction used for making short troughs is the same as that for the long, but instead of being continuous for long distances and extending all the way from one cross girder to the next they are usually but 5 or 6 ft. in length and give protection only to the cross girders to which they are buttoned. The trolley wire hangs free between the short troughs and thus the troughs make a succession of hard spots in the line which is flexible between them. The short trough construction thus is not as satisfactory as that of the long trough, but it is much cheaper.

Where the girders are all high above the level of the trolley wire it can be supported from spans in the usual manner, and the girders can then be protected by flashboards buttoned on to their lower flanges. These flashboards are merely forms of wooden protection about as long as a short trough. They are usually made of three boards placed side by side so as to give the required width, the boards being held together by wooden crosscleats at the ends.

As a protection against the weather the trough should be painted and two coats of paint should be applied, one of these before the various pieces are assembled. This will permit all sides of every piece to receive a coat of paint, and after the trough has been erected a final coat should be given. To make sure that all of the lumber receives both coats of paint it is well to use paint of different colors for the two coats. A satisfactory method is to use white lead for the first coat and a color that will harmonize for the second.

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

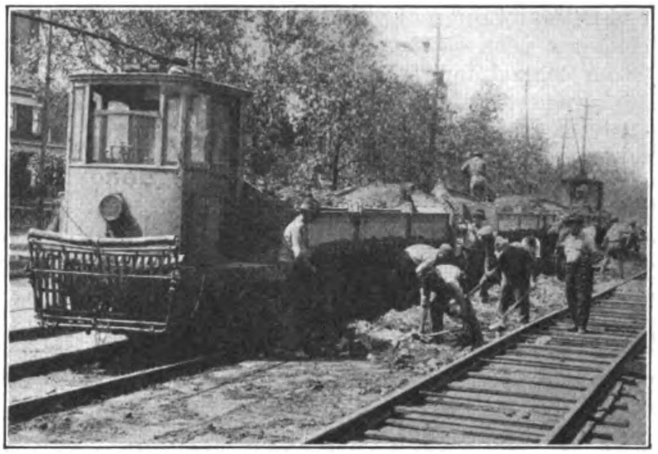
Use of Dump Cars in Cleveland, Toledo and Pittsburgh

Double-End Control of Three-Car Trains Is Provided by Having a Single-Cab Four-Motor Car at Each End with a Trailer in the Middle

THE electric railway has a greater variety of repair work to do than any other public utility, and in most cases this must be carried on with a minimum of interruptions to the regular service. Consequently all available means are utilized to get the required results without subjecting passengers to annoying delays in reaching their destinations, or causing other delays in service.

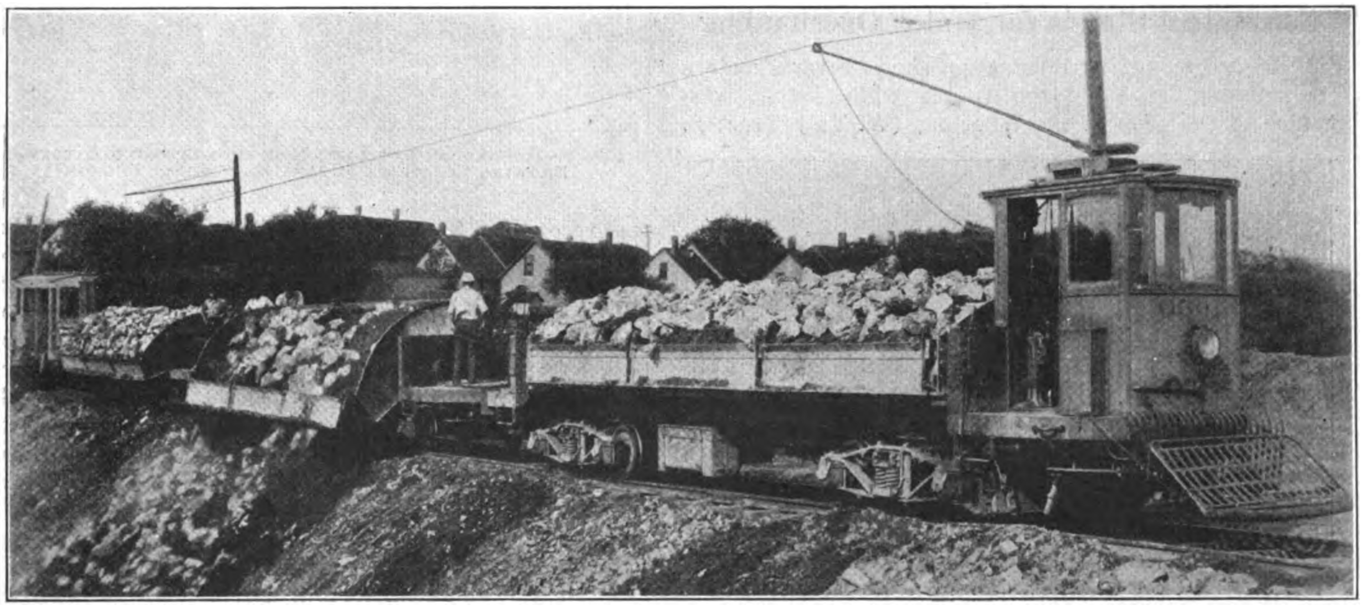
To assist in making rapid repairs a large number of railways have been adding to their repair equipment dump cars having several new design features that have advantages in reducing the number of delays in traffic, where repair work is in progress. Generally, most of the delays are a result of a carload of sand, gravel, or other repair material along the right-of-way, being unloaded by hand where no side track is available, which of course results in a tie up.

Accompanying illustrations show some of the uses which the Cleveland Railways is finding for Differential dump cars. Some recent equipments were put into service about the first of September and have been operating with entire success. This company has been using such cars for years, both for repair work and extensions on its lines. Originally the company used the cars in trains consisting of one four-motor equipment, with Westinghouse Type HL multiple-unit control, and two trailers, each with two motors. This gave them a train with a cab and master controller on one end only. Later it was found that at less expense the company could secure smoother operation and double-end control by putting a single-cab, four-motor equipment at each end and a trailer with no motors in the middle. Bus line connections between the two end cars permitted the train to be operated from either master controller in different directions, power being furnished through either or both trolleys. At the present time the Cleveland Railways has eight dump cars with quadruple equipments of Westinghouse Nos. 340 and 532-A motors and HL control and seven trailers.



Picking up a Load While Tracks Are Being Reconstructed

A train of this kind can easily be run in between cars operating on a five-minute headway, drop all or any part of its load where desired, and move on out



Side Dump Is of Advantage for Filling in of the way before the following car can catch up with it. Another use the company has made of its trains is for hauling ties. By dropping down or removing the car sides and piling the ties in crosswise, as is done on a flat car, a very satisfactory method of transportation is obtained. To be sure ties are not as easily dumped as gravel, but if the whole load is to be dropped at one place, the body can be tilted and most of the ties will slide clear of the car. The others can be handled very easily from this position as one end is already down near the ground.

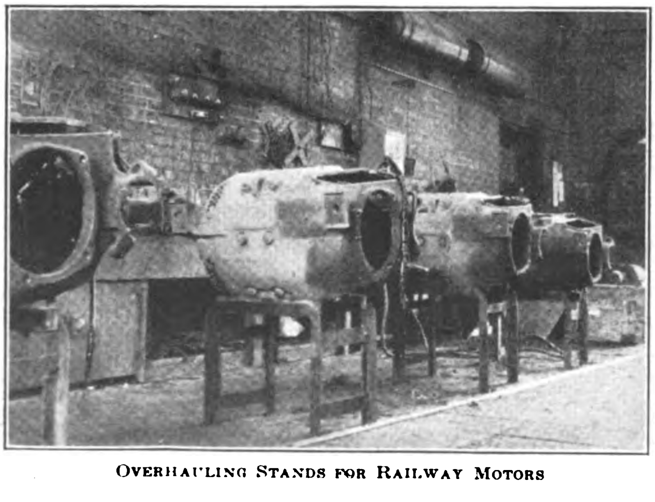
In the winter some of the motor cars are converted into snow plows by the addition of a plow and side boards, and serve to keep the snow over near the curb. It is a common sight on some of Cleveland's main streets, after a heavy snow storm, to see so many automobiles using the railway tracks, which have been well cleared of snow, that the street cars are nearly crowded out.

The Pittsburgh Railways has lately added two double-end Differential type cars to its rolling stock. These are equipped with quadruple equipments of Westinghouse 532-A control and "K" controllers and are mounted on 26-in. wheels. This company has a great quantity of contract work to carry on besides its regular repair work, and it finds this type of car very useful in moving slag and ore or even for carrying away rubbish. Two Differentials are used continually in disposing of ashes from the boilers at the plants of the Duquesne Light Company.

The Community Traction Company of Toledo, Ohio, is another that has recently acquired some "dump" trains for track repair and general hauling. The equipment consists of a three-car train of one motor car and two trailers. The motor car is equipped with four Westinghouse 548-C motors and HL control. The total motor capacity is 400 hp., but the car has been geared so that when loaded to a total weight of approximately 100,000 lb. it will operate and exert the same tractive effort as a 50-ton locomotive. In this manner it is capable of handling six or seven loaded cars in addition to the three cars in the regular train. The Community Traction Company uses the cars for switching around the yards, in addition to the regular track repair and dump service.

Convenient Stands for Motor Overhauling

THE accompanying illustration shows several motors mounted on angle-iron stands while being overhauled in the shop of the Wheeling (W. Va.) Traction Company. These stands are made of 1½-in. x 1½-in. angle irons bent to a U shape and fastened together by 2-in. x ¼-in. iron straps at each end. In order to provide additional support for the motors, the angle part at the top is filled in with wooden blocks. These are cut out to give clearance for projections on the motor frame, and their use is also of added advantage, as it is found that the motor frames are less liable to slip on the wood surface. By the use of these stands the motors are brought to a convenient height for overhauling, so that the work can be done more rapidly and efficiently.



OVERHAULING STANDS FOR RAILWAY MOTORS

Quick Installation of Noiseless Crossings in Cleveland

Old Intersections Were Cut Out and New Ones Put in Place and Connected up in Each Case Between 2 a.m. and Daylight—Near-by Residents Much Pleased with the Result

THE Cleveland Railway has been receiving favorable comment from residents and storekeepers in two neighborhoods where Balkwill articulated crossings were installed recently at street intersections. These intersections were East 105th Street and Euclid Avenue, and Harvard Avenue, S.E., and Broadway. It was recognized by the railway company that while the noise caused by electric railway cars passing over intersections cannot be eliminated in many cases it can be reduced. The difficulty is greatest where the crossing angle is practically 90 deg. The articulated crossings have overcome the difficulty at these two points, where the crossings are both double track. The work in each case was done between 2 a.m. and daylight, the old crossing being cut out by means of acetylene torches. It was done under direction of C. H. Clark, engineer of maintenance of way Cleveland Railway.

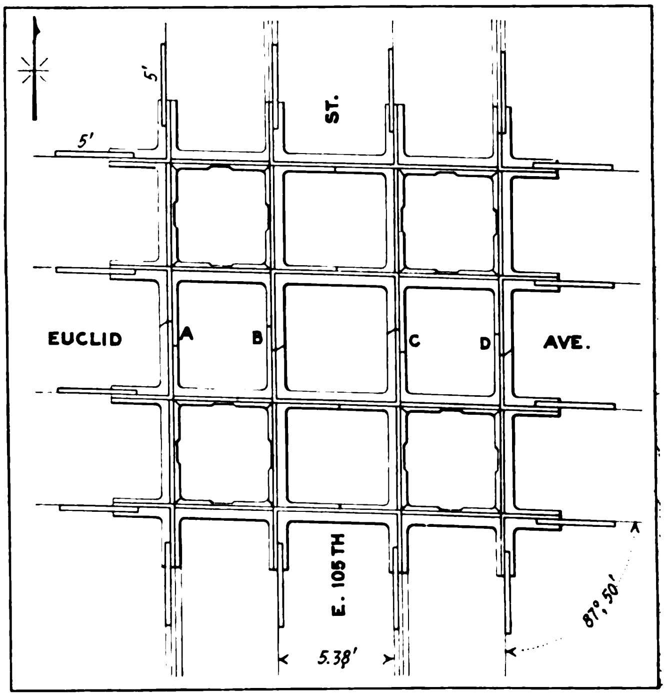


FIG. 1—DETAILS OF CLEVELAND NOISELESS CROSSING LAYOUT, SHOWING LOCATIONS OF DEVILSTRIP SCARF JOINTS

The Balkwill articulated crossing, of which noiselessness is but one feature, is appropriately named because it is made up of a number of castings bolted together to form a rigid structure. The pieces are manganese

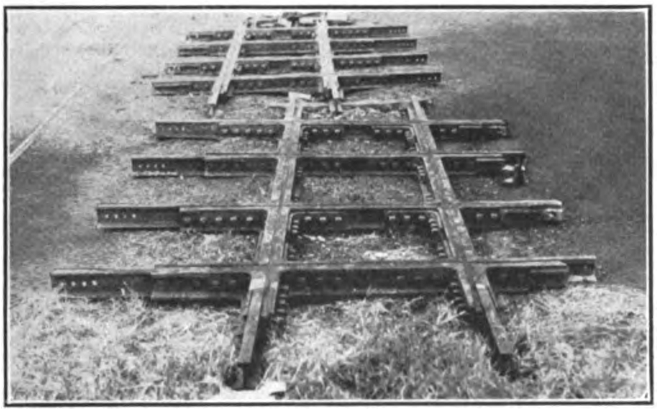
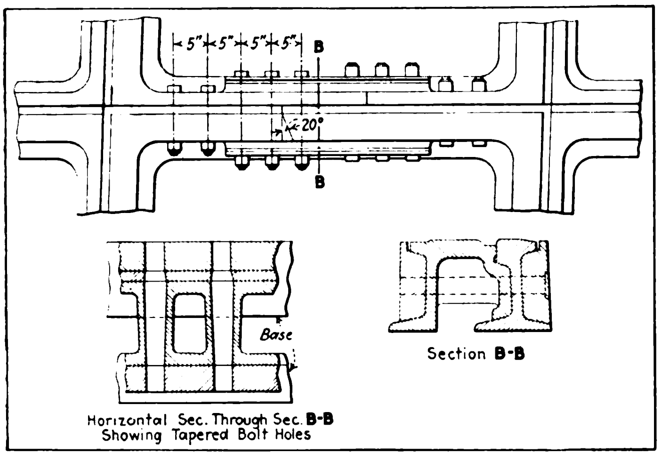


FIG. 2—CLEVELAND NOISELESS CROSSING IN TWO PIECES READY FOR INSTALLATION

steel castings and they are assembled with 1¼-in. bolts in the Cleveland job, with castellated cube nuts, spring nut locks and cotter pins. The make-up of the Cleveland crossing is as shown in Fig. 1. It is composed of four single crossings of the sixty-four-bolt type, there being ten bolts in each outside angle and three in each inside one. Fig. 1, examined in connection with the reproduced picture of the crossing in halves, shows not only the method of assembly but also the cuts made to facilitate handling. These cuts are designated "A, B, C, and D," and through the tread they are made at an angle of 20 deg. to minimize their effect on wearing quality. The four cuts shown are the only ones intersecting the tread. Fig. 2 gives details of joints A, B, C and D.

The Balkwill construction is designed primarily to provide a crossing of great durability, with elimination of possibility of breakage in the flangeway. The crossing is the flange-bearing type, the groove being but ⅜ in. deep through the intersection when new. The flangeway floor begins to rise at 15 in. to 20 in. from the intersection, gradually approaching the crest as mentioned. Thus the car wheels go through the special trackwork with wheel treads clear of the rail tread.

The Cleveland crossings were made by William Wharton, Jr., & Company, Inc., one of the score or more of special trackwork manufacturers licensed under the patents of Stephen Balkwill of Cleveland. Mr. Balkwill's crossing inventions were described and illustrated in issues of this paper for Jan. 26, 1918, page 192, and July 6, 1918, page 19, where more detail of purpose and design will be found.

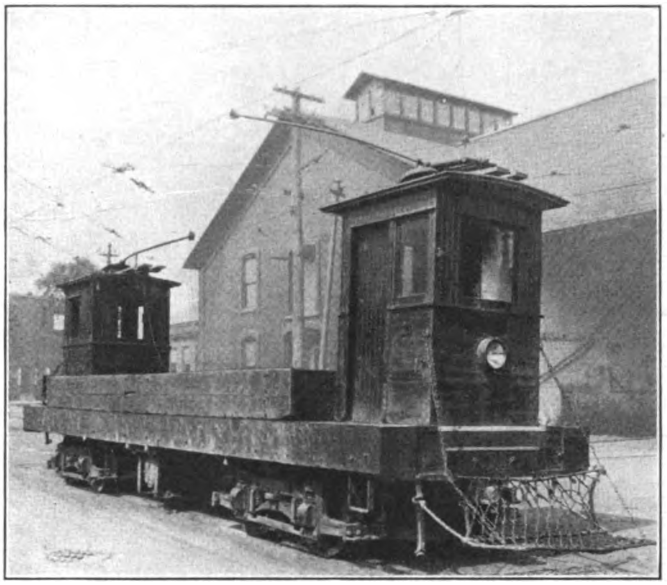


DETAILS OF DEVILSTRIP SCARF JOINT IN CLEVELAND NOISELESS CROSSING

Service Car Constructed from Old Passenger Car

THE Trenton & Mercer County Traction Company has recently built in its shops a service car of the type shown in the accompanying illustration using the underframe of an old passenger car. The sides of the underframe, which were originally 8 in. wide, were reinforced with steel plates ½ in. x 12 in. The steel plate thus projected 4 in. above the wooden sills. These were tied together at the ends and in the middle with steel plates 1 in. x 4 in., and cross-members were also installed of the same dimensions. A false floor was then laid over this of 1½ in. flooring and this was covered with ⅛ in. sheet steel. An operating cab 5 ft. square was constructed at either end, and equipment was installed for double-end operation. Air brakes were added.

Removable sides were constructed for carrying ballast, rail and light material. These sides are constructed in two sections, with three stakes to a section. The stakes set in pockets in the floor of the car and the sides are 18 in. high. The car is 30 ft. long and 8 ft. wide and has a capacity of 20 tons of ballast.



SERVICE CAR BUILT IN TRENTON SHOP

This is the second car of this class which has been constructed in the shops of the Trenton & Mercer County Traction Company, and provision has been made to use these for snow removal during the winter season. Snow noses 58 in. deep have been constructed of planks 10 in. wide x 2½ in. thick and with a ⅛ in. steel plate on the outside. These have a steel nose at the point and are held together by two braces at the back made of 1-in. x 5-in. iron. A hood made of ⅞-in. wood tongued and grooved covers the top of the nose.

For fastening this nose in position on the ends of the car two T-rails are used. These extend 12 in. above the floor of the car and down to within 9 in. of the rail. The cross-braces of the noses have two cleats with a lip which fits over the bottom part of the rail. Thus the snow noses will slide up and down with the rail as a guide. A 6-in. x 12-in. brake cylinder has been installed on each end of the car for raising the snow noses. Air is admitted to this cylinder through a brake valve installed in the cab. When the snow nose has been raised to its proper position, it is held by chains, the upper part of the rails being slotted so that a link of the chain will just fit in the slot. The lower ends of the chains have hooks, which are hooked about the bottom braces of the snow nose on the inside. A similar equipment is provided for each end of the car.

Short Versus Long Contact Tips for Brush-Holders

By J. S. Dean
Renewal Parts Engineer,
Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

A FAMILIAR type of contact tip used on the brush-holders of a large number of the older type of railway motors is shown on the left-hand finger of the brush-holder in the accompanying illustration. These are made of either a copper drop forging or machined from a strip of extruded brass metal. As it is the common practice to use carbon brushes in railway service without pig tails or shunts, the question of the wearing action of this tip on the top of the unprotected carbon has often been raised by operators, and it seems to be the general consensus of opinion that it is good practice to make the ears on these tips as long as practicable to increase the contact area, the idea being that this will minimize the wear on top of the carbon at this point.

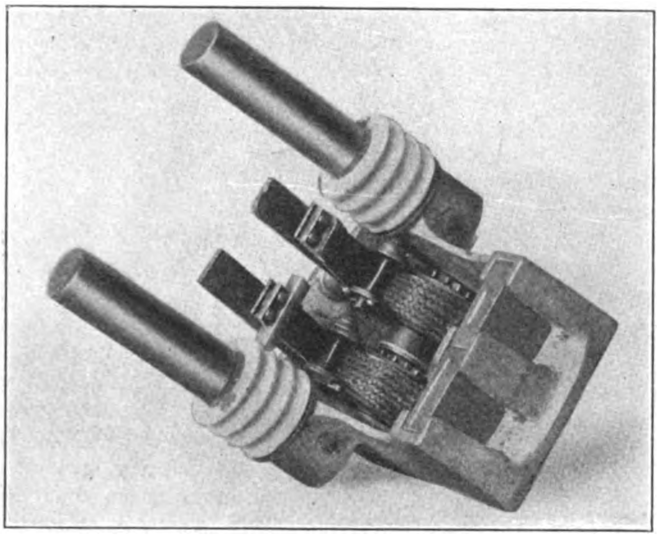


Exhibit Showing Wear of Carbon Brushes with Standard Tip on Left and Tip with Ears Sawed Off on Right

It has been noted that in the operation of brush-holders with these long ears on the contact tips there is a possible chance, after parts of the moving mechanism become worn in service, of a faulty operation of the brush-holder, resulting in a reduction of spring pressure on top of the carbon due to the following reasons:

1. Ears on contact tips riding on top of carbon box.
2. Ears on contact tips riding on top of both carbons; in the case of brush-holders using more than one carbon in the same box.
3. Tendency for the ears on contact tips to jam against the inside of the carbon box as the brush wears down in service.

In addition to the tendency to lose the effective spring pressure, there is always a large percentage of carbons that have the tops broken out due to this type of contact tip.

To secure some information on this subject, a sample brush-holder using two carbons was made up with the tip on the left-hand finger standard, and the tip on the right-hand finger having the ears cut off flush with the sides of the finger, as shown in the picture. The construction of all other parts of the brush-holder pressure fingers was in every other respect identical. With the spring pressure on both fingers of this brush-holder set at approximately 6 lb. and fitted with two new carbons of the same grade, it was mounted in a motor operating in regular service, and after about three months of continuous service it was removed with its carbons and photographed as shown in the illustration. Measurements taken on both test carbons showed practically the same wearing depth on top of carbons and the same end wear.

A second test was made with a similar brush-holder on a different type of motor and the results obtained were the same as outlined above, which indicates that the extensions or ears on the contact tips do not reduce the wear on the top of carbons.

In view of the above findings, the following reasons might be advanced as a possible explanation of results obtained:

1. The wear on the top of the carbon may be due largely to burning action rather than mechanical wear.
2. The long tip is subject to more vibration with more arcing, hence more total wear.
3. The shorter tip has more direct pressure, thus less vibration and less total wear.
4. The shorter tip has greater pressure per unit, hence less arcing and total wear.

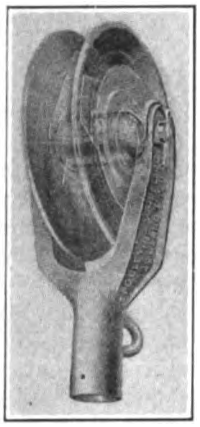
Severe Service Test for Welded Drawbridge Axle

IN THE AUG. 7, 1920, issue of *Electric Railway Journal* a description was given of the making of a thermit weld on a 6-in. diameter pinion shaft used for turning a large drawbridge in North Chelsea, Mass. Cars of the Eastern Massachusetts Street Railway are operated across this bridge and any long delay would mean a serious suspension of operation.

The accompanying illustration shows this shaft, which has broken again after two and one-half years service. The break, however, was at a location considerably outside the previous weld which is shown in the illustration. An idea of the service test to which the weld has been subjected may be gained from the fact that the starting torque transmitted through this pinion shaft is 520,000 lb.

Shaft Broken Outside of Previous Weld

What's New from the Manufacturers



Side Bearing Trolley Wheel

THE accompanying illustration shows a new type of trolley wheel, which is being marketed by the Thornton Trolley Wheel Company, Inc., Ashland, Ky. Among the new features incorporated are side bearings and a grease lubricating system which is designed for service over an extended period without attention. A large contact spring is provided on either side of the wheel for conducting the current, and a large grease reservoir with a hole for filling forms the outside portion.

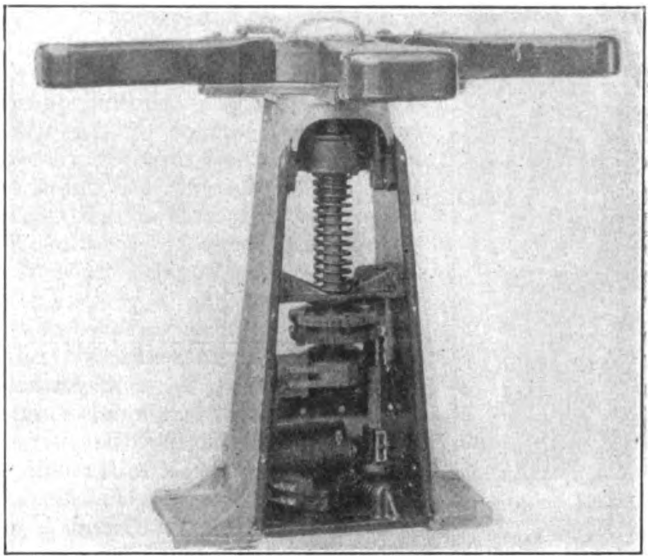
New York Subway Turnstile on the Market

ONE of the features of the General Electric Company's exhibit at the recent American Electric Railway Association convention at Chicago was the new electrically operated turnstile developed for the Interborough Rapid Transit Company of New York City. The General Electric Company is now marketing this turnstile and 430 are being installed in the New York subway.

The complete equipment consists of two elements, the turnstile and the fare box. The latter is mounted near the guide rail to the right of the turnstile and contains electrical contacts, which, when closed by the dropping of the passenger's nickel, permit the turning of the stile enough to admit one person only and lock it in the reverse direction. The stile is, however, designed for free operation in the other direction, so as to permit the free egress of passengers.

On the shaft of the turnstile is mounted a double ratchet wheel with two pawls and below it a cylinder carrying four contact-making plates 90 deg. apart. One of the pawls controls the operation of the stile in the entrance, and the other in the exit direction. The pawls are mounted on a short common shaft, to which is attached the armature of a magnet coil supplied with current from contacts in the fare box.

When the stile is ready for operation one of the contact plates on the cylinder is under the fingers that complete the circuit to the relay coil of the fare box. The pawl which holds the stile from turning in the entrance direction is engaged with its ratchet, the other is free. When a nickel is dropped in the fare box it lands between two contacts, completing the circuit to the relay coil. The energizing of the relay completes the circuit of the magnet coil and its armature turns the shaft carrying the pawls enough to disengage the entrance direction pawl, leaving the stile free to operate in that direction when pushed by the incoming passenger, and to engage the exit pawl, locking the stile in that direction. When the stile has been rotated through 90 deg. by the incoming passenger the relay circuit is broken by the moving of the current carrying plates from under the fingers, the magnet armature is released and the pawls return to their original positions. The relay coil in the fare box actuates a small lever that knocks the nickel away from between the contacts into the chute to the receiving box, thus breaking the contact in the box. Should a dime or a cent be dropped in the fare box by mistake, their smaller diameter permits them to drop free between the contacts into a chute that returns them to the passenger. A centering cam is located on the turnstile shaft which returns the cross arm to its normal off position, no matter what position it is left in. Stop pawls are provided which stop the cross arm momentarily every 90 deg., thus preventing the arm from spinning.



NEW YORK SUBWAY TURNSTILE

A special feature of the fare box is the provision for exposing slugs or foreign coins. Each nickel as it is dropped in the fare box is held before a magnifying lens, strongly lighted, which gives an illuminated image about twice the size of the nickel. The coin remains in that position until the next one is dropped. The enlarged coin is thus visible to a distance of 20 ft. and can be readily detected by the platform attendant.

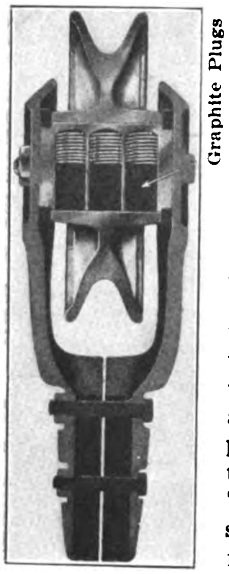
New Air Brush for Paint Spraying

NEW PAINT-SPRAYING BRUSH

THE accompanying illustration shows a form of air brush for paint spraying which is being marketed by the Dayton Air Brush Company, Dayton, Ohio. It is constructed of aluminum and brass and weighs 21 oz. In size it is 6½ in. x 11¼ in. The brush, together with air hose, coupling, nozzle and aluminum container, constitutes the equipment necessary for connecting to the air line. Among the advantages claimed for this new brush is that it will handle material varying in weight from the lighest disinfectant to the heaviest lead and oil paints, without special preparation. It is self-cleaning and requires but a few seconds to change from one color to another.

Graphite Lubricated Trolley Wheel

A TROLLEY wheel and harp of new construction is now being marketed by the Dayton Manufacturing Company, Dayton, Ohio, under the trade name of the "Feist" self-lubricating trolley wheel. The bearing or axle of this wheel is made of a special grade of axle steel and is case hardened and ground. This enables worn wheels to be replaced with new ones on the same bearing.



SELF-LUBRICATING TROLLEY WHEEL AND HARP

Three spring-compressed plugs of hard graphite are inserted in the bearing which keep the interior convex bearing surface of the wheel lubricated. The three bores or chambers containing the lubricant are preferably located at that side of the bearing opposite to the side where the wheel engages the trolley wire, thus avoiding a reduction in area of the bearing surfaces at the points where these surfaces receive the pressure from the trolley wheel. This provides a maximum contact surface for conducting the current from the trolley wheel to the axle.

The "Feist" trolley wheel harp is made of malleable iron, and is of split design, as shown in the accompanying illustration. At points where nuts or bolt heads project, protection is afforded by ribs formed on the outer sides. These serve to deflect the trolley wire past the bolt heads or nuts, should the trolley leave the wire.

New Lubricating Feature for Trolley Retriever

THE TROLLEY SUPPLY CO.
PATENTED
MASSILLON, Ohio. U.S.A.

SPECIAL LUBRICATING FEATURE FOR TROLLEY RETRIEVER

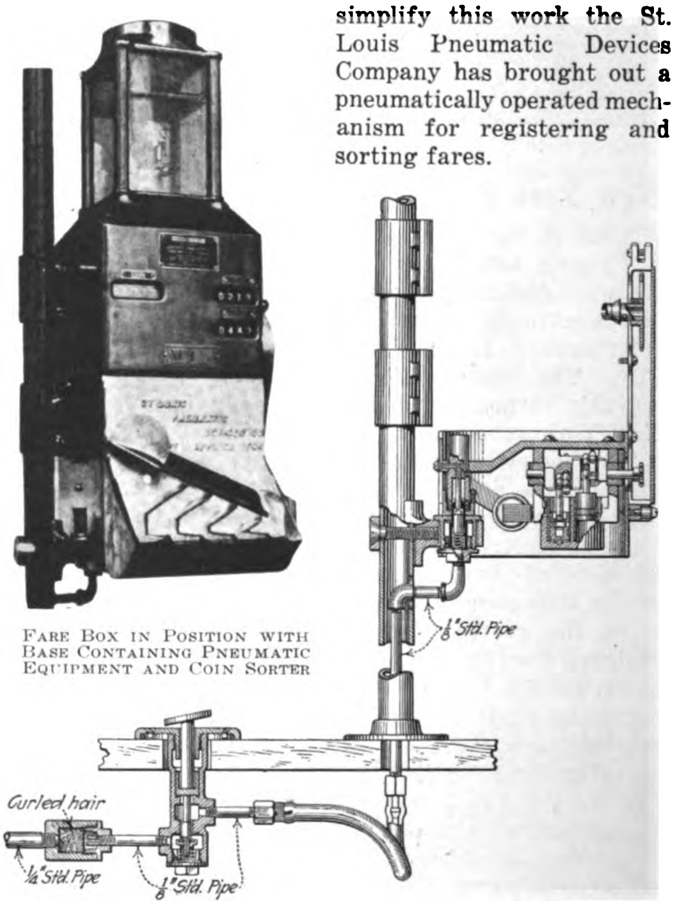
THE accompanying illustration shows a new lubricating feature which forms the latest development of trolley retrievers manufactured by the Trolley Supply Company of Massillon, Ohio. An oil chamber is provided in the control portion with an opening to keep the axle lubricated. Oil is supplied to the reservoir through an opening with a screw plug which effectively closes the oil hole in the reel and prevents any leakage. This design makes it unnecessary to dismantle the retriever or remove it from the car in order that it may be lubricated.

New Light-Weight Motor Developed

TO MEET the requirements of mass transportation with large light-weight double-truck cars and with safety cars heavier than the universal standard, a new light-weight motor has been developed by the Westinghouse Electric & Manufacturing Company. This new motor, known as type 510-A, is of the box-frame, commutating-pole type of 35-hp. capacity. Improvements in construction of the shaft, bearing, housing, and brush-holder are embodied in this new development. The ventilation paths are of the very latest design and afford ample protection when the motor is mounted on small-wheel cars. The 510-A motor is especially suitable for replacing obsolete motors on single-truck or double-truck cars when changed from two-men to one-man operation.

Pneumatic Operation of Fare Boxes

OPERATION of cars by one man has now reached such extensive proportions that considerable effort is being devoted to designing devices which will reduce the labor of the operator. The cranking of a fare box is one of the things which consumes considerable time at points where the operator's attention could be devoted more advantageously to operating the car. To simplify this work the St. Louis Pneumatic Devices Company has brought out a pneumatically operated mechanism for registering and sorting fares.



FARE BOX IN POSITION WITH BASE CONTAINING PNEUMATIC EQUIPMENT AND COIN SORTER

PNEUMATIC OPERATING EQUIPMENT FOR FARE BOXES

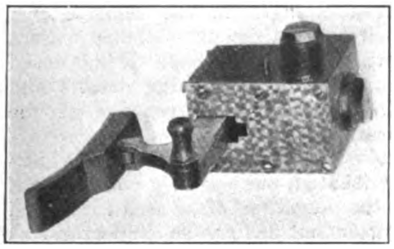
The accompanying illustrations show this equipment. In service the operator presses downward on a pedal and the fares which have been passed by the inspection tray in the fare box are promptly registered in the same manner as is accomplished by hand. The operating mechanism is self-contained in a separate compartment at the bottom, and if the fare box is to be used without the pneumatic attachment it can be readily lifted off and the usual hand-lever operation can be restored without alteration.

The pneumatic equipment consists of the pedal which operates a pneumatic valve installed underneath the car floor or a raised portion of the vestibule if such is desired. The pneumatic valve admits air through a curled hair strainer directly from the air system of the car to the operating mechanism at the bottom of the fare box. Connection is made through the stanchion which supports the fare box. The operating equipment consists of a small pneumatic motor which operates the fare registering mechanism through gearing and a chain belt.

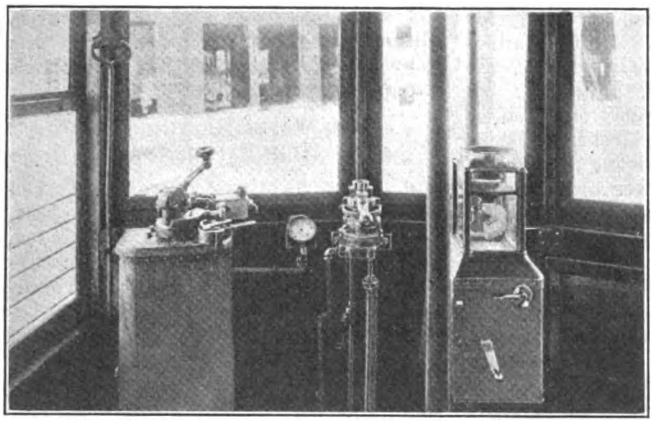
A coin sorter has also been added as a part of this equipment. It can be attached to the fare box either in conjunction with or independent of the pneumatic device. As soon as the coins have been properly registered they drop into their respective pockets and can be removed without visual inspection. The use of these devices makes it possible to register and remove the coins without diverting the attention of the operator from the roadway. The car operator can perform this registration by using his foot either while receiving fares or after the car has been put in motion. The pneumatic method handles the fares more rapidly than can be done conveniently by hand, but the real time saving lies in the fact that pneumatic registration can be done with much less effort and coincident with other duties.

Automatic Bell Ringer and Controller Lock

ACCOMPANYING illustrations show equipment recently brought out by the National Safety Devices Company, Waterloo, Iowa, for automatically ringing the gong of an electric car as the car is started. The controller lock is 3½ in. x 6 in. in size and weighs 7 lb. The apparatus is arranged for attachment to the standard type of controller. An air pipe connects the main casting of the controller lock with the air supply of the car and a second pipe runs from the casting to the bell-ringing device. When mounted the movement of the controller handle operates the lever of the lock, thus opening a valve which admits air to the bell-ringing equipment. A safety feature is also provided in that the equipment locks the controller handle in position so that it cannot be moved should the air pressure be insufficient to apply the brakes. The bell is rung during the first forward movement of the handle and further movement stops the ringing. A rocker arm attached to the operating lever permits the throwing off of the controller without moving the lever or ringing the bell.



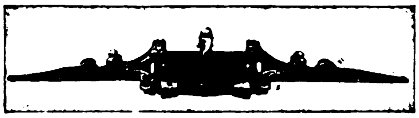
CONTROLLER LOCK OF BELL-RINGING DEVICE



CONTROLLER LOCK AND BELL-RINGING DEVICE APPLIED TO THE CONTROLLER OF A SAFETY CAR

Section Insulator with New Features

THE Ohio Brass Company, Mansfield, Ohio, has developed a new type section insulator, designated as type A-4. A rocker clamp is used for holding the trolley wire which has a cam action, so that as the trolley tension increases the hold on the clamp increases. The clamp is notched to grip the wire firmly and is attached by two bolts. All of the trolley tension is carried in this insulator by two 1¼-in. wood strains in the same horizontal plane as the wire. This is done to prevent buckling of the beam. Pull-off eyes are also in the same plane as the wire, which prevents the tendency of the break to tip in case the strain is slack on one side.



NEW SECTION INSULATOR

The device is fitted with renewable 6-in. cam tips and a renewable runner piece. Feeder lugs are provided on each end casting. The insulator is usually direct suspended from the span, but the yoke casting may be removed and a standard insulated hanger substituted.

Letter to the Editors

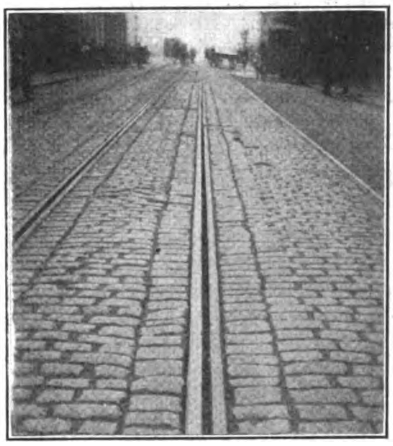
Side Conduit in Brussels

SYRACUSE, N. Y., Dec. 5, 1922.

To the Editors:

On page 856 of the issue of the *Electric Railway Journal* for Nov. 25, 1922, mention is made of conduit track construction in Brussels, Belgium. This particular track construction, I believe, is unknown in American practice. The accompanying illustration, a photograph taken this fall on one of the main streets in Brussels, plainly shows the location of the slot in the street.

The conduit is not located in the center of the track but on the side, adjoining the inside track rail. The slot is formed by one track rail and a slot rail, the slot rail performing the function of the paving lip of the usual type of girder track rail. The plow is suspended from the side of the truck frame of the car. Two plows are used, suspended side by side. Only light single-truck cars, usually hauling one trailer, are used. This type of track construction does not permit of the use of cross-overs, but track loops must be used at the end of double-track car lines.



SIDE CONDUIT IN BRUSSELS

J. KAPPEYNE.

Mechanical Engineers Hold Annual Meeting in New York

Power Generation Was an Outstanding Topic, Stokers Being Exhaustively Considered—High-Pressure Steam, Feed-Water Heating, Boiler Baffling and Other Power-Plant Subjects Were Considered—The Relation of the Engineer to the Public Was Not Overlooked

THE forty-third annual meeting of the American Society of Mechanical Engineers, held in New York City, occupied the four days from Dec. 4 to 7. It was characterized by a number of joint sessions with other organizations, including the American Society of Safety Engineers, and by the evidences of great committee activity. Engineering economics was a topic stressed strongly, and the ideal relation of the engineer to the state was pictured. The leading editorial in the issue of this paper for Dec. 9 brought out some of the high spots in the presidential address of Dean Dexter S. Kimball, in which these features were outlined.

The meeting was attended by 1,200 registrants. While this was but about two-thirds the number in attendance last year, the lack of numbers was made up in efficiency and enthusiasm.

RESULTS OF ANNUAL ELECTION

Early in the meeting the tellers announced the result of the annual election, as follows: President, John L. Harrington, formerly of Waddell & Harrington, and now head of the firm of Harrington, Howard & Ash, consulting engineers, Kansas City, Mo.; vice-presidents, William H. Kenerson, Walter S. Finlay, Jr., Earl F. Scott and Henry H. Vaughan; managers, A. G. Christie, James H. Herron and Roy V. Wright; treasurer, W. H. Wiley.

Secretary Calvin W. Rice reported on his South American trip, during which he attended the International Engineering Congress at Rio de Janeiro, Brazil. He stated that V. L. Havens, editor of *Ingenieria Internacional*, who represented the American Electric Railway Engineering Association, had been elected secretary of the Congress.

STOKER IS COMPREHENSIVELY TREATED

One of the outstanding technical features of the meeting was the attention given to the grates and stokers of boiler furnaces. Papers were read on these subjects by a number of experts.

As to the modern chain grate, T. A. Marsh, Green Engineering Company, said that this type of grate is best for burning high-volatile, free-burning high-ash clinkering coals. Maintenance cost is low and the auxiliary power requirements are small. Efforts to improve efficiency have been directed toward eliminating excess air and reducing furnace and ashpit losses. The forced-blast chain-grate stoker is adapted particularly for free-burning coals that require agitation of the fuel bed to prevent caking.

George I. Bouton, Murphy Iron Works, spoke regarding overfeed inclined stokers. These, he said, are of two classes, side-feed, double-inclined, or V-type, and single-inclined. Those of the first type may have either a flush-front setting (for small boilers) or a Dutch oven setting. They are made with 1 sq.ft. of projected grate area for each 62.5 sq.ft. of heating surface in large boilers, and with 50 sq.ft. in small ones. The fuel bed is 8 to 10 in. thick at the upper end of the grates, thinning down gradually to the clinker grinder. Forced draft is sometimes added to this type of stoker where more than about 200 per cent of rating is desired. As high as 300 per cent can thus be secured.

The speaker referred to the well-known Roney stoker, as illustrating the second type, and also to the Wetzel stoker. The latter consists of bars extending from front to rear, the whole being given a peculiar rocking motion.

The underfeed stoker was covered in papers by H. F. Lawrence, American Engineering Company, and A. H. Blackburn, Underfeed Stoker Company of America. Both traced the development of this type. Mr. Lawrence said that it is particularly adapted for burning bituminous and semi-bituminous coals, and can be adapted for lignites and coke braize. It is quick to respond to load demands.

Automatic regulation was stated to be receiving much attention, but Mr. Lawrence said that probably no regulating apparatus would be developed that would obviate the necessity for occasional adjustment. Clinker adhesion to furnace side walls, one of the most serious operating difficulties encountered, has been largely obviated by the use of perforated firebrick blocks along the clinker line through which air is blown from the stoker air duct, by high-side tuyères, by cast-iron side-wall air boxes, or in some cases by the use of carborundum brick.

Mr. Blackburn traced the developments in stokers from the first Jukes patent in 1838 up to the present day. He covered underfeed single and multiple-retort stokers, underfeed lateral-retort stokers, overfeed inclined-grate stokers, and traveling and chain-grate stokers.

PIONEER INVENTOR HEARD FROM

The extemporaneous discussion on stokers was opened by W. R. Roney, inventor of the Roney stoker, who reviewed stoker history and emphasized the importance of the human element. The consensus of opinion was that the chain-grate stoker is best adapted for burning high-ash Western coal.

In connection with the operation of the chain-grate stokers, however, T. L. Mainz pointed out that among points to be watched is the amount of carbon in the ash and trouble with the seal at the end of the stoker. He said that the best results could be obtained by having a uniform size of coal sent to the grate and that this was a part of the function of the coal-handling system. Another point he mentioned was that the boiler-room dirt must be eliminated when using forced draft under the chain-grate stoker. Further discussion brought out the fact that several types of the modern stoker had solved these problems successfully.

GETTING HIGHER EFFICIENCY OUT OF THE POWER PLANT

A number of papers were presented at a special power session of the convention. In these and the following discussion the interest centered in the utilization of more of the energy available in steam. An important paper was one by Geo. A. Orrok, consulting engineer, New York City, on the commercial economy of high pressures and temperatures. He concluded that as long as the present Rankine cycle is used in the developing of mechanical power from steam there can be little, if any, economic gain by increasing either pressure or temperature beyond present commercial limits. The conclusion is subject to modification in cases of changes in the relative cost of fuel and equipment. Under present conditions the chief hope of increased economy lies in perfecting details and obtaining a larger percentage of the theoretically available heat.

Mr. Orrok's conclusions were vigorously debated, one speaker pointing out that the question of a small thermal saving is not nearly so important as low first cost, simplicity and absolute reliability. Opinion was divided as to the practicability of providing fittings for high pressures and temperatures, although in general it appears that this is possible for values within the present range of practicability.

FEED WATER HEATING FOR HIGH EFFICIENCY

A paper on the economics of feed heating, based on a 25,000-kw. plant, was presented by Linn Holander, Westinghouse Electric & Manufacturing Company. He investigated conditions using single-stage and multiple-stage condensate heaters, both with and without economizers, and treated the subject from the thermal standpoint only.

For power plants using single and multiple stage heaters of the condenser type, the temperature of the boiler-feed water as it leaves the heater should not be less than 150 deg. F. when using economizers and not more than 260 deg. F. when not using economizers. Heat balances showed that when using single-stage heating and no economizers better results were obtained from heating the feed water by combining steam from the house turbine and that bled from the main unit than when using the steam from a house turbine alone. Double-stage heating with no economizers also showed better thermal efficiencies when using a larger amount of steam from the main unit than from the house turbine.

Practically the only adverse criticism made by those who discussed the paper was that perhaps too much attention had been paid to the house turbine, the opinion being that the house turbine as an important factor in power-plant economy would soon generally be replaced by bleeding of the main units. F. Hodgkinson, Westinghouse company, said that the only excuse for the house turbine is to secure reliability of auxiliary power, which can be obtained in other ways. Practically all large turbines are now designed to permit of bleeding, a common plan being to allow four connections, 140 deg. F., 200 deg. F., 50 lb. absolute pressure and 120 lb. absolute pressure.

RESULTS OF EXTENDED BOILER TESTS WERE GIVEN

One of the striking papers presented was by Paul W. Thompson, Detroit Edison Company, on boiler tests at the Connors Creek plant, aggregating fifty in number and involving four grades of coal and four arrangements of baffling.

As a result of these tests seventeen of the large boilers have been rebaffled with considerable improvement in efficiency and degree of superheat, and the Babcock & Wilcox Company has developed a new design of this type of boiler. The baffling arrangement selected exposed two layers of tubes to the radiant heat of the furnace and allowed the gases to cross the inner bank of tubes at the top, pass the superheaters and then return along the outer bank of tubes to the stack. With this arrangement an average increase of 50 deg. F. in superheat was obtained, the flue-gas temperature was reduced 70 deg. and the draft was reduced 38 per cent.

Discussion of the paper showed appreciation of such careful work as was reported.

THE PROBLEM OF ASH HANDLING

An elaborate paper on this subject was presented by John Hunter and Alfred Cotton, St. Louis, Mo. It covered all phases of ash handling and forms a treatise in this field. The discussion brought out the fact that, while water and fuel-handling problems of the power plant have been satisfactorily solved, those of ash handling are difficult and elusive. The quantities to be handled are apt to vary widely and the disposal of ashes often is difficult. Continuous quenching by spraying was advocated and also the frequent replacing of worn metal in conveyors rather than the attempt to prevent wear.

RAILWAY-MOTOR PINION TOOTH STRESSES VISUALIZED

Electric railway equipment men will find interesting information regarding gear-tooth stresses in a paper presented by Dr. Paul Heymans, of the faculty of the Massachusetts Institute of Technology, and A. L. Kimball, General Electric Company. They applied what is known as the photo-elastic method for their purpose, that is they subjected celluloid models of the teeth to stress and passed polarized light through them. The deformation produced by the stress was thus made visible. In the paper photographs in colors were given, as well as diagrams worked out on a quantitative basis. They emphasized the value of this method as compared with ordinary engineering analysis.

The authors studied the effects both of inside radial pressure, such as is due to driving or shrinking a pinion on the shaft, and of applied torque load. They checked their scientific analysis by tests on actual pinions and upon steel rings forced on a tapered plug. Their tests showed that the gear pinion is weaker than the plain circular ring whose outside diameter is equal to the root diameter of the tooth. Gears, they say, fail due either to (1) poor design; (2) excessive load, or (3) excessive radial pressure due to procedure in mounting on the axle.

VOCATIONAL TRAINING VIGOROUSLY DISCUSSED

A report was presented by the A.S.M.E. committee on education and training for the industries which was the subject of lively discussion. The report and discussion were summarized at the close by President Ira N. Hollis of Worcester Polytechnic Institute. He said that the tendency today is not to educate for menial positions, but to train for the best citizenship. An education must train men, first, to make a living, and second, to use their spare time for advancement, intellectual as well as professional. He deplored the desire on the part of many colleges to create an "intellectual aristocracy," to limit the number of college students to the future leaders. Who knows, he said, who the future leaders are to be?

In the discussion the value and relative fields for apprentice training, correspondence and extension courses, etc., were thoroughly covered.

Live Railway Topics Practically Discussed

At a Well-Attended Meeting of the Eastern Section of the Engineering Council of the Central Electric Railway Association, Equipment and Other Technical Problems Were Discussed Frankly and Fully

THE November meeting of the eastern section of the engineering council, Central Electric Railway Association, was held at the Hotel Windsor, Wheeling, W. Va., on Nov. 14. Forty members and railway specialty men were in attendance. L. E. Earlywine, secretary of the association, had issued questionnaires which formed the basis for discussion. The same questions will be discussed by other sections, and the entire council has been asked to send replies to the association office at Indianapolis, where they will be tabulated and distributed to the members. The questions, together with a summary of the discussion which occurred at Wheeling, are given below:

What is the effect on motor and gear maintenance of too much wear on body and collar of axle bearing? (a) What is permissible wear on the body of axle bearings? (b) What is permissible wear on collar of axle bearings?

In a lively discussion of these questions it was brought out that excessive wear on the collars or flanges of axle bearings permits the motor to lunge from side to side as the car hits sharp curves or sways from side to side. This aggravates the condition, causes the armature to pound its bearings, and results in sparking at the commutator. It permits misalignment of the gear and pinion faces and results in more rapid and uneven wear of both. This wear causes the tooth loading to be thrown upon the tips of the teeth, resulting in tooth breakage if allowed to continue for any length of time. The following allowances were given by some of the members: C. W. Folwell, ⅛ in.; Daniel Durie, ⅛ in.; F. C. Martin, ⅛ in. on shaft or ¼ in. on collar; A. B. Creelman, ⅛ in. F. W. Hickling, Westinghouse Company, stated that good practice places the maximum allowable wear on the body of axle bearing at 3/32 in. With new bearings it should not exceed 0.012 in. as the bearings go into service. The amount of wear on axle bearing flanges is not so vital if the wear is taken up by means of the axle collar. The clearance permitted should not exceed 3/16 in. With new bearings this should not exceed 1/32 in. upon going into service.

There appears to have been but little improvement in gear case design for twenty years. What suggestions for improvement in design are recommended?

Mr. Hickling stated that gear cases have been materially improved, both with respect to the pan and the end support. Since the advent of the pressed pan, the principal improvements have been in the supports. The development along this line is in the direction of making a support strong enough to meet severe service conditions. The discussion further brought out the fact that supports were continually breaking and appear not to be heavy enough. Also heavy cases appear to break supports, due to vibration, more than do light sheet steel cases.

What are the advantages, if any, in the use of overhead ground wire for high-voltage transmission lines? (a) What kind of wire is used? (b) How installed? (c) Method of grounding.

Mr. Hickling said that briefly summarized the records of his experience with overhead ground wires show the following:

1. Overhead ground wires do afford a certain protection to insulators. Quantitively, however, the extent and value of this protection are uncertain.

2. Overhead ground wires do not afford any appreciable protection to wood poles in addition to that afforded by individual grounding wires on each pole (except possibly in regions where grounding conditions are exceptionally poor).

3. There is evidence that overhead ground wires do afford protection to station apparatus. The preponderance of evidence indicates, however, that the amount and value of this protection are not material.

4. It is not definitely known whether overhead ground wires tend to reduce disturbances which result in interruption to service without occasioning damage to lines or equipment.

5. Overhead ground wires tend to give better relaying conditions on systems with a grounded neutral. Their value in this respect will depend upon type of relays employed, individual ground conditions and other local conditions.

6. Overhead ground wires add to the longitudinal stiffness of transmission line structures when attached directly to the structure, and to a small extent when carried on a bayonet or crossarm. The extra wire, however, increases the wind and ice loading on the line.

Discussion brought out the fact that stranded steel wire is generally used, its size being fixed by mechanical considerations because the size of the ground wire has very little effect on the capacity to the line wires. On wooden pole lines some companies carry the wire on insulators and others do not. On steel tower lines the wire should be grounded at every tower. On wooden pole lines the general practice is to ground at every fourth or fifth pole.

What effect, if any, does fast controller feeding have on equipment?

The discussion showed as follows:

Effects are most noticeable in city service where frequent stops occur with close headway of cars. Generally, too rapid notching causes more equipment failures and increased maintenance cost. Also, on small railway systems wide fluctuations occur in line voltage and in substation loading.

On short runs, fast controller feeding frequently is one cause of overheating of motors. The tendency of some motors to flash is also increased because the motor is saturated magnetically from the high accelerating current while the rapid notching imposes sudden and wide voltage variations in the motor. Excessive heating dries out insulation, thus producing loose bands and windings. The excessive accelerating currents set up magnetic stresses which produce severe mechanical strains in the windings and sometimes cause broken armature leads.

Gears and pinions are subjected to severe shocks because of the rapid and wide variations in the tractive effort. Controllers wear out contacts and fingers unduly because of the excessive currents handled. Circuit breaker operation is more frequent. Large drafts of power from the line may reduce line voltage too low for satisfactory operation of multiple-unit equipment. Flickering of car lights becomes a source of annoyance to passengers.

What is the best practice for making emergency stops to avoid accidents?

The general opinion seemed to be that the length of stop depends on the condition of the rail and the best judgment of motorman. On dry rail sand should be dropped and brakes applied to emergency. On wet rail sand should be dropped and air used with judgment and if necessary current should be applied to keep wheels moving to prevent sliding.

It was agreed that reversing a car has some effect on a jury verdict, in serious accident cases; that reversing might do at very low speed and, if reversing is necessary, the reverse handle and not the power handle, should be used.

What is the most economic size and shape of trolley wire: (a) for city cars; (b) for interurban cars?

The discussion indicated that No. 00 round is most universally used, with the exception of some of the larger cities. Chicago uses No. 000 round and Philadelphia both No. 00 and No. 0000 round. The No. 00 round wire is easier to install because of less load on cross bands. This is of considerable importance where there are wide streets and steel poles are used without back-guys.

Mr. Hickling said that Westinghouse engineers believed that for interurban lines the No. 0000 grooved trolley wire is the best. Interurban work is mostly high speed, and with the grooved trolley wire a smooth under-run is obtained. This results in the elimination of sparking at the trolley ears and also reduces maintenance as with round trolley wire and drawing heavy currents, the trolley ears would need to be frequently renewed.

Should track bonding be installed and maintained by track or overhead departments?

There was considerable difference in opinions which included line and track departments and a special engineering department to take charge of this.

What effect has bad track in the upkeep of equipment?

A lively discussion took place on this subject as to the damage to equipment. The cost of upkeep varies in some proportion to the condition of the track. Probably 80 or 90 per cent of the maintenance cost on motors is due to troubles resulting from vibrations. One source of these vibrations is bad track, which tends to hammer at the bearings and gears and set up vibration of the brushes, which is a common cause of flashing. It is due to the prevalence of bad track that railway motors have to be made as rugged as they are.

On motors mechanical troubles predominate, and the bearings suffer the most. Brushes come next, and loosening of windings and covers last. Flashing may occur by the bouncing of brushes, or broken windings occur from the extreme poundings. Controllers of the drum type are not affected to a great extent. Remote control relays and some types of contactors may be bounced shut or open, thus giving false operation. Riveted and bolted joints frequently open. Undue strains may be thrown on the supports, air piping or on the apparatus frames, thus causing breakages and delays in service.

The effect of bad track upon the upkeep of equipment might be compared to a leak in a steam or air line. It rapidly goes from bad to worse, and is an expensive luxury. The continuous poundings vertically and laterally cause general deterioration of all equipment, both electrical and mechanical. It tends to loosen all bolted and riveted parts; causes brush and brushholder chattering; produces sparking and flashing on commutator; breaks off the leads both on the armature and on stationary parts of the motor, and adds severe strains to the gear and the bearings. It causes rapid wear of trolley parts and increases the breakage of overhead structures.

A. B. Wilson, sales manager of the Copper Products Forging Company of Cleveland, presented to the meeting the features of the "Cleveland" all copper trolley wheel, and L. E. Gould, president of the Economy Electric Devices Company, explained the new aluminum fields for railway motors.

After the meeting adjourned a trip was made by special car to the Windsor power plant of the West Penn Railway at Beach Bottom, where interesting features of the large power station were observed.

The New York Railroad Club Celebrates Fiftieth Anniversary

THE dinner this year of the New York Railroad Club took the form of a golden jubilee, as the club was organized in 1872. About 2,300 members and guests were present at the banquet which was held at the Hotel Commodore on Dec. 12. H. H. Vreeland, Interborough Rapid Transit Company, was toastmaster, and the principal addresses were given by John J. Cornwall, ex-Governor of West Virginia and general counsel of the B. & O. R.R., and George A. Post, chairman railroad committee, Chamber of Commerce, U. S. A.

New England Street Railway Club

THE December meeting of the New England Street Railway Club was held in Boston last Thursday. The afternoon meeting was at the Engineers' Club and was addressed by Joseph C. McCune, Westinghouse Air Brake Company, on recent developments in air brakes for electric cars.

The evening meeting was at the Copley-Plaza, and W. L. Underwood of the M.I.T. gave an illustrated lecture on hunting big game with a camera in New Brunswick.

Meeting of Committee of One Hundred

THE Committee of One Hundred. which was organized in 1919 shortly prior to the Federal Electric Railways Commission hearings to give currency to electric railway facts, held a meeting at the Railroad Club in New York on Tuesday, Dec. 12, and decided to continue its existence indefinitely and broaden the scope of its work. About twenty-five members of the committee were present and after a report from Gen. Guy E. Tripp, chairman of the committee, was presented, the plan for continuing the work of the committee was unanimously approved.

General Tripp's report showed that since the establishment of the advertising section at association headquarters on Jan. 1, 1920, much information of a constructive character has been cleared to the press and electric railway companies and other channels of advertising and publicity. The good results obtained have been attributable in great measure to the determination of the committee not to make a mere "press agent" service of its information department but to render a real information service to all who desire facts about electric railways. The greatest care has been taken, it was emphasized, to tell the whole truth in each situation and to avoid coloring statements either to the benefit of electric railways or the detriment of their opponents.

Among those who discussed the committee's work, after General Tripp had read his report, were C. D. Emmons, P. H. Gadsden, Barron Collier, F. R. Coates, G. E. Hardy, J. N. Shannahan, J. H. Pardee, J. K. Newman, J. G. White, L. S. Storrs, Thomas N. McCarter, S. Z. Mitchell, O. D. Young and Secretary J. W. Welsh of the association.

All the speakers emphasized the importance of General Tripp and Henry R. Hayes remaining at the head of the work as chairman and secretary of the committee respectively and also of retaining as many members of the committee as possible regardless of whether they were actively engaged in the electric railway business or were in affiliated lines. Several speakers, particularly Messrs. Gadsden and Pardee, paid tribute to the actual handling of the advertising and informational work of the committee. This is carried on by Labert St. Clair, of the Barron G. Collier, Inc., staff, who handled the news of the Federal Electric Railways Commission hearings. Mr. Collier also makes available, without charge to the committee, the service of his entire art and copy departments.

General Tripp's report also told of how information was made available to magazines, the press, public speakers and others, and then summarized the other work of the committee operating through the Advertising Section as follows:

Preparation of booklets, posters, suggested newspaper advertisements and similar advertising material dealing with current situations and forwarding this matter regularly to all electric railway companies in the United States.

Giving counsel and suggestion for special campaigns, when requested by individual companies.

Co-operating with the committee on co-operation of manufacturers by preparing good will electric railway advertising literature and disseminating it through these companies.

Issuing monthly a bulletin publication called "Truth" containing from six to fifteen news items, editorial comment or other material of general interest which may be used in house organs, speeches, interviews and in other ways. This bulletin is distributed to the number of 3,000 copies monthly.

Co-operating with the twenty-five state committees on public utility information, supplying them with regular informational material and rendering special service to meet their local situations.

Co-operating with the National Electric Light Association, American Gas Association and other public utility organizations, as well as the Investment Bankers' Association and other national organizations interested in the welfare of public utilities in the dissemination of facts.

Conducting an Advertising Section in *Aera*, the American Electric Railway Association monthly magazine, giving suggestions for bettering public relations and illustrating the articles with advertising material gleaned from the field.

Henry R. Hayes read a financial report showing that the work of the committee has been financed by voluntary subscriptions to date, and it was decided to continue to meet the expenses of the committee by this method.

Those present were: Messrs. G. E. Tripp, J. K. Choate, J. N. Shannahan, E E. Quantrell, E. W. Sanderson, Frank Silliman, J. H. Pardee, C. M. Clark, G. E. Hardy, S. M. Curwen, P. H. Gadsden, H. V. Bozell, J. W. Colton, F. R. Coates, Barron Collier, C. D. Emmons, R. P. Stevens, O. D. Young, H. R. Hayes, J. G. White, L. S. Storrs, T. N. McCarter, S. Z. Mitchell, H. H. Westinghouse, J. K. Newman, J. W. Welsh and Labert St. Clair.

American Association News

Power Distribution Work Laid Out

THE two-day meeting of the Engineering Association committee on power distribution, held Dec. 11 and 12, was a miniature convention in itself. Seventeen of the twenty-two members were present, besides several guests, and one absentee was represented by deputy. Chairman M. B. Rosevear announced the composition of the sub-committees as follows:

1. *Specifications for catenary construction*—C. H. Jones, chairman; R. L. Allen, S. H. Anderson, L. W. Birch, H. M. Hobart, John Leisenring, W. Schaake.

2 and 4. *Trolley-wire wear and specifications*—H. S. Murphy, chairman; J. W. Allen, H. G. Burd, L. E. Delf, L. F. Griffith, H. D. Hawks, A. Hughes, Jr., H. A. Pharo.

3. *Pole reclamation* — L. F. Griffith, chairman; S. H. Anderson, James Scott.

5. *Inductive co-ordination*—John Leisenring, chairman; D. D. Ewing, H. A. Pharo, A. Schlesinger.

6. *Temporary connections to trolley wire*—L. E. Delf, chairman; L. W. Birch, James Scott.

7. *Overhead construction for trackless trolley* — F. McVittie, chairman; L. W. Birch, H. M. Hobart, W. Schaake.

8. *Review of existing specifications and recommendations to A. E. S C.*— A. Hughes, Jr., chairman; R. W. Eaton, H. M. Hobart, F. J. White.

Next C. H. Jones was appointed vice-chairman of the committee, after which reports were submitted by representatives of the association on the A.E.S.C. sectional committees. A letter from S. L. Foster containing many practical suggestions was read and discussed. The several sub-committee assignments were then taken up with the following general results: No. 1, Not discussed. Nos. 2 and 4, Subject will be covered under two heads; trolley wire wear by the whole sub-committee, and preparation of specifications by Messrs. Murphy, Burd and Hughes. These three men will cooperate with the A.S.T.M. No. 3, It was suggested that cleaning and treating of poles in service be studied and cost data gathered, for publication, on the whole subject of pole reclamation. No. 5, The discussion on this subject brought out the desirability of cooperation with other organizations as opportunity offers. No. 6, Data on this subject will be collected with a view to suggesting the best present and possible practises. No. 7, The subcommittee was given a free hand to gather and analyze information with a view to presenting the high spots in present practice. No. 8, The sub-committee will not only review existing standards but will suggest those which should be submitted to the American Engineers Standards Committee.

On the second day of the meeting the several sub-committees met and made substantial progress in planning the season's work.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Commission Appointed

Last Act of Mayor Couzens Outlines Plan for Municipal Operation—Will Serve as Adviser

The last official action of Mayor James Couzens with respect to the street railway question in Detroit before resigning to become United States Senator was to appoint four of the five men who are to make up a special commission to study Detroit's rapid transit situation. This rapid transit commission was authorized about two months ago, when the City Council also authorized the appropriation of $50,000 to carry on the work.

MR. WALDRON CHAIRMAN

The former Mayor outlined the general plan of operation for the rapid transit commission and stated that in his belief a practicable solution of the city's needs should be submitted to the voters by April, 1924. The recommendations of Mr. Couzens on the appointment of the commission were accepted by the Council, and four of the five men named have agreed to serve. The fifth member of the committee is to be appointed by acting Mayor John C. Lodge.

The men named are: Sidney D. Waldron, former vice-president of the Packard Motor Car Company, chairman; Willard Pope, civil engineer; H. W. Alden, vice-president of the Timken Detroit Axle Company, and C. W. Hubbell, former city engineer of the city of Detroit.

In outlining the work the commission will have to do, the Mayor pointed out that that body will have in mind the discussed Metropolitan district, the possible Detroit-Windsor bridge and the need for more rapid interurban service such as the commuting service around New York, Chicago and Philadelphia. All citizens with constructive ideas will be welcome to appear before the commission or to send in their ideas to it.

BUDGET SCHEME PROPOSED

The Mayor stated that it was his understanding that the commission will prepare a budget for prompt submission to the Council, and that expenditures are to be approved by the Mayor and city controller before submission to the Council for payment. The commission will serve without pay.

Mr. Couzens on Dec. 5 resigned as Mayor of Detroit and as acting general manager of the Department of Street Railways, having been informed by the corporation counsel that the offices of Mayor of Detroit and United States Senator were incompatible.

At the conclusion of the Mayor's last meeting with the street railway commission, a statement was issued by Ross Schram, assistant general manager of the Detroit Municipal Street Railway system, to the effect that there will be no changes in the management or policies of the department of street railways, which the members of the commission are satisfied is efficiently organized and operated now.

The commissioners, after conference, decided to accede to Mr. Couzens' request that he be not asked to assume the duties of general manager, but wish to avail themselves of his offer to serve in an advisory capacity, so that they may have the benefit of his ideas, knowledge and experience.

There is no intention of appointing a general manager, pending the return of Joseph S. Goodwin, now on sick leave. In the meantime the necessary duties will be divided among the commissioners.

Agreement Renewed—Proposals Accepted

At a referendum taken on Dec. 6 the trolley men's unions voted to accept the proposals made to them by the Springfield, Worcester Consolidated, Milford, Attleboro & Woonsocket, Interstate Consolidated and Attleboro Branch Railways for the renewal of the working agreement which will expire on Dec. 31. The general terms governing wages are to remain as in operation since March 1 last under the Storrow award. There are several minor changes affecting wages and working conditions.

The arrangement of a seven-hour guarantee in a fourteen-hour spread has been changed to make the outside time twelve hours instead of fourteen. An hour's time will be allowed hereafter to spare men reporting for duty but not sent out, or whose starting may be delayed for that period. Time and a quarter is to be paid for the thirteenth hour or fraction thereof and time and a half thereafter.

Men on schedule runs of seven and a half to nine hours are to receive nine hours pay. The minimum at present is eight hours.

A rearrangement has been made governing method of payment for late-in time, computations to be made separately for each day, instead of being taken collectively at the end of the week, putting Springfield and Worcester on the same basis.

Maximum rates for blue uniform men which are to be continued for one year by the vote thus taken are 58 cents an hour on the Springfield and Worcester systems, 53 cents on the Milford, Attleboro & Woonsocket, and 56 cents on the Interstate Consolidated and Attleboro Branch roads.

Decision Reversed

Circuit Court of Appeals Rules Seattle Is Not Compelled to Use General Fund for Railway Operation

Seattle taxpayers have won another victory in their fight to protect the general tax fund of the city from invasion as a means of meeting the cost of operation and maintenance of the Seattle (Wash.) Municipal Railway. The United States Circuit Court of Appeals has reversed the decision of Federal Judge E. E. Cushman, in the suit brought by the Puget Sound Power & Light Company to put the tax fund behind the $15,000,000 of railway purchase bonds. This is the decision which the city has been awaiting before taking action on the 5-cent fare on city cars. The decision reversing Judge Cushman was filed by the Circuit Court in San Francisco, and the case was sent back to the District Court in Seattle for dismissal.

Judge Cushman's decision, which has been reversed, held that the city must draw from the general tax funds, or any other available fund, in event the revenues of the railway at any time become insufficient to pay the cost of operating the street cars, after payment of bond interest and principal. The reversal of this decree has the effect of holding that the city is not compelled to invade the general fund for the purpose of operating the railway, if the revenue ever becomes insufficient for that purpose. The holding is similar to that of the State Supreme Court in the "fourteen taxpayers" suit, in which the state court held that the general tax fund cannot be invaded for support of the railway.

Telegraphic notice received in Seattle by attorneys in the fourteen taxpayers case, announcing the decision, said the federal suit had been remanded to the lower court for dismissal "without prejudice to any right the power company may hereafter have for future breaches of ordinances or bonds."

JUDGE CUSHMAN OVER-RULED

This decision also removes Judge Cushman's jurisdiction over the railway system, which he assumed in the decree which has been reversed, to enforce specific performance of the terms of the contract under which the railway was purchased from Stone & Webster.

The Circuit Court finding held that the Cushman decision was unnecessary because the railway is paying expenses out of its revenues, and that the municipal officers of Seattle had acted within their rights in effecting a transfer from the general fund for the purpose of investigating charges that the city had been defrauded in the purchase of the system. The passage of the enabling ordinance to make effective the terms of the bond contract the court also found to be fully sustained by law, and not subject to attack because it was passed by the City Council, and not by the electorate as a whole.

One of the provisions of the Cushman decree which had a bearing on street car fare was that under which the Federal Court retained jurisdiction of the case, and under which the power company was given the right to call the city into court on twenty days notice in event any steps were taken in conflict with the interests of the power company. As this provision has been stricken out by the Circuit Court's decision, attorneys point out, the jurisdiction of the court has been removed, and the company would have to begin new litigation, in event it considered its efforts were being jeopardized.

James B. Howe, attorney for Stone & Webster interests, who brought the specific performance suit in the Federal Court, states that he is not prepared to say whether the case will be appealed to the United States Supreme Court until he has seen the decision of the Circuit Court.

Mayor B. J. Brown and City Councilmen predict that with the favorable court decision, early adoption of a 5-cent fare on the lines of the Seattle Municipal Railway will be possible. However, it is agreed that no change would be politic before Feb. 1.

Numerous suggestions for reducing fare in the city have been offered by Councilmen and railway officials, but to date no agreement has been reached. The suggestion of Councilman John E. Carroll that the weekly pass system be tried has not met with the approval of the Council, and the suggestion has been permanently tabled.

The Council is now considering a report of Superintendent of Public Utilities George F. Russell, requested by Councilman Erickson, which indicates that there will be a monthly operating loss of from $70,000 to $200,000 from the various fare reduction plans. The report did not take into consideration a probable increase of 13 per cent in business of the railway, which the utilities chief said might result from the reduced fare. For the various proposed plans, his report indicates the following estimated operating losses:

Five-cent fare, with 1¼-cent transfers (Mayor Brown's plan); net operating loss of $129,227, and including the $70,250 monthly allotment for redemption of bonds, a loss of $199,477 a month.

Five-cent fare, with free transfers, net operating loss of $146,880, with bond redemption, $217,130 monthly; 5-cent fare with 2-cent transfers, total operating loss of $188.825 a month; 6¼-cent fare with free transfers, total operating loss $142,961; 6¼-cent fare with 1-cent transfers, total operating loss $128,759; 6¼-cent fare with no transfers, a net operating gain of $16,055, but a total operating loss, counting bond redemption of $54,195; 5-cent fare, and no transfers, net operating loss of $75,967, and with bond redemption, $146,217 a month.

Superintendent Russell pointed out that under the present 8⅓-cent fare, counting the $57,000 depreciation charge (a mere book account, for which only $20,000 is actually set aside) there is an average monthly fictitious operating loss of $12 101.

In ten months of 1922, Superintendent Russell said, the expenses of the Municipal Railway were decreased $405,491 as compared with the corresponding period in 1921, a decrease of 10.91 per cent. The decrease in expense next year, he predicted, will be even greater than this.

Franchise Awarded

San Diego Railway Pays One Hundred Dollars for Privilege of Building Cross-Town Line

The franchise for the cross-town line on Sixteenth Street, San Diego, was formally awarded to the San Diego Electric Railway by the City Council on Dec. 4, after a stormy fight, which was finally decided by the issue being submitted to the people at a special election on Oct. 10, and at which election the company won its point, the electors approving the franchise by a small majority.

The company first made application to the City Council for the franchise in April, 1922, stating that the cutoff was necessary to facilitate reconstruction work then under way, and also for rerouting of cars to meet the needs of the growing city. The granting of the franchise was opposed by an association of merchants with establishments located on lower Fifth Street and Market Street, who asserted that if the franchise were granted the company would so reroute its cars as to kill their section of the city as a retail district. The Council heeded the merchants and refused to grant the franchise. The company renewed its application in July, having procured the approval of its plans by the State Railroad Commission, but again the Council listened to the merchants' association and refused the franchise. The company then took the fight to the people, circulating petitions, and secured the necessary signers to a petition calling a referendum election on the question, and at the election the people approved the franchise.

Opponents of the franchise then took the fight to the Superior Court, asking that the City Council be enjoined from granting the franchise as voted by the people, claiming that the election was not authorized under the city charter, that franchises were not a subject for referendum elections and that the power of granting franchises rested solely with the City Council. A temporary injunction was granted, but at the hearing attorneys for the plaintiff, the city and the railway company being heard, the court dissolved the injunction. The plaintiff gave notice of appeal.

The franchise was then put on the City Council's calendar for action on Dec. 4. Early that morning the attorney for the opponents of the franchise again applied for an injunction on the ground that the franchise should not be granted while the question of validity of the election was on appeal, but the court denied the application without even asking for argument, stating that the court could not see where any irreparable injury was threatened. The claim of the merchants that their business would be adversely affected by rerouting of cars, the court said, was not well founded, as no one could foresee what the results of the rerouting would be.

The Council then sold the franchise to the San Diego Electric Railway for $100, it being the only bidder. The general terms of the franchise are the same as those of the general franchise held by the company.

Claus Spreckels, general manager announced that construction of the Sixteenth Street line would begin as soon as the material could be assembled, which will be in about two weeks. The work will be done according to the new standard adopted by the company —twin-steel ties, 100-lb. rails, all electric welded and embedded in 14 in. of concrete. It will be necessary to build four blocks of double-track line on Sixteenth Street to connect existing lines, or the equivalent of a little more than one-half mile of single-track.

It is estimated that the company will save $10,000 a year in car mileage to and from the carhouse at Fifteenth and L Streets through use of this new line. National City and Chula Vista cars also will be routed over the new line, and probably the Logan Avenue line, leaving the Imperial Avenue and Market Street lines to serve lower Fifth Street.

Council Adopts Agreement—People Will Vote in January

The City Council of Ottawa, Canada, by a vote of eighteen to three, on Dec. 8 adopted the report of the civic street railway committee which provides for submission to the voters questions affecting the operation of the Ottawa Electric Railway. The proposed franchise agreement, including Robert M. Feustel's recommendations for extensions, was referred to in the *Electric Railway Journal*, issue of Nov. 25.

The questions on which the people will vote are whether the city shall sign an agreement for a new franchise allowing a flexible rate of fare and a guaranteed return of 7½ per cent to the company on $4,500,000, and on $500,000 to the city, which is the city's equity in the road, or whether the city shall buy out the Ottawa Electric Railway Company, its property and assets for $4,500,000, and have it operated by an independent commission. This commission, it was explained, would consist of three members, who would be appointed by the City Council.

The Council also passed a motion authorizing the city solicitor to have a synopsis of the agreement prepared for publication three times in each of the three daily newspapers.

The present agreement does not expire till August of 1923, but in the event of the new agreement being approved the company is willing to date the agreement from January and start at once on the extensions.

Commission Holds Hearing on Extension Application

Permission to construct an extension of its Monrovia-Glendora line easterly 4 miles to connect with its San Bernardino line at San Dimas Junction, along with the necessary permits to cross twenty streets and the tracks of two different steam road lines at grade in and near Glendora, Calif., was asked on Dec. 6 by the Pacific Electric Railway at a hearing held before Examiner W. R. Williams and engineers of the State Railroad Commission at Glendora. When this line is completed, this cutoff will enable persons living at Glendora, or between that city and Los Angeles, to travel east to San Dimas Junction and other points on the company's lines in that territory without coming to Los Angeles and going out on a parallel line as has been necessary in the past. It also will make it possible for persons living at San Dimas and points east thereof to go to Glendora and other near-by points, including Mount Lowe, without coming first to Los Angeles. The railroads which the company asks permission to cross are the Atchison, Topeka & Santa Fé and the Southern Pacific.

Vote Down Renewal Franchise

The renewal of the franchise of the Rockford-Interurban Railway, a subsidiary of the Commonwealth Power, Railway & Light Company, was voted down at a special election in Rockford by a vote of 7,300 to 4,100. The City Council had previously voted for renewing the franchise over the Mayor's veto.

The franchise expires in October, 1923. The terms of the new franchise grant were referred to in the *Electric Railway Journal*, in the issue of Oct. 21, 1922.

Construction Awaits Amicable Settlement of Differences

The County Board of Revenue of Jefferson County, Birmingham, has threatened to withdraw $450,000 set aside for street construction within the city limits, unless the City Commissioners and the Birmingham Railway, Light & Power Company can get together on their long standing controversy as regards the right-of-way over certain streets of the city.

For some months it has been planned by the County Board of Revenue and the City Commissioners to pave certain streets leading from the center of the city, in conjunction with the federal aid appropriation. The right-of-way over these roads is owned by the Birmingham Railway, Light & Power Company. The city and the company have been in a controversy over this right-of-way for some time, and the matter remains unsettled.

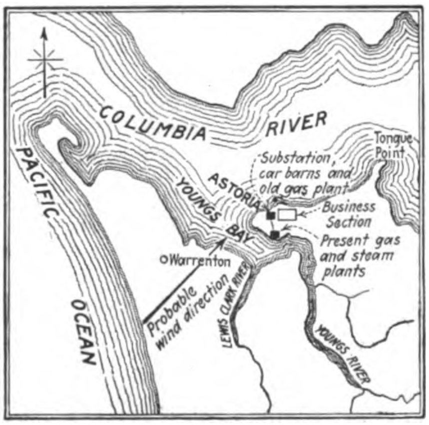
City Commissioner W. E. Dickson stated that he believed this right-of-way could be secured before Dec. 15, the date set by the County Board of Revenue to withdraw the appropriation, in the event the right-of-way was not secured by that time.

Astoria System Hard Hit

But Speedy Resumption of Electric Service Follows the Fire in That Oregon City

Destruction of the electric light and power distribution system in about thirty-five city blocks in the heart of Astoria, Ore., was caused on Dec. 8 by the fire which started at 2:30 a.m. and burned until noon. The loss includes that of the meters and transformers in the burned area, which included the main business section of the city and some residence blocks.

The part of the city destroyed was built principally on filled-in land, some parts of which have been filled to the street level. but the part which burned first was filled to within about ten feet of the street level. The paved streets in this section were supported on timber trestles, and the tunnel thus formed was used for electric light and telephone cables, gas and water mains and sewers. This tunnel construction provided a flue for the burning timber that carried the fire throughout the burned area in a short time, causing the failure of both the gas and water mains because of the loss of the supporting structure and the falling of the street pavement. The failure of the water supply in certain sections from this cause proved a serious handicap in fighting the fire. At least fourteen blocks of street-railway track were destroyed and through service permanently interrupted.



SKETCH SHOWING VULNERABILITY OF ASTORIA TO FIRE

The Pacific Power & Light Company owns and operates the street railway, electric light and power and gas properties, and much credit is due the company for the promptness with which service was resumed by all these properties. Fortunately the main electric feeders for the burned district were on Boundary Street, just beyond the fire zone, and this area was soon cut off from the rest of the city. Many arc lights were back in service on the first night, and within twelve hours after the fire nearly every light and power customer outside the burned area was receiving uninterrupted electrical service. The new steam-electric plant and the Young's Bay gas plant, as well as the Astor Street substation, were outside the fire zone, but the local offices were burned. Virtually all the records, however, were saved.

It has been reported that the property loss of the Pacific Power & Light Company will amount to at least $175,000. The industrial district of the city was not harmed, but the entire commercial section was wiped out and no one has yet hazarded an estimate as to what the revenue loss wil be to the various utilities.

Legislature Will Consider Bus Regulation

That some effort will be made during the coming session of the Iowa Legislature to restrict the irresponsible bus competition from which city railways have suffered during the past two years seems to be a foregone conclusion. The Iowa League of Municipalities, made up of city officials from many of the cities and towns, has interested itself in the bus problem and promises to attempt some relief during the biennial session of the state Legislature which meets in the city of Des Moines early in January.

A. E. Gnagey, Mayor of Waterloo, is the chairman of a committee appointed by the league to investigate the matter and offer a solution, and he is now preparing a bill which will be introduced in the Legislature. Mayor Gnagey claims that bus owners and operators, paying only a nominal fee, have full use of city streets without any restrictions except those which apply to individual motorists. He calls attention to the fact that by establishing a "carriage rate" and not actually accepting a fare for a "within the city" haul buses have escaped taxation under ordinances governing taxicabs.

Mayor Gnagey is now drafting a bill and while it is not complete it is known that it will seek to give municipalities power to regulate buses and provide an operating tax which will compensate cities for injury to streets by the operation of buses.

Will Have Uniform Bookkeeping System

By an order of the Tennessee Public Utilities Commission, which will become effective in 1923, the entire bookkeeping system of all the privately owned gas, electric light, water works, street railways and power companies in Tennessee will be changed. The order requires all companies to keep their accounts in a uniform manner and in strict accordance with definite rules laid down by the commission. The new classification will conform with the accounting plan recently adopted by the National Association of Railroad & Utilities Commissioners.

Hydro-Radials an Issue

Construction of Proposed Lines Will Depend on Vote of Toronto Ratepayers

The ratepayers of Toronto, Ont., will vote at the municipal election on Jan. 1 on the question: "Are you in favor of the hydro-radial agreement passed by the City Council on Sept. 6, 1922?" Upon the answer given, the construction of the Toronto-Niagara Radial will be proceeded with or will be abandoned.

The agreement of July 27 provided for the building of the radial in question as a co-operative enterprise. As the Toronto *Globe* explains the matter Toronto's obligations under the adopted plan are twofold. The city agrees to guarantee bonds to the amount of $4,240,000, representing 85 per cent of the cost of a line from the foot of Bay Street, Toronto, to Port Credit, and to furnish free of cost that part of the right of way from the Humber to the terminal, which will pass over public property.

In pursuance of the July agreement the City Council, on Sept. 6, adopted a supplementary agreement, providing for the needed right-of-way. The agreement confers on the Hydro-Electric Commission, as trustee for the associated municipalities, the right to use for fifty years a strip of land 105 ft. wide extending from the Humber on the west to Morley Avenue on the east, and to construct and operate an underground line on Bay Street from the radial terminal, near the waterfront, to the City Hall.

The Bay Street tube and the tracks for an eastern entrance for radials are not to be constructed at present. According to the *Globe* nothing can be done by the Hydro-Electric Commission upon these portions of the enterprise without the express consent of the City Council, which may or may not vote the needed money should the commission propose at any future time to proceed with the work. The lease of the eastern right-of-way is a "reservation," and for the present nothing more. If no steps are taken within six years toward utilizing it in the bringing in of radials from the east the lease is then cancelled automatically.

The question goes to the people because a majority of the Harbor Commission is opposed to giving up the land needed without a direct vote of the ratepayers authorizing them to do so. The membership of the Harbor Commission consists of three representatives appointed by the city, which has provided most of the land and the money for harbor improvements; one by the Dominion Government, and one nominated by the Board of Trade. Two of the city's representatives, R. J. Fleming and Home Smith, not only object to the grant of the right-of-way as provided for by the agreement of July 27, but are of opinion that the city should own and operate the radial entrance and terminals, through the agency of the Toronto Transportation Commission, instead of entering into partnership with the other municipalities through whose territory the proposed radials are planned to run. As the *Globe* sees the matter the ratepayers must choose between the two principles—municipal co-operation and the opposite as presented in the phrase "Us for Toronto."

Paint Shop Destroyed

Thirty-One Cars Lost by International Railway in Blaze at Cold Spring Plant

Thirty-one cars were destroyed by fire and a workman was burned to death in a blaze which completely destroyed the paint shops of the International Railway, Buffalo, on the morning of Dec. 13. Prompt work on the part of the firemen prevented the destruction of the Cold Spring carhouse of the company, which adjoins the paint shops. The damage is estimated by Herbert G. Tulley, president of the International, at more than $350,000, fully covered by insurance. The cause of the blaze had not been determined late in the week and an investigation is being made by the company.

CARS DESTROYED WERE AWAITING OVERHAULING

The cars which were destroyed were in the paint shops for overhauling. They consisted of nine Peter Witt type center exit cars; eleven double end cars; three near side P.A.Y.E. cars; four interurban cars and four converted one-man cars. The building, a brick and frame one-story structure, and the equipment are a total loss and the company will be crippled for some time to come as the paint shop was being worked at capacity repairing and overhauling the company's equipment in preparation for the winter. There are no paint shops connected with any of the other carhouses in the city.

The fire was discovered shortly after 4 o'clock in the morning. Before the first battalion of firemen arrived, the entire structure was in flames. The grease and oils in the building and the high wind caused the blaze to spread rapidly and the firemen had difficulty in keeping the flames confined to the paint shops and adjoining dwellings. The main car sheds at Cold Spring, housing more than 500 cars, were not damaged in the least.

Edward McQuivey was burned to death in the fire. He was employed as a painter and night watchman. His charred body was found by firemen after the blaze was extinguished.

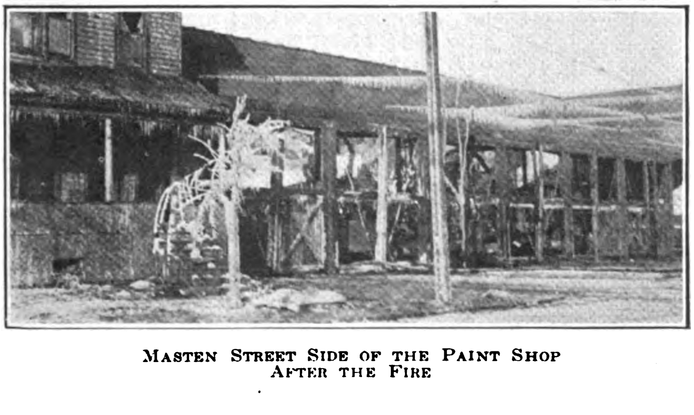
The company has received several letters from individuals who have threatened to fire the Cold Spring carhouse and in some quarters suspicion is directed toward strikers or their sympathizers. One attempt was made some time ago to destroy the structure by the explosion of a bomb placed on the roof of the building. Since the start of the strike on July 1, 1922, the carhouse has been under heavy police guard.

Adjournment on Car-Bus Hearings

Quick settlement to determine the result of the street car-bus franchise that was submitted to the electors of Saginaw, Mich., on Nov. 7 has been removed with an adjournment on the hearings for orders to show cause issued by the Circuit Court until Dec. 21.

The hearing on the order secured by the opponents and the hearing on the order secured by the proponents will be combined, as both measures have been consolidated. Attorneys interested in the election from both sides will fight it out through the courts.

The franchise, if carried, would have meant the resumption of street car service with motor bus extensions, but apparently it was defeated on the original returns by fifteen votes. On the recount the measure lost by fifty-seven. More than 1,000 ballots are now in dispute, the opponents having asked the courts to pass on a majority of them because of alleged technicalities. No matter which side secures the decision in the lower court, the entire question, it is believed, will be carried to the State Supreme Court for a decision.



MASTEN STREET SIDE OF THE PAINT SHOP AFTER THE FIRE

GENERAL VIEW OF THE RUINS OF THE PAINT SHOP WITH THE WRECKED CARS

Financial and Corporate

Extra Common Dividend Declared

At a meeting of the board of directors of the United Light & Railways Company, Grand Rapids, Mich., held on Dec. 6, 1922, the regular quarterly dividend of 1½ per cent was declared on the first preferred stock payable Jan. 2, 1923, to stockholders of record on Dec. 15, 1922. There was also declared the quarterly dividend of 1¾ per cent on the participating preferred stock payable Jan. 2, 1923, to stockholders of record on Dec. 15, 1922.

A quarterly dividend of 1¼ per cent on the common stock of the company was declared payable on Feb. 1, 1923, to common stockholders of record on Jan. 15, 1923. An extra dividend was announced of ¼ of 1 per cent on the common stock of the company payable on Feb. 1, 1923, to stockholders of record on Jan. 15, 1923.

Net Income $97,059

The accompanying table shows the results of operation by the Department of Street Railways, Detroit, Mich., for October and September, 1922.

CITY OF DETROIT

Department of Street Railways

INCOME STATEMENT AND OPERATING STATISTICS, OCTOBER, 1922, COMPARED WITH SEPTEMBER, 1922

Operating Revenue	October, 1922 31 Days	Cents per Car-Mile	September, 1922 30 Days	Cents per Car-Mile
Revenue from transportation				
Passenger revenue	$1,525,249		$1,444,326	
Parlor, chair and special car revenue	62		72	
Miscellaneous transportation revenue	1			
Total	$1,525,313	.3921	$1,444,399	.3795
Revenue from other railway operations				
Station and car privileges (advertising)	$6,772		$6,660	
Rent of track and facilities	81,557		81,867	
Miscellaneous	366			
Total	$88,696	.0228	$88,527	.0233
Total operating revenue	$1,614,010	.4149	$1,532,927	.4028
Operating expenses				
Ways and structures	$178,998		$166,398	
Equipment	97,817		89,829	
Power	157,365		149,006	
Conducting transportation	563,433		545,082	
Traffic	310		290	
General and miscellaneous	129,445		122,809	
Total operating expenses	$1,127,370	.2897	$1,073,416	.2820
Net revenue railway operations	$486,640	.1252	$459,510	.1208
Deduct taxes assignable to railway operations and miscellaneous rents	$54,573	.0140	$52,901	.0139
Net operating income	$432,066	.1112	$406,609	.1069
Non-operating income				
Net income from miscellaneous property	$1,182		$1,697	
Income from unfunded securities and accounts	15,123			
Income from sinking fund and reserves	2,960			
Total non-operating income	$19,266	.0050	$1,697	.0004
Gross income	$451,332	.1162	$408,306	.1073
Deductions				
Pro rata sinking fund provision on $15,000,000 original bond issue	$38,471		$37,747	
Pro rata reserve on D.U.R. purchase contract	143,274		142,015	
Pro rata sinking fund provision on $4,000,000 bond issue	11,324		11,111	
Pro rata interest fund provision on $15,000,000 bond issue	59,706		58,583	
Pro rata interest fund provision on $4,000,000 bond issue	14,715		14,086	
Pro rata interest fund provision on deferred payments on D.U.R. purchase contract	86,528		83,736	
Amortisation of expense on funded debt	253			
Total deductions from gross income	$354,273	.0911	$347,280	.0913
Net income	$97,059	.0251	$61,025	.0160
Ratio operating expenses to revenue from transfers		73.9 per cent		74.3 per cent
Ratio operating expenses to operating revenue		69.8 per cent		70.0 per cent
Ratio net income to operating revenue		6.0 per cent		3.9 per cent
Revenue car-miles operated	3,882,888		3,798,386	
Non-revenue car-miles operated	7,628		7,377	
Total car-miles operated	3,890,516		3,805,763	
Earnings per car-mile		.3921		.3795
Earnings per car-hour		2.0358		1.9703
Expenses per car-mile		.2897		.2820
Expenses per car-hour		1.5047		1.4640
Revenue passengers carried	28,530,594		27,025,653	
Transfer passengers carried	9,221,851		8,744,410	
Total passengers carried	37,752,445		35,770,063	
Ratio of transfer passengers to revenue passengers		32.3 per cent		32.3 per cent
Revenue passengers per car-mile operated		7		7
Transfer passengers per car-mile operated		2		2
Total passengers per car-mile operated		9		9

Results Under Service-at-Cost

Youngstown Commissioner Says 300,000 More Passengers a Month Must Be Carried to Avoid Deficit

The report of an audit of the accounts of the Youngstown Municipal Railway, authorized by the City Council, has just been made to that body by H. W. Feather, the accountant employed by the City Street Railway Commissioner for the purpose. The period covered by the audit is from Jan. 16, 1919, when the service-at-cost ordinance under which the Youngstown city railway lines are operated, became effective, to Aug. 31, 1922.

Mr. Feather prefaces his report with the statement:

> The entire accounting system including that in the storeroom is exceptionally good, and the check on cash receipts is accurate and complete. Every courtesy was shown me by the officials of the operating company.

In the period covered by the audit Mr. Feather found that the gross revenue was $5,747,624, while the operating and maintenance expenses, including taxes, were $5,413,356. The latter item is increased to $5,439,387 by certain special expenditures authorized under the ordinance, leaving a balance of $308,237 applicable to depreciation and interest on capital.

The agreed capital value under the service-at-cost ordinance on Jan. 16, 1919, was $4,370,480, and the additions to capital since that time up to Aug. 31, 1922, were $98,276, making a total of $4,468,757 on which, under the terms of the ordinance, a return is to be paid, the rate on the original agreed value being 7 per cent and on the capital additions the actual cost of the money. These charges against operating income and depreciation charges, Mr. Feather's audit shows, amount to $1,162,168, or $853,931 in excess of the balance left after paying operating charges and taxes. This excess is carried as a debit balance in the stabilizing fund, the state of which fund controls the rate of fare to be charged under the service-at-cost ordinance.

In this regard, the audit report points out:

> The present physical condition of the company's property is such as to warrant the capitalization of this deficit plus any additions since Aug. 31, 1922, that portion of this deficit represented by unpaid interest on capital value bearing interest and the balance being non-interest bearing.

Mr. Feather found that the company during the period of his audit had operated a total of 13,030,069 car-miles, carrying 77,898,884 original passengers and 17,341,096 transfer passengers. Basing his calculations on the fare revenue received, he found that the average fare per original passenger was 7.34 cents, while including the items of interest and depreciation, in part accrued, the cost per original passenger was 8.48 cents.

Mr. Feather points to the falling off in the number of passengers carried and the increased cost of carrying them, due to the "unsettled business conditions with resultant labor troubles, increased cost of materials (particularly fuel), increased cost of labor and the general business depression starting early in the fall of 1920 and extending to late summer of this year." He continues:

During 1920 there were 727,626 fewer original passengers carried than during the 11½ months of 1919, and in 1921 6,136,408 fewer than in 1919. The entire year of 1922 will probably show an increase of about 3,000,000 passengers over 1921, but still fewer by 3,000,000 than 1919.

Regarding the weekly pass, Mr. Feather found that the average fare per original ride on passes was 4.97 cents. He says:

There has been a steady growth of passengers carried since the installation of the weekly pass, which was started in October, 1921. Better business conditions are probably responsible for some of this increase, but the greater part of the increase is, no doubt, due to the pass. August, 1922, showed an increase of 566,854 passengers over August, 1921, or more than 50 per cent.

Without attempting to solve the problem of the number of these passengers who would not have been carried were it not for the weekly pass, Mr. Feather comments:

Unfortunately the use of the pass has lowered the average fare per passenger to such an extent that unless the weekly pass is discontinued the company must carry 300,000 more passengers per month to avoid a deficit.

Memphis Reorganizations Progressing

The management of the Memphis Power & Light Company, Memphis, Tenn., successors to the Memphis Gas & Electric Company, and the Memphis Street Railway, will be directed by T. H. Tutwiler, executive head of the street railway, it is stated. Following the sale a few days ago of the gas property, the owners will be ready to take charge by Jan. 1. Just as soon as the details of reorganization of the gas company are completed, preliminary steps will be taken looking to the sale of the Memphis Street Railway at auction on an order of the Federal Court. The Electric Bond & Share Company, New York, contemplates the purchase of the street railway property as has been done in other southern cities and will proceed with immediate reorganization of the street railway.

Securities at Auction

Electric railway securities sold by Adrian H. Muller & Company on Dec. 6 at the Public Auction Room, 14 Vesey Street, New York, were as follows:

200 shares Albany Southern Railroad common; $11.50 per share.

100 shares Albany Southern Railroad preferred; $26 per share.

230 shares International Railway Company common, voting trust certificates; $13 per share.

$14,000 Second Avenue Railroad first consolidated mortgage 5 per cent bonds, due 1948, Guaranty Trust certificates of deposit, 1½ per cent.

$16 900 Dry Dock, East Broadway & Battery R.R. Company registered refunding mortgage income gold bonds, series C, due 1960, with $239 scrip, $600 lot.

225 shares North Jersey Rapid Transit Company, common, $7 lot.

$37,500 North Jersey Rapid Transit Company first mortgage 5 per cent bonds, certificates of deposit, $200 lot.

15 shares Nova Scotia Tramways Company, common, $100 lot.

50 shares Nova Scotia Tramways Company, preferred, $2,000 lot.

Toronto Purchase Arbitration Completed

The Toronto Railway arbitration has been concluded and the next and vital step will be the announcement of the award.

The *Financial Post* of Toronto says that surrounding this matter are the questions:

Will it be acceptable to both sides?

Will there be further litigation—an appeal to the Privy Council?

According to the *Post* there are those who contend that both sides will be anxious to avoid a further piling up of costs, but such a contention is hardly borne out by experience. The company may appeal on some questions of law, but it seems more reasonable to believe that the city, not always given to weighing the dollars and cents of the people before rushing in to spend, would be more liable to take the jump than the company. On the other hand, says the *Post*, if the award is unacceptable to the company, and especially if there is a hitch in the interpretation of a clause of the franchise, the company is certain to appeal. In further explanation of the matter the *Post* says:

During the past few years, since the wave of public ownership has hit the country, franchises and agreements have been likened more to a scrap of paper. The Privy Council, however, has been the only standby. There an agreement is respected and an interpretation on the strict letter of the paper, devoid of any sentiment, is usually forthcoming. However, both these conjectures might be termed "crossing bridges."

For the present the guessers have sufficient to conjure with in the possible award. The guesses already vary. Some place the figure between $10,000,000 and $12,000,000. The city is willing to pay around $7,500,000 and this does not include a considerable amount of the company's real estate, including the office building, Scarboro Park and the steam plant site. To this would be added the $3,000,000 which the company already has in its treasury from the clean-up deal, including interest on the award, which dates back to Sept. 1, 1921.

There is another point to consider, as to whether the city is likely to get the road at its figures with Chicago experts placing the value of the property at $20,000,000. Each side must pay its share of the arbitration cost, but it is said that the company has already set aside sufficient to care for this. An approximate cost is given as $2,000,000, and the company has a reserve on hand greater than this amount to care for such a charge. The company is to be paid in 6 per cent bonds of the city, dated Sept. 1, 1921, so that if there is an appeal, no matter by the city or company, this interest continues. Thus it can be said that on the interest alone the stock is worth 6 points more than it was a year ago. The uncertainty which surrounds the matter caused a pronounced weakness in the stock lately and a drop of about 12 points from the recent high.

Seeks Discontinuance of Line

The San Diego (Calif.) Electric Railway has applied to the State Railroad Commission for permission to discontinue service over the main portion of the Woolman Avenue line—that portion extending from Twenty-fifth Street and Imperial Avenue to the Intersection of Fifth and K Streets—a distance of about three-fourths of a mile, it is announced by General Manager Claus Spreckels. Service over that part of the line was discontinued about Dec. 1 because of the poor condition of the track, and Manager Spreckels states that service will not be resumed except under orders from the commission.

In April the company applied to the City Council for a franchise for a line on Twenty-fifth Street from K Street to Broadway, with the intention of running the Woolman Avenue cars over this route and abandoning K Street, which is closely paralleled by the Imperial Avenue line on the south and the Market Street line on the north. This franchise was granted by the Council, but with conditions added which are not in the company's general franchise and which General Manager Claus Spreckels declared he will not accept. At present residents of the Woolman Avenue district are being served by a stub operated from Twenty-fifth and Imperial, with transfers to and from the Imperial Avenue line.

Manager Collins Made Receiver

John S. Collins of Jackson, general manager of the Michigan United Railways, was named by Federal Judge Arthur J. Tuttle on Dec. 13 as receiver for his company, following filing of a petition for receivership by the Commonwealth Power, Railway & Light Company. The Michigan United Railways serves about forty cities and towns in the western and central parts of the State.

Financial News Notes

Seeks Increased Capital Stock.—The Port Arthur (Tex.) Traction Company has filed an amendment to its charter under which the capital stock is increased from $300,000 to $400,000. Under the recent order from the city to move all car tracks to the middle of the street, the company faces heavy expenditures and additional capital is needed.

Transfer of Rights Sought.—The Richmond Light & Railway Company, New York, N. Y., has applied to the Transit Commission to transfer the railroad property of the company to the Richmond Railways, Inc., and to make and transfer certain issues of securities. This is a step in the reorganization of the company now in the receiver's hands, and which was recently acquired by new interests. Permission is sought to transfer the franchises and properties comprising the electric railroad system of the Richmond Light & Railroad Company to the Richmond Railways, Inc., in consideration of receipt by the Richmond Light & Railway Company of 6 per cent 30-year mortgage bonds in the face amount of $2,000,000 and capital stock of no par value to the amount of 20,000 shares. None of the securities to be issued is to be sold. A hearing was held by the commissionon Dec. 13 and decision was reserved.

Traffic and Transportation

Reduction Not Likely

Connecticut Commission Believes Five-Cent Rate Impracticable in Large Cities—Service Satisfactory

In the opinion of the Public Utilities Commission of Connecticut the installation of a flat 5-cent or 6-cent fare without transfer privileges would not give satisfaction in large cities taking the cities as a whole. Bridgeport and Norwalk lent themselves to the adoption of reduced fare zones because of the particular geographical layout and also because of the trend of traffic. These statements were made in the annual report of the commission which was recently presented to Governor Lake.

The report covers in full electric railway operation in the State of Connecticut. The announcement of the impracticability of the 5-cent fare in Connecticut comes at a critical time when Mayor Kinsella of Hartford has announced his intention of taking up with the commission body the matter of reducing fares in his city.

The present rates of fare charged by the Connecticut Company are based upon a flat rate of 10 cents for a single cash fare with a ticket rate of 8⅓ cents or three for 25 cents. Bridgeport and Norwalk are exceptions to this schedule. They have a 5-cent zone fare without transfers. This schedule was authorized by the commission in November, 1921, for a trial period of ninety days, and thereafter until changed by the commission. The results of the eleven months' operation in Bridgeport referred to in *Electric Railway Journal* of Dec. 9 showed an increased operating income but provided an amount below what would be considered a reasonable return on the investment or fair value of the property. This condition obtained also in Norwalk. The test period expired in the early spring and the temporary order has not been revoked. The report says on this point:

> It was the hope and reasonable expectation of the commission that the ticket rates of the Connecticut Company could before now be reduced from 8⅓ cents to 7½, or two tickets for 15 cents, and at such time a proper modification of the temporary orders in Bridgeport and Norwalk might be made; but industrial depression and unfavorable weather during the summer months operated against more favorable gross and net operating revenues of the Connecticut Company.

Believing the cut detrimental the report continues:

> The commission is strongly imbued with the theory that any utility company, to give good service, must be in a healthy financial condition, and that any reduction of rates or diminution of revenues of any necessary utility, operating under efficient and economical management, which will seriously impair its financial standing and fail to afford a fair return upon a conservative valuation of its property used and useful in the service, will ultimately and surely be extremely detrimental both to the company and to the public which requires its service, and which service should be reasonably dependable and satisfactory.
>
> It may be assumed that the services of a public utility are essential for the well being of the state and for the comfort and happiness of its citizens, and that only by financially successful and carefully managed companies, as in any other line of business, can such service be satisfactorily maintained.
>
> Under public regulation there should be little chance for undue profits or discriminatory service, but any policy of regulation which will arbitrarily and without sound reason reduce utility rates or diminish the revenues to an extent that utilities are unable to pay a fair return or raise new money for necessary capital improvements, betterments and extensions, will very much diminish the power of the regulating body to compel good service.

The report says further:

> The companies are gradually increasing mileage of open track, which is to be commended, and on side location and interurban lines they are constructing earth landing places which enable passengers to be handled more safely.
>
> Automatic signals have been installed on a number of lines. This substitution of modern signal equipment for older types should be continued as extensively and as rapidly as practicable.
>
> Traffic and operative signs show considerable progress toward standardization, as advocated by us in previous inspection reports; however, a few turnouts and calling points still remain unlabelled. Highway crossing signs were found in only a fair condition of maintenance; some with broken wings or sadly out of plumb, others obscured by tree limbs which should be kept trimmed.

The report concludes by saying that street railway service on the whole has been satisfactory and that the companies, particularly the Connecticut Company, have shown better financial results and have been able to meet with some degree of success their state tax obligations.

Applies for Seven-Cent Fare Continuance

The United Railways & Electric Company, Baltimore, Md., has filed an application with the Public Service Commission for a continuation of the 7-cent fare. In discussing the application H. B. Flowers, general manager, said that almost half of the total receipts of the company were returned to the 5,000 employees in wages in the last ten months.

In commenting on the affairs of the Company, Nelson Cook & Company, bankers of Baltimore, in their December pamphlet say in part:

> There are naturally many people in Baltimore who selfishly and without reason would like to see a lower street car fare. There are many, perhaps, who would be glad to ride on the street cars without any fare. It would make little difference to them who paid the freight so long as it cost them nothing. It is against thoughtlessness of this character that the Public Service Commission of Maryland stands as a bulwark in the protection of property rights.
>
> A large Baltimore labor body is reported to have passed a resolution asking the return of the pre-war 5-cent carfare. As the United Railways Company is one of the most extensive employers of labor in Baltimore, we wonder what labor would say if the company sought to cut the wages of its employees to a point where the former 5-cent fare would be possible. Until the time comes when wages can be materially reduced and the cost of transportation correspondingly lowered our street car fare must remain at its present 7-cent rate to enable the combany to earn a sufficient sum to maintain its credit and thereby maintain public service.

Cut in Cleveland Fare Expected

As a result of a settlement between the City of Cleveland and the Cleveland (Ohio) Railway, regarding the disposition of a number of funds, it appears certain that the Cleveland car riders will receive another reduction in fare on March 1. The adjustment of funds just made involves a grand total of $986,022. This sum has been carried for several years in so-called "suspense accounts."

In the agreement between the city and the company, $476,151 is transferred to the interest fund, which is the fare barometer. Because of the transfer there was in this fund on Nov. 1, $588,522. When this total reaches $700,000 the fare is automatically reduced. There is today a large accumulation in the operating reserve surplus which must be transferred to the interest fund on March 1, making the fare reduction almost sure.

Cleveland car riders are now paying 5 cents cash fare or five tickets for a quarter with 1 cent for transfer. The next lower rate of fare is the same, except that riders may get eleven tickets for 50 cents. In view of the fact that this next lower rate of fare varies so slightly from that now in effect, it is not at all unlikely that a further reduction will be made to 5 cents cash or six tickets for a quarter with 1 cent for transfer.

In the adjustment made in the agreement between the city and company, $305,982 went to the maintenance, depreciation and renewal reserve; $82,536 to the road equipment reserve and $6,982 to the operating expense reserve.

None of the Cleveland Railway executives will be quoted as to the certainty of a fare reduction on March 1, but there is a general accord that unless there is a totally unexpected drop in business during the next few months, or some extraordinary expense is incurred, the fare will go down probably two notches on March 1.

School Tickets Reduced

According to a recent announcement of the Connecticut Company, pupils can hereafter ride at one-half the metal ticket rate instead of one-half the cash fare.

Fares on all Connecticut Company lines were reduced 16 per cent on March 1, 1922. The fare unit had been 10 cents and it was provided that three metal tokens be sold for 25 cents, at the rate of twelve for $1. Single cash fares remained at 10 cents, when tokens were not used. School children have continued to pay one-half of the 10-cent rate, buying books of twenty tickets for $1. Under the decision of the Connecticut Company directors, they will be able to buy books at one-half of the token rate, saving 16 per cent.

Books of tickets are issued to school children, when the fact of their attendance at public or parochial schools is attested by parents and school authorities.

Plan in Effect to Reduce Fares and Maintain Revenue

On Dec. 8 the San Diego (Calif.) Electric Railway started a thirty-day trial of a plan calculated to reduce fares to the street car rider and still maintain the usual revenue for the car company. The plan is fostered by an organization known as the Merchants' Transportation Coupon League, and its promoters claim that it will promote business for the merchants who are members of the league and also increase street car patronage during the hours when traffic is usually light.

In brief the plan is as follows: The company issues to the league a special red token at 7½ cents each (the regular outer zone fare in San Diego). The merchants who are members of the league sell these tokens to the public at two for 15 cents, and with each token sold give two coupons valued at 2 cents each in trade. Merchants who are members of the league accept these coupons as cash on purchases in their establishments at the rate of one 2-cent coupon for each 25 cents worth of goods purchased. Thus if the patron purchases two tokens for 15 cents for the round trip to town and back, and makes purchases at league stores amounting to $1, the coupons can be turned in for 8 cents, thus reducing the actual fare paid to 7 cents for the round trip, or a reduction of more than 50 per cent of the regular fares. The league promoters have secured 100 merchants as members of the league, representing practically all lines of business, both downtown and suburban, so street car patrons desiring to purchase the new red tokens will find them at convenient points throughout the city.

The railway company has placed the following restrictions on the use of the red tokens: They will be accepted in payment of fare only between the hours of 9 a.m. and 4 p.m., and from 6 p.m. until midnight. During the peak-load hours regular tokens must be used. No transfers will be issued on the red tokens.

Whether the plan becomes permanent or not depends upon the showing made by the thirty-day trial, it was stated by Claus Spreckels, general manager of the San Diego Electric Railway. If the expectations of the promoters are realized the plan will be made permanent.

Seeks Another Extension of Seven-Cent Fare

An application for another extension of the 7-cent fare has been made by the United Railways Company, St. Louis, Mo., before the State Public Service Commission at Jefferson City.

The commission has extended the 7-cent rate several times, the last occasion being up to Dec. 31, 1922. The application filed recently asks that the extension be granted until the commission has completed the valuation of the property of the United Railways Company now being made and has promulgated and put into effect a permanent order authorizing the collection of a fare that is predicated upon the final valuation.

In the event that the commission does not see fit to grant the extension upon those terms the petition asks that some extension at least be given.

Supreme Court to Decide

Opponents of Increased Fare in the City of Dallas Will Take Issue to Higher Court

The fight on the 6-cent fare in Dallas, Tex., will be taken to the Supreme Court, according to attorneys for those opposing the higher fare, unless relief is had in the lower courts. Joe A. Worsham, attorney for the Dallas Railway, is also preparing to take the case to the Supreme Court on a writ of error.

The case as originally brought by F. J. Geller et al. in the Forty-fourth District Court of Dallas County, sought to enjoin officials of the Dallas Railway from collecting a 6-cent fare, alleging that the city ordinance making the grant of the 1-cent increase in fare was not legally passed by the City Commission. Petitioners set forth that the franchise entered into between the city of Dallas and the Dallas Railway on Jan. 8, 1917, was a contract and bound the company to charge a 5-cent fare during the life of the franchise, unless said fare should be changed under the conditions of the sliding scale set forth in the franchise, and that therefore the city ordinance granting the fare increase was void, inasmuch as it had not been submitted to the qualified voters for indorsement at a referendum election.

John W. Pope, sitting as special judge in the Forty-fourth District Court, denied the injunction in sustaining a general demurrer filed by the attorney for the company.

The case was appealed to the Fifth Court of Civil Appeals at Dallas by attorneys for Geller et al. and on hearing before the Appellate Court the case was reversed and remanded to the District Court for hearing on its merits.

The Appellate Court held that the franchise entered into between the company and the city of Dallas was not a fixed contract, but was subject to constant regulation by the governing body of the municipality granting it; that the ordinance involved in this case was not one granting a franchise but one regulating the rate schedule; that such regulatory ordinance could not go into effect immediately because none of the exceptions creating an emergency existed; that the suspension of the prescribed method of passing ordinances was not required for the immediate preservation of the public peace, health or safety; that the declaration of the board of city commissioners declaring an emergency existed did not create such an emergency, was not binding and conclusive, but was subject to judicial ascertainment; that the emergency clause in the ordinance is void, but that the ordinance is not void, but merely inoperative until it shall have been published for the thirty days required by law. And if within the thirty days a referendum shall be demanded by the electorate of the city of Dallas in the manner provided in the city charter, then such referendum must be held and the ordinance ratified by the people before it shall take effect.

Upon this decision Joe A. Worsham, attorney for the company, announced that he would seek to carry the case before the Supreme Court on a writ of error, and this proceeding served to halt the rehearing of the case in the Forty-fourth District Court.

In the meantime the city of Dallas, through J. J. Collins, city attorney, sought and was granted authority to enter the case as *amicus curiae*, declaring that although the city was not named in the original petition, the fare case was a matter of public interest and the city should be represented in the litigation. The city entered the case to attempt to aid the street railway in showing that the 6-cent fare increase was legally granted and should be continued in order that the traction company might earn a fair return on its invested capital.

Another development following the decision of the Fifth Court of Civil Appeals was the filing of a petition by attorneys for F. J. Geller et al. with the City Commission asking that the Dallas Railway be directed to issue a fare receipt to every person paying the 6-cent fare. The petition asked further that the company be directed to set aside the money collected by reason of the fare increase so that this money might be available for refund to patrons of the company in case the 6-cent fare ordinance is finally declared void.

The City Commission referred the petition to the city attorney without action.

Seeks Permission to Charge Seven Cents

The Shreveport (La.) Railways has filed a petition with the Public Service Commission of Louisiana asking permission to charge a 7-cent fare. The company based its application upon a belief that it was entitled to earn a fair return on the fair value of the property.

The appraised value of the property, based upon reproduction on present prices less a fair depreciation, is $3,229,834. The company asks to be allowed to earn 7½ per cent on this amount above the cost of operation, taxes and depreciation. The commission now has public accountants preparing a statement of the historical value of the property.

In 1920 the people by a popular vote granted an increase from 5 cents to 6 cents. The Constitutional Convention of 1921 placed the public utilities of the state under the Public Service Commission and that commission promptly reduced the fare to 5 cents. Following this the company had the property appraised upon which it could base an application for an increase.

Personal Mention

Selling an Idea

W. B. Spencer, Assistant to President at Providence, Tells Public to Use Trolley for Business

To the general public of Providence, R. I., W. B. Spencer is just a name, like thousands of others in the telephone book or the city directory for instance. The public may not know Mr. Spencer, still all Providence is talking about him, or at least about his work, for it is he that is driving home to them by car dasher sign, newspaper ad and by pamphlet the philosophy of using the street car for business and saving the automobile for pleasure. He is getting his message across, or the public wouldn't be talking about him.

W. B. SPENCER

Mr. Spencer isn't new to the railway business in Providence. Indeed, not. He was, in point of fact, brought up in it. But he is comparatively new to that particular phase of the work he is now carrying on, for he has been at it actively only since Feb. 1, 1922, when he was appointed assistant to the president of the United Electric Railways and placed in charge of a newly organized department of publicity and public relations.

Mr. Spencer is twenty-nine years of age. He is a native of Providence. He joined the service of the trolley company in the summer of 1907, serving as office boy for the duration of the school vacation period, but liked his occupation so well that he retained his position when school reopened and attended an evening business school.

After serving several years in the electric railway business, Mr. Spencer decided in his own mind to see the business all the way through. He was then a junior clerk in the transportation department. Later, a position as night clerk in one of the carhouses was accepted, and the work here enabled him to become acquainted with the railroad man—his habits, his likes, his dislikes, etc. After gaining considerable experience there, Mr. Spencer returned to the main office of the transportation department, working as a record clerk. Still desirous of gaining more experience, permission was granted him to work after office hours as a conductor, and he thus learned at first hand the many arduous tasks that confront the man on the rear platform in dealing with the public. Later, he operated the front end of a car as a motorman, also for the purpose of obtaining experience.

Not being satisfied with these attainments, Mr. Spencer peered into the inner workings of the transportation department, and began to experiment in schedule making, and gradually worked up in this department until he was appointed chief clerk, taking charge of the making of schedules, the chartering of special cars and the handling of the details in connection with the company's transfer system in the transportation department, and, in general, assisting the superintendent of transportation.

As stated previously, Mr. Spencer was next advanced, on Feb. 1, 1922, to the office of assistant to the president, in which capacity his duties consist of taking charge of the department of publicity and public relations, and such other matters as the president assigns to him.

Mr. Cullen Re-enters Newspaper Work

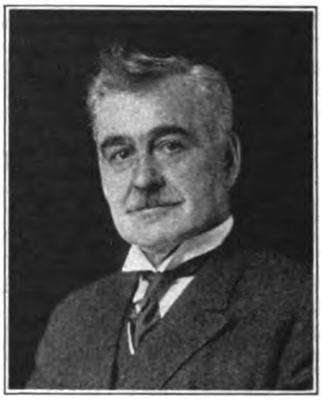
John E. Cullen, assistant to the president of the United Railways & Electric Company, Baltimore, Md., has accepted a post with the general staff of the Hearst newspapers and has gone to Milwaukee to take charge of two papers there. The announcement as made in the Baltimore *News* says that Mr. Cullen has been granted leave of absence for one year by the United. Mr. Cullen was appointed to the railway at Baltimore in 1918, in line with the policy of the company there to enlarge its staff so as to hasten the solution of the many problems created by the war. He directed his attention more particularly to the question of public regulations and publicity. He is a Baltimorean, well known as a special writer and former city editor of the *Evening Sun*. For three years before he accepted the appointment to the Baltimore company Mr. Cullen was engaged in newspaper work in New York City.

R. H. Horton, traffic engineer for the Philadelphia (Pa.) Rapid Transit Company, has been assigned to special duty in Buffalo for the International Railway and may be given a permanent position with the International, according to announcement made by Herbert G. Tulley, president of the International Railway.

William J. Clark Dead

William J. Clark, advisory manager of the railway department, General Electric Company, died at his residence in New York Dec. 13. He leaves a widow and two sons. The funeral occurred Dec. 15.

Mr. Clark became interested in electric railways in 1888, when he was instrumental in obtaining a legislative charter authorizing the construction of an electric railway between Derby and Ansonia, Conn. Shortly after he joined the sales department of the Thomson-Houston Electric Company and had been connected with that company and its successor, the General Electric Company, ever since. For part of this time he was managing director of the British Thomson-Houston Electric Company, with headquarters in London, and the acquaintance then gained and later expanded of electric railway conditions abroad made him an authority on this subject.



W. J. CLARK

Mr. Clark was a pioneer in electric railway matters in many ways besides manufacturing. He was a great student of the sociological and economic aspects of electric railroading, and in 1896, he made a valuation of the electric railway and lighting property in Milwaukee. This is said to have been the first extended physical valuation of a large electric public utility, and the general plan adopted by Mr. Clark has since been frequently followed by others. He was also greatly interested in the economic side of municipal vs. private ownership of public utilities. It was largely through his efforts that the National Civic Federation undertook its study of the subject in 1907 and he was chairman of its ways and means committee, as well as a member of the commission which made the investigation. In 1908 he acted as an expert on Cuban affairs for the War Department.

During recent years his attention had largely been given to collecting the materials for a comprehensive history on the electric railway industry.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Increase in Electric Locomotive Orders

A recent survey of the locomotive department of the Erie Works of the General Electric Company discloses the fact that at the present time there are a larger number of orders from different customers than has been the case at any time since 1914. Many of these customers have electrification projects under way in various parts of the world, and it is evident that interest in steam railroad electrification has been greatly stimulated by the high prices of fuel, labor and commodities.

Domestic orders include two 120-ton electric locomotives for handling increased business over the Baltimore & Ohio Belt Line, which was electrified by the General Electric Company in 1895. Another order has been received from the Sacramento Northern Railway in California for two freight locomotives to be used in heavy interurban freight service.

Among foreign orders are contracts for locomotives to be installed in Spain, France, Chile, Japan and Mexico. A Mexican order including ten 150-ton, 3,000-volt direct-current locomotives is the first electrification in that country. The equipment will be installed for the Mexican Railway on the Mexico City-Vera Cruz Line and is expected to effect sufficient economies to pay for the entire equipment in a period of five years.

The six locomotives for the Spanish Northern Railway, also to be operated at 3,000 volts direct current, are nearly completed and will be in operation early next year. These will be called upon to handle both freight and passenger service over a heavy grade section and will be the first installation of 3 000 volts direct current in Europe.

As part of a large order for electrification equipment the Paris-Orleans Railway has under construction at the Erie Works of the General Electric Company a high-speed gearless passenger locomotive, which will be tried out on the initial electrification in France. In Chile, the Bethlehem Chile Iron Mines Company has purchased three 60-ton switching locomotives for hauling ore out of the Tofo mines. These will operate at the mines from a 600-volt trolley, but will haul ore to the bins from which it is taken to the port of Cruz Grande over the present 2,400-volt direct-current line. The Imperial Japanese Government had laid out an extensive program of electrification on the so-called Tokaido Railway using 1,500 volts direct current. Trial orders have been placed for locomotive equipment, and the Erie Works of the General Electric Company has recently shipped two 66-ton locomotives, which will be temporarily operated on the present 1,200-volt electrification pending the purchase of additional equipment for the electrification of those lines which at present are steam operated.

There are numerous indications that a greater interest in electrification is being developed in the United States, and it is predicted that within the next few years extensive work will be done in electrifying the main-line roads of this country.

Largest Street Railway Adopts Meters

The Chicago Surface Lines has placed an order with the Economy Electric Devices Company for Economy watt-hour meters to equip the entire system of 3,000 or more active cars. The order is for immediate delivery. The meters will be complete with energy saving and car inspection dials.

Metal, Coal and Material Prices

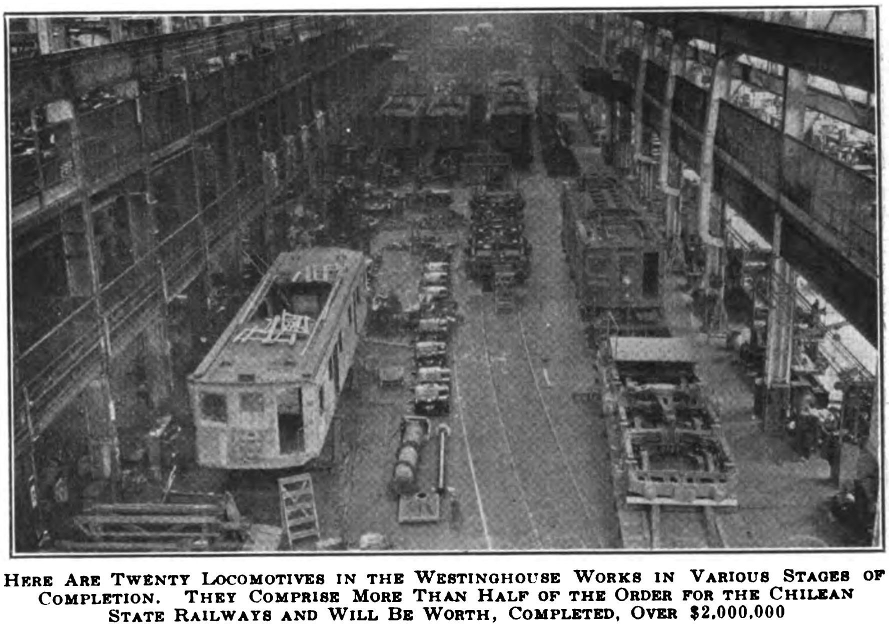
Metals—New York	Dec. 12, 1922
Copper, electrolytic, cents per lb.	13.95
Copper wire base, cents per lb.	15.625
Lead, cents per lb.	7 10
Zinc, cents per lb.	7.35
Tin, Straits, cents per lb.	37.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7.50
Somerset mine run, Boston, net tons	3 875
Pittsburgh mine run, Pittsburgh, net tons	2.625
Franklin, Ill., screenings, Chicago, net tons	2.375
Central, Ill., screenings, Chicago, net tons	1.675
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No 14, per 1,000 ft	6.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	90.00
White lead, (100-lb. keg), N.Y., cents per lb.	12.125
Turpentine, (bbl. lots), N.Y., per gal.	$1.395

Electrification Work Started

Work has been started by the Texas Interurban Company, Dallas, the corporate name of the company that will electrify the line of the Missouri, Kansas & Texas Railway from Dallas to Denton and operate it as an interurban line. The work of electrifying will go forward as rapidly as possible, according to Richard Meriwether, vice-president of the company and in charge of construction work. A crew of fifteen men has been put in the field digging holes for poles along the track of the steam railway. Mr. Meriwether said the entire electrification project, which is expected to cost approximately $1,500,000 will be completed by August, 1923, and cars started.

The route of the new line from Love Field into Dallas has not been selected, and will not be selected before Dec. 14, Mr. Meriwether said. The traction company will build its own line from Love Field into Dallas, a distance of about 5 miles, and the new line will connect either with the Oak Lawn line on Cedar Springs Road or with the Lave Avenue line at Lake and Oak Lawn Avenue. The mileage in either case is approximately the same and one route is just about as direct in its entry to the business district as the other.

The company has also placed a crew of engineers in the field for surveys of the route of entry into the city of Denton. B. R. Brown and S. R. Fowler, in charge of engineering crews, have made all necessary surveys and have located a depot site in the heart of the business district at Denton. The Denton County Commissioners' Court has also granted a fifty-year franchise for the electrification of the line and the operation of interurban trains over any part of the lines of the Missouri, Kansas & Texas Railway, in Denton County from the Dallas County line to the corporate limits of the city of Denton. A similar franchise will be granted by the Commissioners' Court of Dallas County.



Here Are Twenty Locomotives in the Westinghouse Works in Various Stages of Completion. They Comprise More Than Half of the Order for the Chilean State Railways and Will Be Worth, Completed, Over $2,000,000

Rolling Stock

Glendale & Montrose Railway, Glendale, Calif., expects to furnish new modern cars in line with its complete rehabilitation of the property.

International Railway, Buffalo, N. Y., lost thirty-one cars in a fire which destroyed the Cold Spring paint shop on the morning of Dec. 13. The cars destroyed consisted of nine Peter Witt type center exit cars; eleven double-end cars; three near-side pay-as-you-enter cars; four interurban cars and four converted one-man cars.

Public Service Company, San Antonio, Tex., has placed orders for fifteen new one-man cars to cost approximately $100,000, according to announcement by E. H. Keifer, general manager. Contract for purchase of the equipment was signed Nov. 25 and calls for the first delivery on cars eight weeks from that date. The new cars will be put in service in speeding up traffic in carrying out the traction company's agreement with the city in connection with the city's curtailment of the operation of jitneys in competition with street cars.

Boston (Mass.) Elevated Railway has given an order to the Westinghouse Electric & Manufacturing Company to furnish thirty motor and control equipments for cars. Each equipment will include four Westinghouse Type 508-A motors with helical gearing and Type K-71 controllers. The cars, which are practically duplicates of those purchased by the railway last March, are being built by the Laconia Car Company and will be equipped for operation from either end. Work on the equipments has been started at the East Pittsburgh Works of the Westinghouse Company and shipment will be made about February, 1923.

Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio, has purchased two gasoline rail cars from the American Railway Motor Car Company, Elyria, Ohio. These cars will be operated over the interurban tracks connecting Norwalk and Shelby, Ohio, a distance of 30 miles. The new cars will seat 40 passengers and weigh 13 tons. They are to be equipped with Midwest engines, and will have Timken roller bearings for the journals and a new type of transmission recently patented. The present owners of the railway bought it at a small fraction of its original cost, and are said therefore to have an opportunity to operate profitably.

Track and Roadway

Philadelphia (Pa.) Rapid Transit Company, through President Mitten, has submitted to the Council ordinances for three proposed new trolley routes connecting the Frankford section with Germantown and Nicetown.

Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, is constructing about 5 miles of new track around the Kelley Island Lime & Stone Company's plant near Lakeside.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., will extend its curves at Fourteenth Street and Twenty-first Avenue and Fifteenth Street and Twenty-first Avenue.

Public Service Railway Company, Newark, N. J., has begun the work of raising 1,000 feet of track on Lafayette Street, Riverside, N. J. The company and the Burlington County authorities planned to eliminate the Fairview Street and Pavilion Avenue crossings on both sides of the railroad by repairing Lafayette Street.

Pacific Electric Railway Company, Los Angeles, Calif., was given permission by the commission to make track changes in the City of Long Beach. The company plans to relocate its crossing across the tracks of the Los Angeles & Salt Lake Railroad at Alamitos Avenue and Broadway, to construct an additional track, and to relocate tracks across Alamitos Avenue and across the intersection of Olive Avenue and Broadway.

Power Houses, Shops and Buildings

United Electric Railways, Providence, R. I., is taking figures for the construction of its new carhouse on North Broadway, East Providence. The structure is to be one and two stories high, 535x170 ft., of brick and steel. C. R. Makepiece & Company, Providence, are the engineers.

British Columbia Electric Railway, Vancouver, B. C., is preparing to build a new substation on Bodwell Road to cost about $65,000. It will probably be ready in six months. This station will be of the latest type. It will supply direct-current for railway purposes in the South Vancouver district.

Louisville (Ky.) Railway is planning the erection of a large new office building and interurban station, work on which will probably start within three or four months. This station will house the offices of the company and its subsidiary, the Louisville & Interurban Railway, as well as the interurban lines operating out of Louisville, including those into southern Indiana operated by the Interstate Public Service Company.

Trade Notes

A. A. Heller has taken over the management of the International Oxygen Company, in place of L. W. Hench, secretary and general manager, resigned.

Locke Insulator Company, Victor. N. Y., has been awarded the order for insulators on the Paris-Orleans (France) Railroad 150,000-volt electrification. It is understood that this is the largest insulator order that has been made in ten years.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces a change in the addresses of the St. Louis and Los Angeles offices. The former office is now located at 717 South Twelfth Street, St. Louis, and the latter at 420 South San Pedro Street, Los Angeles.

Monroe Brass & Wire Company, Cincinnati, Ohio, announces the death of its manager, J. Sumner Monroe. The business conducted by the late J. Sumner Monroe was incorporated under the laws of the State of Ohio Oct. 6 as the Monroe Brass & Wire Company with L. D. Whitcomb as president and general manager.

H-E Supply Company, Chicago, Ill., has been organized with offices at 945 Monadnock Building by J. W. Himmelsbach. The company will handle the products of the United Boiler, Heating & Foundry Company of Hammond, Ind., which manufactures steel tanks, steel stacks, breeching, light structural steel work, United traveling grate stokers and accessories and repair parts for all types of automatic and hand-fired stokers. Mr. Himmelsbach is known to the electric railway field for his connections with the Green Engineering Company, of which he was formerly district manager in Chicago, and with the Johnson Fare Box Company.

New Advertising Literature

Locke Insulator Corporation, Victor, N. Y., has issued an eleven-page booklet entitled "Strain Insulators for Guy, Dead End and Anchor Service."

Gould Coupler Company, New York, N. Y., has issued a descriptive booklet describing its type B and C slack adjusters. Drawings are given of the applications of these brake slack adjusters to late designs of cars, including one-man types.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a twenty-page booklet, folder 4506, entitled "Salient Facts on Silent Gears." This is issued in order to acquaint the industrial gear user with the advantages of Micarta gears. The booklet describes the advantages of the use of Micarta gears and pinions and gives photographs and data describing some of their applications, tables of gear data, etc., enabling the gear user to judge whether or not they are applicable to his machinery.

Economy Electric Devices Company has recently published an interesting circular which is available for electric railway men, setting forth what may be accomplished by the substitution of aluminum field coils for copper. In this circular it is pointed out that as much as 1,500 lb. can be saved on some interurban equipment and up to 1,000 lb. on some city equipment by using aluminum coils. The technical aspects of the aluminum coil are quite clearly and fully set forth. Quite a considerable number of these coils are now in use on some forty electric railways.

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Volume 60 New York, Saturday, December 23, 1922 *Number* 26

How Shall Stranded Wire or Cable Be Specified?

ONE of the knottiest little problems now confronting power distribution engineers is to settle upon some standard way of specifying the sizes and types of stranded wires and cables. The American wire gage provides for solid wires through practically the entire range of commercial requirements. Unfortunately, when expressed in circular mils, the areas all come out in odd numbers, but there are fairly good reasons for the use of the present gage sizes in the "A.W.G." The most important of these is the difficulty that would be occasioned by any attempt to change them.

The situation is quite different once the "A.W.G." boundary is passed. For convenience in handling, conductors larger than No. 0000 must be stranded. There is as yet no general agreement as to how the sizes of these conductors should be specified, that is whether their sizes should be stated in terms of total circular mils of cross-section or in number of strands of wires of the standard gage. Obviously the same total area can be secured with the use of a variety of strand sizes; the greater the number of strands the more flexible being the cable. If a given total area is specified, there must be a certain latitude or tolerance permitted the manufacturer, because otherwise he would be obliged to draw special sizes of strand.

The purchaser of a stranded wire or cable has essentially to specify the number of strands, as well as the area, to secure the current-carrying capacity which he desires combined with the required flexibility. It would therefore seem desirable to make up the standard specifications on the basis of the number of strands and sizes of strands. For each approximate total area there could be a sufficient variety of stranding to meet commercial needs in regard to flexibility. For the convenience of purchasers, the approximate size of each stranded conductor could be given in the tables.

The Inductive Interference Problem Can Be Solved Only Through Co-operation

ONE of the subjects assigned to the Engineering Association committee on power distribution this year is that of "inductive co-ordination." This relates to the harmonizing of differences in regard to the phenomena long and unfortunately grouped under the term "inductive interference." This committee ought to be able to foster the spirit of co-operation suggested by the comparatively new but generally acceptable term "inductive co-ordination," a spirit which is in every way preferable to the conflict suggested by the older term.

The accepted use of the term "inductive co-ordination" in itself indicates that a marked change in attitude on the part of leading engineers is taking place. This more constructive approach to the problem should be disseminated to the men all through the utility fields, by means of such works as the report of this committee. All public utilities must co-operate along engineering lines if they are to furnish their maximum of public service. Of course, where electrical transmission forms an important part of a public utility service, there is always a likelihood of what has been known as "inductive interference." This must be controlled, and as no one utility can monopolize the ether, each must be willing to go to a reasonable expense to insure the safeguarding of its own service as well as the protection of its neighbors.

Beyond the direct advantage to the utilities in getting together, there is the further advantage that all public utilities will receive greater consideration at the hands of public utility commissions if it is understood that efforts are being made to settle differences along sound technical and economic lines. Among themselves utilities may have differences of opinion as to details and even as to principles. As a whole, however, they should present a united front, for it is enough that a commission should have to adjudicate the relations or differences between public and utility. It should not have to be called upon to settle differences of one utility with another.

Discontinuance of Tax-Exempt Issues a Benefit to All

MANY of those strongly in favor of the proposed constitutional amendment to stop the issue of tax-exempt bonds doubt whether it will ever pass, because they think the smaller and less populous states will be unwilling to give up the present privilege enjoyed by themselves and their subdivisions in issuing these securities. They point out that in the decision on a constitutional amendment of this kind, Idaho or Florida, for example, has as much voice as New York or Pennsylvania, although in these latter states the corporations which would indirectly benefit from such an amendment and the individuals who are now escaping a great deal of state taxation because of the exempt securities are much more numerous. As the less populous states are now selling their securities to citizens of the more populous states at far lower interest rates than would be possible if the amendment was in force, it is believed that it will be very difficult to get enough of them in line to pass the amendment.

It is to be hoped, however, that further discussion of the subject will indicate to the representatives of these states that their gain from such an amendment will be in equal if not greater ratio than that of the more populous and industrial states.

In the first place, it is not difficult to point out, as was done in the debate in the House this week, that the practical effect of the present amendment is gradually to exempt from taxation the very wealthy and to increase the taxation on those of moderate income. This is a matter which is a serious one to all states alike, but as the people of great wealth are most likely to reside near the large industrial and economic centers of the country, the exemptions to the federal income taxes would be much more numerous in the Eastern and Central states than in the states farther west or south. This should mean that the practical effect of the opposition of an agricultural or mining state to the amendment is to assess on its inhabitants a greater portion of federal taxes to the extent that the very wealthy who are largely residents of other states escape taxation.

So much for the individual side of the question. Another point is the corporation side, and the effect on the country at large of a lessening of corporation activity as a result of the present policy. While the large industrial corporations usually have their financial offices in the older states, their fields of activity must be largely among the states requiring greatest development, whether their purpose is direct development like railroading, mining and power, or indirectly as in manufacturing equipment for these purposes. Here again is a place where the interests of the less populous states seem at least proportionately to be as great in the proposed amendment as the more populous states.

Lower Turnover of Trainmen Favors Better Merchandising

IT USED to be said that one big reason why it was hard to train platform men to be courteous was that they did not look upon their railway job as a lifework; that most of them were on the cars only until such time as they could get back to their trades. Therefore, they did not have the necessary incentive to take pride in their work.

Today matters are much better as regards turnover in the platform ranks. The motorman and conductor are paid a wage which relatively is so much higher than before the World War that there is no longer the old desire to quit at the first opportunity. One may say that such attractive outside opportunities are much fewer. The union itself also finds its interest served by making the men feel that they have permanent and not temporary occupations. One may say then that the casual character of platform work has largely disappeared.

At the same time, none of us should be satisfied that the platform man has improved as fully as is possible in those requisites that should go with an employee who so nearly is the personal representative of the company to the patron as he is. The principal task is to secure a greater degree of courtesy. On the average property, there is still a great field for improvement in developing the attitude of mind of both motorman and conductor that the passenger is their personal customer. Some railways have really accomplished something along this line, but the observations of the *Journal* editors are that the customer still gets pretty shabby treatment on many systems.

The problem is largely one of "selling" the trainmen the merchandising principles, and this task must start with the management. It can be followed up by the superintendents, but the spirit of the thing must emanate from the big boss.

Another point in this development of the merchandising atmosphere is that the conductor might be authorized under certain conditions to refund the fare, making report of each such transaction. Perhaps this would appease the ruffled customer in some circumstances and turn his antipathy. Suppose such a policy did cause the loss of a few nickels a day, would that not be insignificant if the practice was found to help in winning friends, or in keeping from making enemies?

Our Heads Are Coming Out of the Sand

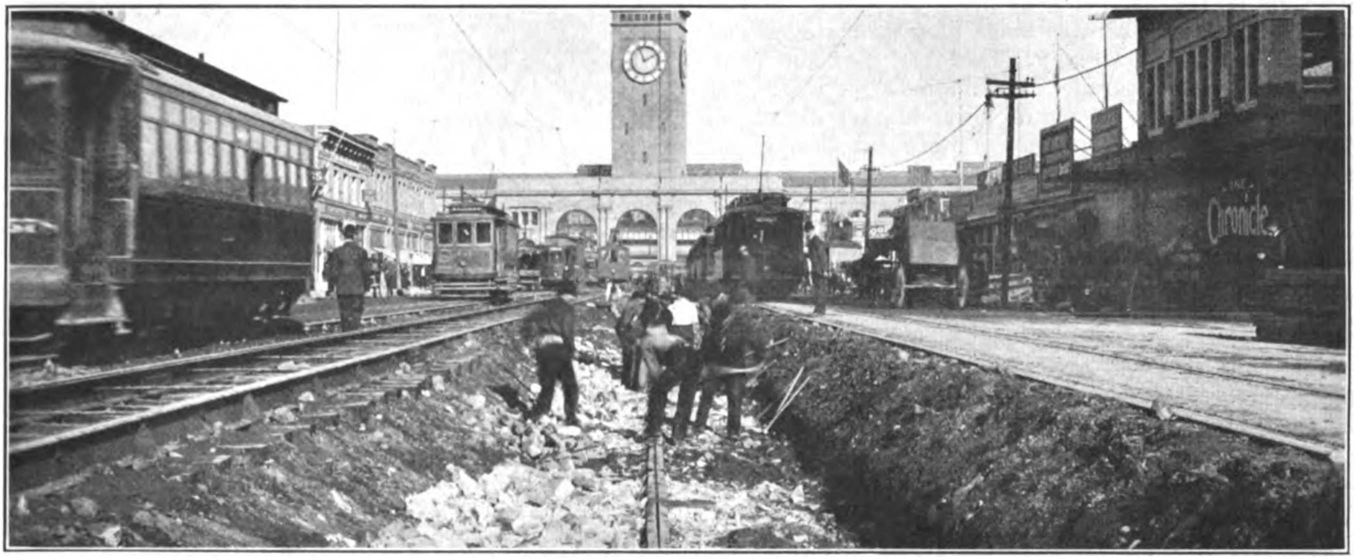
EVIDENCE is plain and plenty that a change of heart and mind is rapidly taking place with respect to the attitude of railway men toward the bus. Several of those who so vigorously opposed admitting bus companies to the transportation counsels of the American Electric Railway Association have already come to question the wisdom of their stand. There was a great tendency on the part of many of the important executives of the railway field to fight the bus, to have nothing to do with it themselves as a transportation tool. But several of these same men have since taken up operation of buses as adjuncts to their rail lines.

It has taken less than a year for them to grasp the fact that they must take hold of the bus. They must, because the public demands buses. They must because it is good transportation business to take care of the demand for a kind of service beyond that supplied by the rail lines. They must do it because there are places where the bus is economically the right form of vehicle. They must, anyway, whether altogether profitable or not, as a means of protecting present rail investment and maintaining their monopoly (which is sound principle from the public viewpoint) so that the bus service may be co-ordinated and helpful, not competitive and destructive. Let no one get the idea that the bus will replace the railway. The point is that the railway man must use the bus as well as the rail car in his business.

These comments are made not because of the opportunity to say "we told you so," but rather to bring out the fact that it now seems clear that those who took the position that buses should be used, and bus companies should be in the association, were right. The important thing now is not the error made (and it is being considered such, more and more), but to recognize the mistake and to revise the kind of thinking that has been going on while there is still time for constructive thinking to make the most of the bus—to avoid its potential destructiveness if its coming is unguided.

Why not give consideration again to an amendment of the American Association constitution to permit membership of the stable, legally recognized bus companies, as an early step toward harmonizing interests and avoid cut-throat fighting? Certainly, from the standpoint of helpful value to the bus transportation company, the American Electric Railway Association has much more to offer than any strictly bus association has now or will have for several years to come, provided the railway members really take a helpful and not antagonistic attitude. It would be to the best interests of the railways selfishly to do this.

The *Journal*, as one of the earliest advocates that railway men should make use of the bus and that bus companies should be taken into the association, feels that its position has been justified. And also, inasmuch as so many railway men were at first antagonistic toward the bus and objected to discussions of it in the *Electric Railway Journal*, the wisdom of satisfying that feeling but at the same time carrying on the educational work with both railway men and independent bus men by publishing a separate bus paper (*Bus Transportation*) may now be better appreciated.



RAISING LOWER MARKET STREET TRACKS AFTER THE FIRE
Three tracks raised and in service at new grade. The grade prior to raising is indicated by slot in old cable track not yet replaced by new construction.

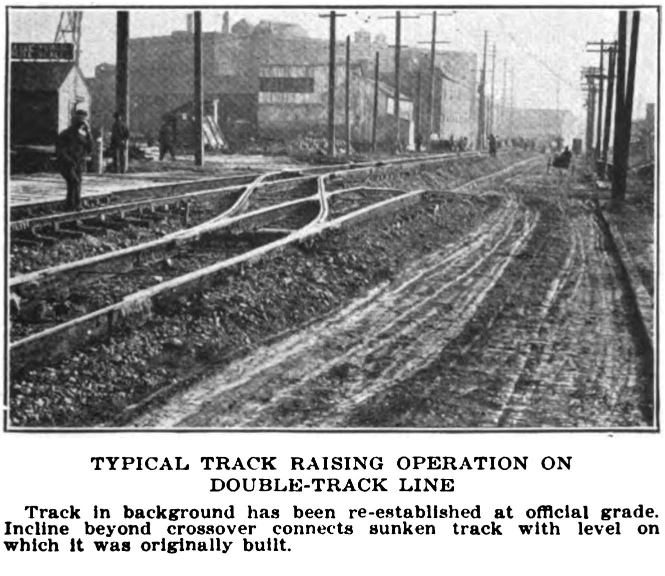
Maintaining Continually Sinking Track

Nine Miles of Track in San Francisco Settles at the Rate of 0.1 Ft. per Year—Permanent Types of Construction Are Held Inadvisable—Methods Used for Restoring Grade Are Described

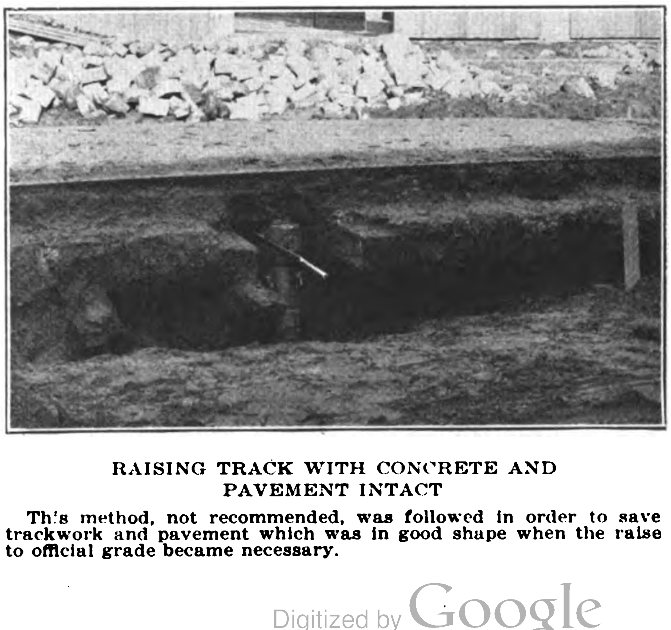
YEARS ago the shore line of San Francisco Bay extended a mile or more inland from its present location along parts of the San Francisco waterfront, but as the city developed the tide flats and shallows have been filled in so that much of the waterfront is now on filled land. The material used in making the fills has been of good quality, but the filled area has nevertheless continued to settle year by year because of the great depth of underlying soft mud. In the construction of the Southern Pacific Building on lower Market Street piles 125 ft. long were used and for this depth only soft material was encountered. All large structures in the filled area are built on piles, which support them at an established grade, while the streets continue to settle, thus making the situation worse than if structures and streets settled alike. Some of the problems brought upon the street railway by this condition and the methods of meeting them are described in this article.

The Market Street Railway operates some 9 miles of track in the areas subject to settling and has found that the rate of subsidence is fairly uniform, being about 0.1 ft. per year. This has necessitated entire reconstruction of the tracks at intervals. Fortunately, in practically all of the areas affected the electric lines operate on double tracks, thus making it possible to avoid interruption to service by operating short portions as single-track lines during reconstruction.

All of the tracks east of the old shore line, as shown on the accompanying map, have been rebuilt since the fire of 1906; some of them have been raised twice in that time. Frequently a subsidence of 3 ft. and sometimes as much as 5 ft. occurs before the grade is restored. In 1911 the track on Third Street was brought



TYPICAL TRACK RAISING OPERATION ON DOUBLE-TRACK LINE
Track in background has been re-established at official grade. Incline beyond crossover connects sunken track with level on which it was originally built.



RAISING TRACK WITH CONCRETE AND PAVEMENT INTACT
This method, not recommended, was followed in order to save trackwork and pavement which was in good shape when the raise to official grade became necessary.

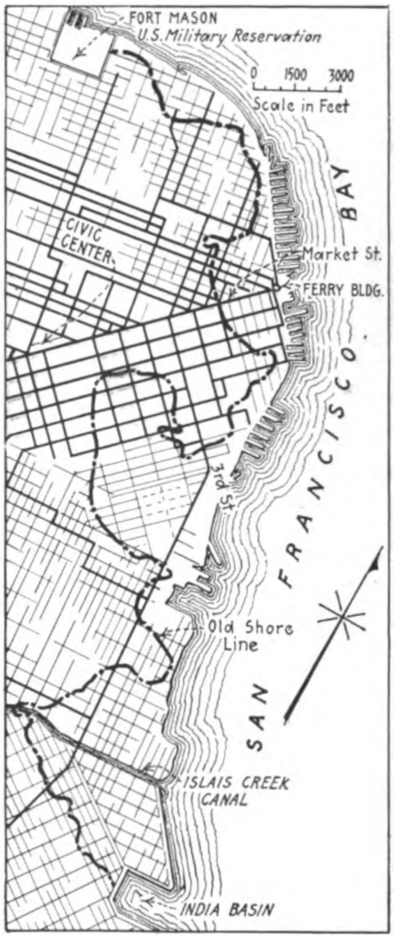
up to grade, the lift being as much as 5.35 ft. at the lowest point. The fill was made of good material and compacted in the usual way. This track has now sunk 1½ ft. below official grade. In sinking a pit which the company recently put down on lower Market Street, no less than five sunken pavements were cut through in excavating to a depth of 10 ft.

For this continually settling foundation the only method believed to be generally satisfactory is the entire reconstruction of the track at appropriate intervals. The practice is to allow the track to settle without any endeavor to maintain or otherwise improve its condition until the time comes for entire reconstruction. In reconstruction the pavement is removed, rails and ties are taken up, and the material used for making the fill is dumped on top of the old ballast. New ballast is provided and old or new rails and ties, if required, are then laid. A finished height of about 2 in. above the official grade is usually made to allow for the immediate settlement.

In one notable case the track and paving were raised intact. This was done to save the paving as reconstruction became necessary at a time when track and paving were in good condition. This method is not recommended. The process is slow and comparatively costly, but a still more serious objection is the impossibility of tamping the fill thoroughly from the sides of the raised track.

Track with paving intact jacked to the new grade is shown in one of the accompanying illustrations. In this case a "permanent" form of track construction had been used—basalt blocks on top of concrete extending down to the bottom of the ties. In raising this track, trenches were first dug along either side of the track and 20-ton jacks were placed against the under side of the rail flanges at intervals of about 20 ft. As new material was shoveled under the raised track it was tamped horizontally from both sides, using 4-in. x 4-in. timbers fitted with handles.

Because the subsidence is at a slow and uniform rate, fairly accurate prediction can be made of the time when a maximum permissible separation of street and building grade will be reached. Endeavor is made to program track and paving work in such a way that as this time approaches no work will be necessary and when the street is regraded new paving and perhaps also new rails can be put down without economic loss. Under these conditions it is considered economical not to use a permanent and expensive type of rail foundation such as concrete, steel ties, etc. A short length of track built on trestle has been found most unsatisfactory. The trestle keeps the track at grade satisfactorily, but the paving (basalt blocks are used in that district) is continually sinking away from the track and requires to be removed and replaced on new ballast about once a year. The use of planks over the stringers to support the paving has been considered inadvisable because of the renewal costs on the planking and because there would still be the subsidence of the remainder of the street to make a continually increasing abrupt change of grade on either side of the track. The trestle itself is a necessity to maintain exact grade for the approach to a lift bridge. Some of the typical grade subsidences are shown in the accompanying profile. Lower Market Street, which was restored to grade in 1907 by raises of as much as 2.86 ft. in some places, is now 1 to 2 ft. below grade again. Lower Clay Street was brought up to grade in 1908 by raises of 2 to 3 ft. and was again required to be raised a foot or more in 1920.



MAP SHOWING AREA THAT IS SUBSIDING

All that area between the bay and the old shore line is sinking at the rate of 0.1 ft. per year. Most of this has a soft mud bottom of great depth.

In these soft-bottom areas where the tracks cross sewers or culverts supported rigidly on piles conditions

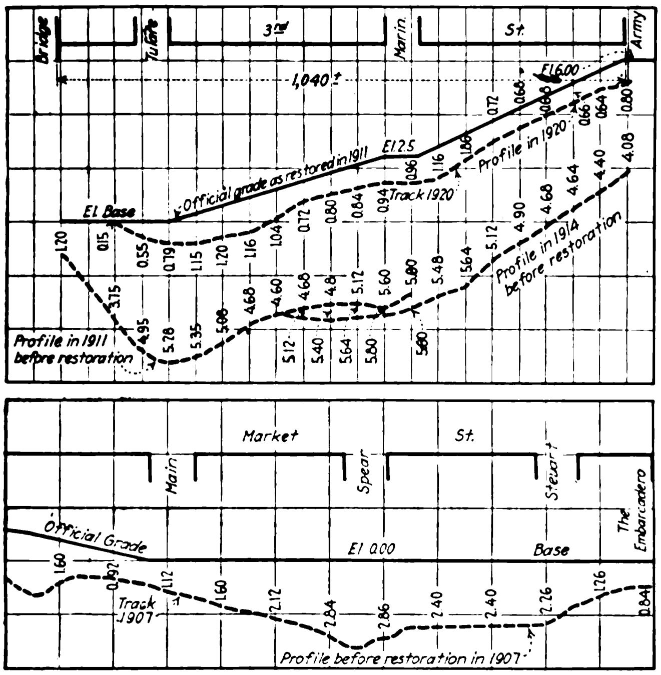
RECONSTRUCTION OF CABLE TRACK IN SERVICE

This track has been raised and back-filled. The difference in level between track and remainder of the street, which has yet to be filled, shows amount of raise, which has been necessary to compensate for the subsidence.

UNITED CIGAR STORES COMPANY

RECONSTRUCTED CABLE TRACK READY FOR CONCRETE

Note the yokes spaced 3 ft. 6 in., which take the place of ties. Wooden forms are built around these yokes for the concrete placed in final construction stage. This track indicates the restored street grade to which remainder of the street will be raised.



SUBSIDENCES ON THIRD STREET AND ON LOWER MARKET STREET

These are typical profiles. In the case of lower Market Street the tracks are now well below the official grade again.

are introduced that cannot be easily remedied. In one case where the tracks cross a box culvert the subsiding ground on one side of the culvert allowed the track to go down until a difference of 1 ft. in elevation developed within a distance of 20 ft., the rails bending to allow the track to conform to this change. Operation over the track in this condition has continued for about five years.

In another case where a concrete sewer 10 ft. wide underlies the tracks lengthwise, so that part of the tracks are rigidly supported and other parts are on settling ground, uneven settlement has caused the inner ends of the ties on both tracks to rise 2 to 3 in., while the outer ends have sunk an equal amount, thus tilting the tracks away from each other.

CABLE LINE SETTLEMENT CORRECTED BY RAISING STRUCTURE

Re-establishment of grades on the cable lines is quite a different process from that used for the electric lines. The cable railway track is supported on steel yokes embedded in concrete; a construction which could be rebuilt only at prohibitive costs. It has been found possible to raise this structure bodily, however, and as the cars are light the raising is done without interrupting operations. The narrow gage (3 ft. 6 in.) and the fact that heavy equipment is not used make it possible satisfactorily to tamp the back-fill from the sides. Sand is used largely for the back-fill and is kept wet during the tamping. When the side trenches are refilled they are also thoroughly tamped.

In order to avoid danger of cracking the concrete, the cable tracks are raised in sections of not less than 200 ft. After excavating side trenches 10-ton screw jacks are placed at 8-ft. to 10-ft. intervals under shoulders of the yoke or under the concrete bottom, as may be more convenient. The jacks are rested on pieces of old ties sewed up for this purpose. The first lift is made at least 100 ft. from one end of the section to be regraded, and the maximum lift is kept at this point until jacks are placed for 100 ft. or more in either direction and the desired grade at this central point has been reached with an easy slope in either direction. Work is then advanced in one direction only, always keeping an easy grade ahead of track that has been restored to grade.

The gangs raising cable track consist of about fifteen men and will ordinarily raise about four blocks of single track per month. A track raise of 3 to 4 in. per day has not been found to be detrimental to the concrete of the cable duct. The cable tracks are usually finished 2 in. above the official grade.

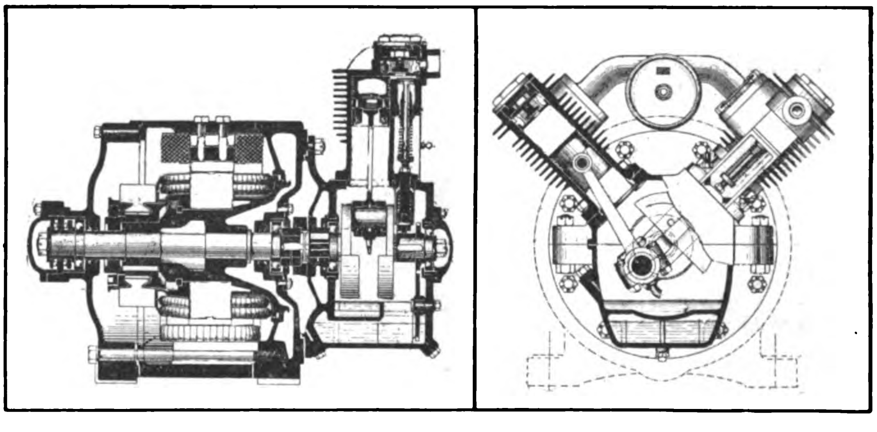
B. P. Legare, from whom material for the foregoing was obtained, is engineer of maintenance of way and construction of the Market Street Railway and has been in charge of all track work done since 1907.

A Light-Weight, High-Speed Motor Compressor

THE department of studies of the unified transportation system in Paris (la Société des Transports en Commun de la Région Parisienne) is attacking several fundamental problems of urban transportation. This was illustrated in the article on an experimental light-weight car appearing in the issue of this paper for Dec. 2. Another result of the researches of this department is a light, high-speed, direct-connected motor-compressor, weighing complete about 420 lb. The accompanying illustrations show the general construction.

The compressor is driven by a 2½-hp., four-pole series motor, operating at full load at 1,100 r.p.m. Its armature runs in ball bearings. The ends of the motor casing are of aluminum.

A flexible coupling connects the motor with the compressor, which has two cylinders, one 2½ in., the other 3½ in. in diameter. These are arranged in "V" at right angles to each other. The inlet valves are controlled by a cam carried on the main shaft. Like the motor shaft, the crankshaft of the compressor is carried in ball bearings. It is claimed that the new compressor is 20 per cent more efficient than a compressor of the low-speed type and 30 per cent lighter. An extended illustrated description of the motor-compressor will be found in a recent issue of *L'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles.*



LONGITUDINAL SECTION AND CROSS-SECTION OF EXPERIMENTAL MOTOR-COMPRESSOR FOR USE ON TRAMWAY CARS IN PARIS

Budget Control in Boston

All Expenditures Are Controlled by a Budget Prepared Every Six Months and Semi-Annual and Monthly "Controlling Sheets" Are Used in Order to Check Expenditures

ALL expenditures on the Boston Elevated Railway both for capital and operating accounts are controlled by a budget which has proved very satisfactory to the company, one reason being that it enables all operating departments to plan and conduct their work systematically and consequently with the greatest real economy.

For the operating budget the year is considered as a whole and no false feeling of prosperity or of disappointment is caused when the monthly earnings go up or down from perfectly natural causes. This means that the work can be planned more carefully and when once undertaken does not have to be stopped suddenly at considerable loss.

An article on the forms and classification used in the preparation of the Boston Elevated Railway budget, written by E. M. Flint, assistant to general manager, was published in the issue of this paper for Dec. 25, 1920. The present article will describe methods followed in the preparation of the budget and how the expenditures are checked and controlled. A tentative operating budget is prepared in June and December containing an approximate estimate of the receipts and expenditures for the six months of the following half-year period. In the preparation of this tentative six-month budget the estimated gross earnings are based on the figures for the corresponding period of the previous year with allowances for expected increases or decreases in traffic, changes in fares, etc., and the estimated expenses are based on information secured from the operating departments as to their requirements, taking into consideration wages paid, prices of material, etc.

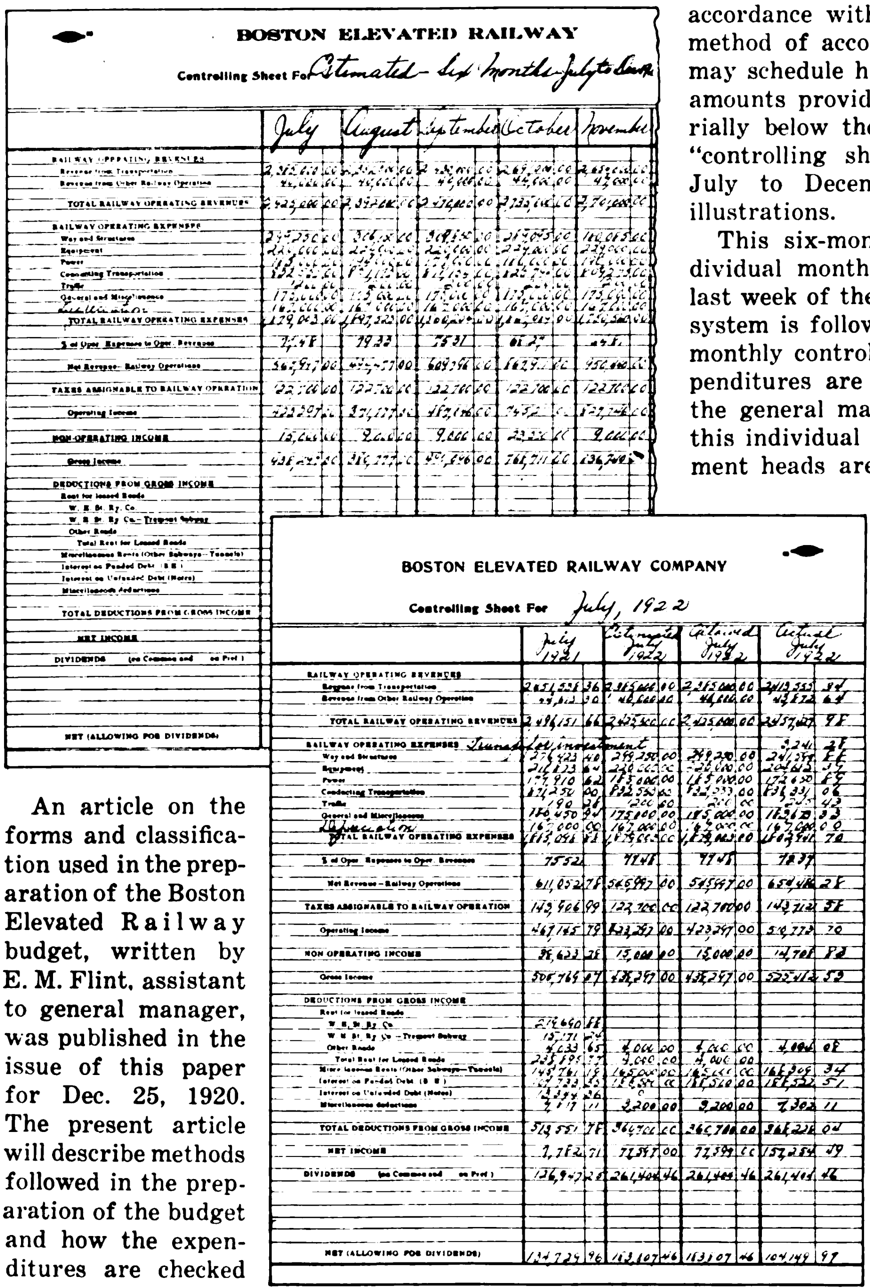
For this purpose the departments considered are four in number, namely, maintenance, equipment, power and transportation. These estimates are gone over by the general manager in conference with the department heads before the various amounts are allowed. When this has been done, each department head is furnished with a copy of this tentative six-month budget showing the amounts which he is authorized to spend during that period under the various accounts, divided in accordance with the Interstate Commerce Commission method of accounting, with the understanding that he may schedule his work with the view of spending these amounts provided the gross earnings do not fall materially below the estimates. This is given the title of "controlling sheet" and the one for the six months July to December, 1922, is shown in one of the illustrations.

This six-month controlling sheet is followed by individual monthly controlling sheets issued during the last week of the preceding month. Practically the same system is followed in the preparation of this individual monthly controlling sheet except that the estimated expenditures are not the subject of conference between the general manager and department heads, and after this individual controlling sheet has been issued department heads are not required to restrict their expenditures to amounts less than those allowed even though it may be apparent some time during the month that the earnings will fall below the estimate. This arrangement is for the purpose of giving the department heads as free a hand as possible to carry out their work as scheduled and in the most economical manner.

As each month passes, figures are filled in a column provided on this controlling sheet showing the actual expenditures so that when the accounts are closed for the month the sheet shows in four columns the estimated figures for the month, the allowed figures, the actual figures and the actual figures for the same month of the previous year.

In the monthly controlling sheet for July, 1922, the estimated and allowed figures happened to be the same, but this is not always the case.

There is also furnished to each department head before the fifteenth of each month a statement prepared by the general auditor giving the operating expenses by sources showing the amounts spent by each department chargeable to each account, which



BOSTON ELEVATED RAILWAY

Controlling Sheet For Estimated – Six Months – July to Dec.

	July	August	September	October	November
RAILWAY OPERATING REVENUES					
Revenue from Transportation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Revenue from Other Railway Operation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL RAILWAY OPERATING REVENUES	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RAILWAY OPERATING EXPENSES					
Way and Structures	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Equipment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Conducting Transportation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Traffic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
General and Miscellaneous	175,000 00	175,000 00	175,000 00	175,000 00	175,000 00
Depreciation	167,000 00	167,000 00	167,000 00	167,000 00	167,000 00
TOTAL RAILWAY OPERATING EXPENSES	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
% of Oper. Expenses to Oper. Revenues	[illegible]	79.33	75.31	[illegible]	[illegible]
Net Revenue—Railway Operations	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TAXES ASSIGNABLE TO RAILWAY OPERATION	122,700 00	122,700 00	122,700 00	122,700 00	122,700 00
Operating Income	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NON-OPERATING INCOME	15,000 00	9,000 00	9,000 00	[illegible]	9,000 00
Gross Income	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEDUCTIONS FROM GROSS INCOME					
Rent for leased Roads					
W. E. St. Ry. Co.					
W. E. St. Ry. Co.—Tremont Subway					
Other Roads					
Total Rent for Leased Roads					
Miscellaneous Rents (Other Subways—Tunnels)					
Interest on Funded Debt (B. E.)					
Interest on Unfunded Debt (Notes)					
Miscellaneous deductions					
TOTAL DEDUCTIONS FROM GROSS INCOME					
NET INCOME					
DIVIDENDS (on Common and on Pref.)					
NET (ALLOWING FOR DIVIDENDS)					

BOSTON ELEVATED RAILWAY COMPANY

Controlling Sheet For July, 1922

	July 1921	Estimated July 1922	Allowed July 1922	Actual July 1922
RAILWAY OPERATING REVENUES				
Revenue from Transportation	2,451,538 36	2,385,000 00	2,385,000 00	2,413,555 34
Revenue from Other Railway Operation	44,613 30	40,000 00	40,000 00	43,872 64
TOTAL RAILWAY OPERATING REVENUES	2,496,151 66	2,425,000 00	2,425,000 00	2,457,427 98
RAILWAY OPERATING EXPENSES [illegible]				3,241 28
Way and Structures	276,423 40	249,250 00	249,250 00	241,354 [illegible]
Equipment	216,823 64	220,000 00	220,000 00	204,615 [illegible]
Power	177,910 62	185,000 00	185,000 00	172,650 [illegible]
Conducting Transportation	871,250 00	882,553 00	882,553 00	836,331 06
Traffic	190 26	200 00	200 00	245 42
General and Miscellaneous	180,450 94	175,000 00	175,000 00	182,610 33
Depreciation	167,000 00	167,000 00	167,000 00	167,000 00
TOTAL RAILWAY OPERATING EXPENSES	1,885,098 88	1,879,003 00	1,879,003 00	1,802,941 70
% of Oper. Expenses to Oper. Revenues	75.52	77.48	77.48	73.37
Net Revenue—Railway Operations	611,052 78	545,997 00	545,997 00	654,486 28
TAXES ASSIGNABLE TO RAILWAY OPERATION	143,906 99	122,700 00	122,700 00	143,712 58
Operating Income	467,145 79	423,297 00	423,297 00	510,773 70
NON OPERATING INCOME	38,623 28	15,000 00	15,000 00	14,708 82
Gross Income	505,769 07	438,297 00	438,297 00	525,482 52
DEDUCTIONS FROM GROSS INCOME				
Rent for leased Roads				
W. E. St. Ry. Co.	214,690 88			
W. E. St. Ry. Co.—Tremont Subway	15,171 24			
Other Roads	4,033 65	4,000 00	4,000 00	4,046 08
Total Rent for Leased Roads	233,895 77	4,000 00	4,000 00	
Miscellaneous Rents (Other Subways—Tunnels)	145,761 18	165,000 00	165,000 00	166,909 34
Interest on Funded Debt (B. E.)	[illegible]	187,500 00	187,500 00	188,532 51
Interest on Unfunded Debt (Notes)	12,344 86	0		
Miscellaneous deductions	2,117 11	9,200 00	9,200 00	7,302 11
TOTAL DEDUCTIONS FROM GROSS INCOME	513,551 78	365,700 00	365,700 00	368,228 03
NET INCOME	7,782 71	72,597 00	72,597 00	157,254 49
DIVIDENDS (on Common and on Pref.)	126,947 25	261,404 46	261,404 46	261,404 46
NET (ALLOWING FOR DIVIDENDS)	134,729 96	188,807 46	188,807 46	104,149 97

TYPICAL SEMI-ANNUAL AND MONTHLY CONTROLLING SHEETS USED IN BOSTON ELEVATED RAILWAY BUDGET PRACTICE affords the departments an opportunity intelligently to analyze their expenditures.

The budget for capital expenditures is made out on a yearly basis with respect to the larger projects and is added to from month to month as the smaller matters come up. The practices of budgeting and controlling the capital expenditures are very similar to those of budgeting and controlling the operating expenditures except that the capital expenditures are not, of course, based on estimated earnings and are therefore followed only to the extent of insuring that the expenditures are kept within the appropriations.

The budget system in practically its present form has been in use since Jan. 1, 1919.

How Money Is Handled by Seattle Street Railway

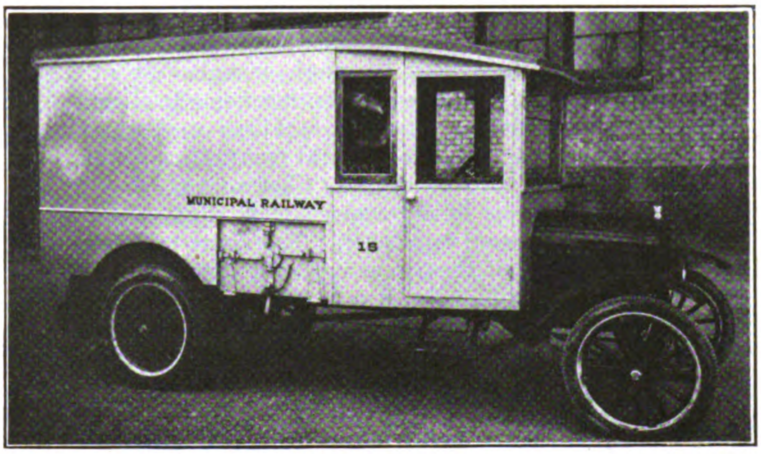
By Allen B. Hiatt

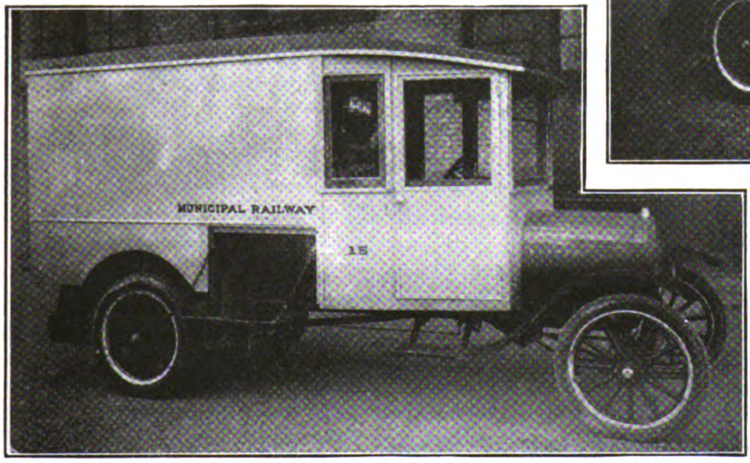
Auditor Department of Public Utilities, City of Seattle, Wash.

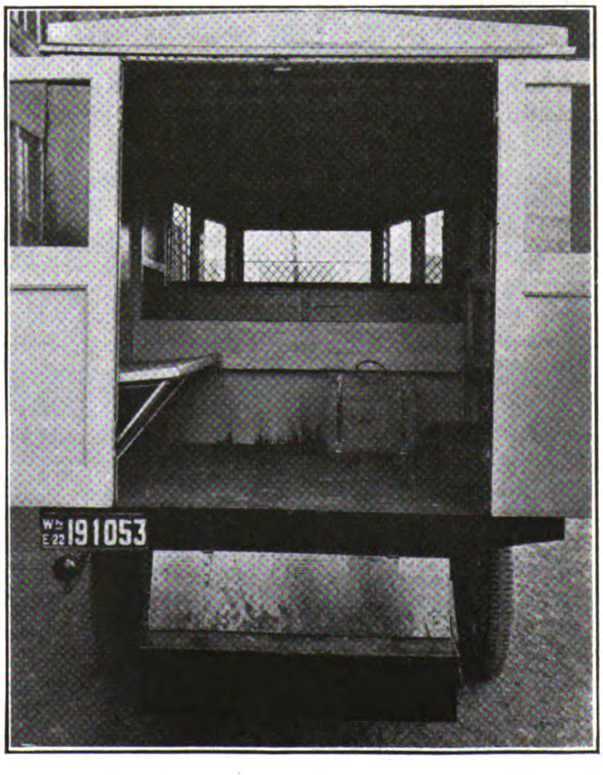
THE Municipal Street Railway of Seattle, shortly after its purchase of the Puget Sound Traction, Light & Company system, adopted the use of the auto truck for the collection of money from the carhouses and the distribution of transfers and stationery to them.

The company had followed the slower and more inconvenient method of using an old single-truck street car.

After three years' experience we recently purchased a new chassis (having worn out the old), placed upon it the old body, which we had slightly remodeled, and will continue to use the truck, well satisfied with the results.







Steel Money Compartment and Interior Arrangement, Seattle Money Car

The accompanying cuts illustrate how the body is built to fit our needs. A heavy steel tank, opening at the side of the car and placed just behind the driver's seat, extends across the body with a drop-door at each end.

In the tank, which is well secured and locked at all times, is carried all moneys. "Lost articles," stationery, transfers, etc., are carried in the body proper, a shelf being arranged on top of the tank to care for the transfer cases. Seats are placed along each side for the convenience of the cashiers on their daily trips to the banks and are arranged to fold up against the side of the body when not in use. Underneath, at the rear, is a box for spare tires, so placed as to serve for a step. The sides of the body are of sheet metal and the top of agasote. It was designed and built in our shops.

Two men, armed, drive the truck to the various carhouses, picking up the money, "lost articles," and interdepartment mail to be brought to the office, and leaving stationery and one day's supply of transfers. When the receipts have been checked, balanced and prepared for deposit they are taken to the bank by these two men and the office cashiers.

We find the truck much faster, more convenient and its routing more flexible, while at the bank we can pull up to the curb or to the alley entrance, thus eliminating the blockade of traffic on a heavily traveled street which is caused by the street car method of handling.

Wisconsin Utilities Advertise

A CHECK on the advertising carried in newspapers by the public utilities of Wisconsin during the month of January showed that 9,776 column inches were used in twenty-eight of the forty-two daily papers of the state. The four Milwaukee daily papers carried 5,505 column inches of such advertising and the weekly papers carried 1,237 column inches in addition. This aggregated about ninety-four pages of paid advertising for the month.

Safety Measures Cut Accidents

They Also Reduce Costs on the Chattanooga Street Railway Lines to 3½ per Cent of Gross Instead of More than Five Times that Amount—A Representative of the Company Gives Particulars

A REVIEW of the safety work of the Chattanooga Street Railway lines though which the percentage of accident costs to gross were reduced from 17.8 per cent to 3.5 per cent in five years is given by J. C. Costello, editor of "Electro Topics" of the Chattanooga system in *National Safety News* for December. An abstract follows:

For several years prior to 1919 the number of accidents occurring on the street railway lines in Chattanooga, and the consequent resulting expenditures, has been constantly increasing, the expense particularly being materially augmented in 1917 and 1918 as a result of a number of serious accidents. The total amount expended on account of accidents reached a maximum in 1918, when as a result of 2,793 accidents in that year and held-over claims from the previous year we expended 17.7 per cent of our passenger revenue. In one instance, the records show an expenditure for a single month equivalent to 30 per cent of the passenger revenue.

Late in 1918 the conclusion was reached that the only salvation lay in a very thorough organization of all employees for the purpose of bringing home to them the need and benefits of intensive accident prevention work. After casting about for several months for some effective method of procedure the "Chattanooga plan" of safety contests was finally evolved from suggestions received from our own employees. The contests have been the very heart of the company's safety work since their inception. Contest No. 8 is now in progress and our employees seem even more enthusiastic in the present contest that they were in the first one.

THE PLAN OUTLINED

The plan, with its many novel features, may be summarized as follows:

Members of the various operating departments, excluding superintendents and foremen, are eligible to participate. The contestants are divided into six teams, each with a captain and two lieutenants. Contests are of four months' duration; to be entitled to a prize award each member must be engaged in active company work for at least 720 hours during the four months period. The rules require that all accidents, no matter how slight, must be reported. In the cases of cars operating on the road, motormen and conductors are required to make out separate reports. Every untoward incident, such as a controller flash, disturbance or ejectment of a passenger, the frightening of an animal resulting in an accident, a trolley break, broken glass, etc., is classed as an accident. Severe penalties are meted out for failure to make out reports or for willful concealment or misrepresentation of facts in connection with an accident. The winning team divides a cash prize of approximately $600 equally among its members, and badges of merit are awarded men of other teams who have earned perfect records. Appropriate recognition is also given those who establish exceptional records in more than one contest.

The total number of accidents in 1917 and 1918 was 2,291 and 2,793 respectively, but the actual number was no doubt considerably higher, since the rules covering the classification and reporting of accidents at that time were not as strictly defined or enforced as at present. As compared with a monthly average of 233 for 1918, all classes of accidents were reduced to a monthly figure of 182 in 1919, 201 in 1920, 151 in 1921, and 123 for the first half of this year—in other words, an average of 4.1 per day now as compared with 7.8 per day in 1918.

Naturally a big improvement was noted in 1919, the first year of intensive safety work. As compared with 1918, the number of employees' accidents was decreased 44 per cent, and the number requiring medical attention 64 per cent. The total cost of employees' accidents, including lost time, payment for injuries and medical attention, decrease 84 per cent, this saving alone being twice the entire expense of carrying on all safety work, including the cost of contests.

For the same period the total number of all accidents was decreased 22 per cent. The number of claims filed decreased 56 per cent. The number of suits filed was reduced 59 per cent, and a reduction of 56 per cent was effected in the total costs on account of injuries and damages. The total accidents for 1920 was greater than in 1919. This does not mean that the results were not as good as for the previous year, but is really due to the fact that the safety plan had been better established by 1920 and more complete accident reports were being received from the men. The cost of accidents increased approximately $11,000 in 1920 over 1919 also, but this was caused by one single serious accident in January of that year which cost the company over $21,000.

The continued decrease in the number of accidents meant, of course, that more perfect records were made by employees in successive contests. This fact is readily shown from a summary of the various charges assessed against all six teams in each contest, together with the records of the winning teams. These figures are as follows:

Contest	Total Charges All Teams	Total Charges Winning Team
1	1,364	206
2	742	114
3	886	133
4	817	113
5	596	82
6	587	84
7	472	65

Just what the reduction in accidents has meant in the amount of money required to be paid out for injuries and damages is readily apparent from a glance at the following figures:

Year	Accidents	Cost	Passenger Revenue	Per Cent Accident Costs to Rev.
1917	2,291	$120,010	$672,646	17.8
1918	2,793	152,604	860,275	17.7
1919	2,182	66,356	857,372	7.7
1920	2,521	77,205	1,084,653	7.1
1921	1,817	42,050	978,202	4.3
1922—six months	741	16,152	456,272	3.5

This picture would not be complete without some mention of the cost of actually carrying on the safety work itself. Data on this subject will be found to be equally as surprising, as may be noted in the following summary which gives the total annual expenditures since 1919: 1919, $4,432; 1920, $4,757; 1921, $5,018; 1922—six months—$1,725.

These figures include the cost of preparing and printing car cards, safety bulletins, booklets, etc., the expense of publishing a monthly employees' magazine, membership dues in the National Safety Council and the expense of two delegates to the Annual Safety Congress, the costs of two entertainments and banquets staged each year at the conclusion of the safety contests and the cash prize awards to the winning teams. The $5,018 expended in 1921 was distributed as follows: $1,200 for cash prizes, $600 for entertainments, $1,100 for house organ and a like amount for safety cards, bulletins, etc., $450 to cover National Safety Council expense, $350 for payroll account, covering time of men attending safety meetings, and the balance for miscellaneous expenditures.

SAFETY MEASURES FOUND EFFECTIVE

In the early stages of our campaign to eliminate accident hazards, we soon realized that success could only be attained by the co-operation of the public as well as of employees. The first appeal was made through car cards in the form of a series of "Don'ts." These cards embodied cartoons depicting various hazardous practices of the pedestrian, motorist, careless child, and others, with advice on how to avoid accidents. The cards were changed at intervals and were subsequently superseded by a set carrying simple safety messages, unillustrated, which are still in use.

The latest innovation along this line and one that has produced much favorable comment is the carrying of a safety slogan on the dashboard of the car. About twelve trolleys are so equipped, no two carrying the same message, and it is the intention to increase the number to twenty. Various color schemes have been employed in working up the different signs and they have attracted the prompt attention of both motorist and pedestrian. One, containing the admonition to motorists not to cut-in in front of street cars, has already brought about a noticeable improvement in this practice. Other methods of impressing the public mind with the need for safety have been attempted through talks to the school teachers and the disseminating of literature among the school children.

To maintain the interest of employees, general safety meetings are held once each month and a safety committee, comprising about forty members, meets twice each month, at which time suggestions are received for improving track, overhead lines, condition of equipment, etc., and the elimination of any unsafe practices. It is interesting to note that over 900 suggestions have been favorably acted upon since the inauguration of these meetings. Bulletin boards featuring the literature of the National Safety Council are also maintained at various locations on the property to keep up interest in the movement.

Like the safety contest idea, which, after first starting among the platform men, subsequently spread to the other operating departments, every effort has been made to insure safe working conditions in every department of the company. Numerous safeguards have been provided for the various high-speed machines in the wood-working department to prevent operators from losing a finger or hand; rubber gloves and safety belts are insisted upon in the line department; every track gang carries a first aid kit in its tool box. The automobiles operated by the company are inspected at regularly scheduled times in order that any defects may be corrected; the same applies to street cars, which are inspected on a mileage basis. A monthly fire inspection is made of the entire property. Cleanliness in the various offices, shops and yards is required at all times. Every week is "Clean-Up Week" in the Chattanooga organization.

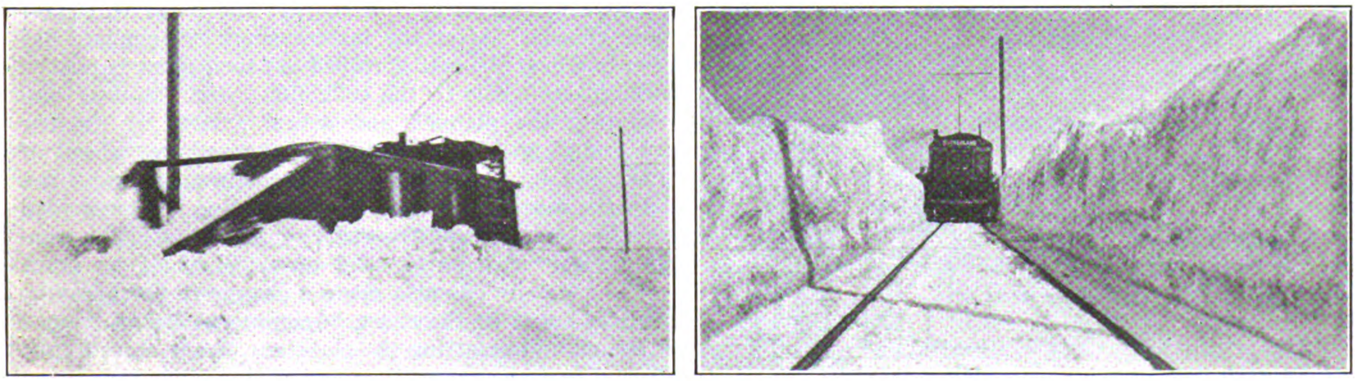
During the fall of last year, an added safety feature was the employment of a man to conduct among the workers practical demonstrations of the prone pressure method of resuscitation from electrical shock. Lessons were also given the members of the city police and fire departments and to the Boy Scouts. At least once during the past year this practice was directly responsible for saving the life of a lineman who came in contact with a 2,300-volt current.

This single instance of having saved one man's life has amply repaid the company for all the time, money and energy devoted to the teaching of safety principles and practices.

Accidents never happen, they are always caused. Carelessness on the part of some one is always responsible for the untold misery and life-long suffering that we see about us every day. Safety, on the other hand, is something which, in the abstract, costs nothing, its art is easily acquired, and it pays for itself over and over again.

Saskatoon Snow Problems

THE accompanying illustrations give an idea of some of the snow difficulties encountered along the electric lines of the Saskatoon Municipal Railway, Saskatchewan, Canada. A portion of the road serving the Canadian Pacific Railway shops at Sutherland, 5 miles from Saskatoon, is shown as it appeared last winter. The lines run across the level prairie, but owing to the continued drifting which occurs, a wall of snow was created on both sides of the track for a distance of more than a mile. The snow plow and sweeper shown at work was built in the railway company's shops. The longest period that this line was tied up last winter was a day and a half.

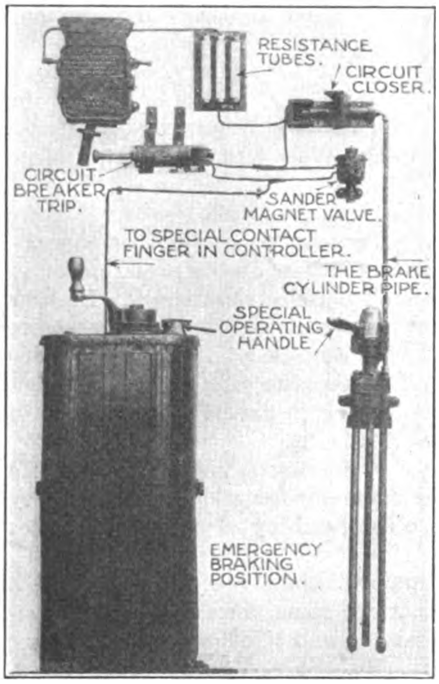


AT LEFT, BUCKING THE SNOW WITH A SNOW PLOW. AT RIGHT, HIGH SNOW WALLS ON EITHER SIDE OF THE TRACK

Safety Device with Dead-Man Air-Brake Valve Handle

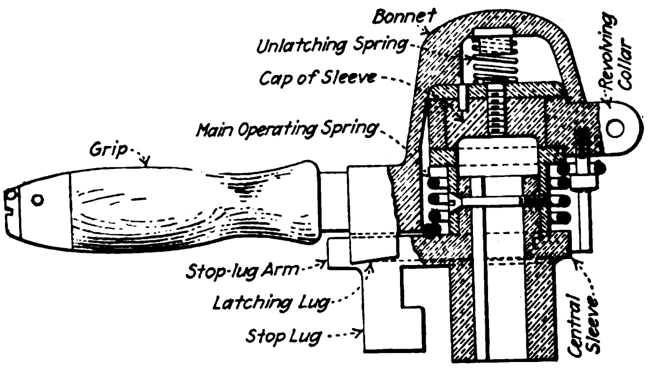
By F. L. Hinman
Assistant Superintendent of Rolling-Stock and Buildings
Philadelphia Rapid Transit Company

For three months past we have been operating in Philadelphia several cars equipped with simple apparatus designed primarily to improve the safety of operation, a feature being a "deadman" brake-valve handle. The apparatus is as shown in one of the accompanying illustrations, consisting of six pieces of equipment which, functioning together, give automatically a brake application, a release of the circuit breaker and an application of sand to the rails if the motorman releases his hold on the air-brake handle or moves it to a brake application position. The central feature of this apparatus is the special air-brake valve handle. This fits over the stem of the regular air-brake valve. It automatically goes to emergency position when released, thus providing the "deadman" feature. It is rotated to this position by a coiled spring, after being unlatched by another coiled spring in the top of the bonnet which tilts the handle upward for this purpose. In the latched position the handle operates like one of the ordinary type. After being unlatched, and thus taking the emergency position, the device may be relatched by moving the grip to the emergency position and depressing it.



Essential Equipment Used in the "Simplex Safety System"

Besides the special brake-valve handle, the equipment comprises a circuit closer, a circuit-breaker trip and a sander magnet valve. The circuit closer is a small air cylinder connected to the brake-cylinder air line and carrying on its piston push rod a quick-break head which makes connection between two phosphor-bronze springs at each brake application. The circuit-breaker trip is a cylinder containing a plunger which is normally latched against the pressure of a spiral spring. This latching lever is tripped by the pull of a magnet on the rear end of the cylinder. The sander magnet valve is simply an electrically operated valve supplying air to the sand traps.



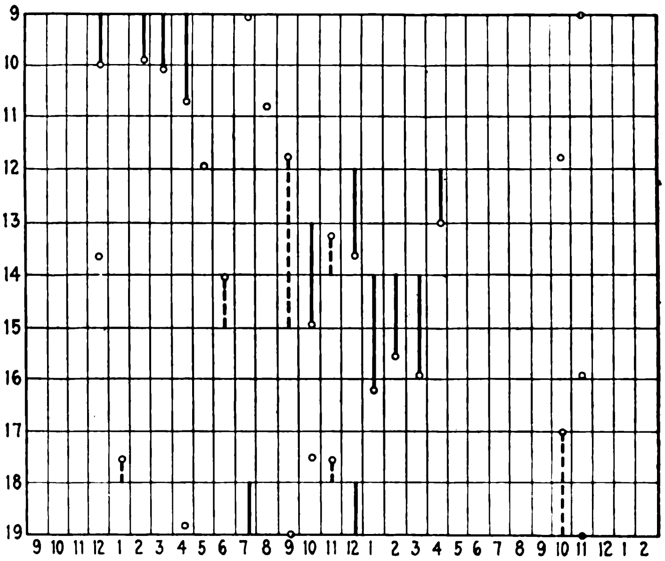
Cross-Section of the Special Brake-Valve Handle

The above aggregation we have entitled "The Simplex Safety System." Patents on the new features have been applied for and in due course provision will be made for manufacturing the essential pieces.

Rapid Checking of Headway Recorder Records

Through the use of a sheet of celluloid as a template, J. R. Ong, transportation engineer of the Georgia Railway & Power Company, saves appreciable time in securing a check of actual schedule against headways on the railway lines in Atlanta.

The company carefully checks its schedule times and running times, as described in the issue of this paper for May 6, 1922, and in this work uses a Nachod headway recorder, which is moved from route to route as necessity indicates. The report sheet taken out of the recorder is placed under a piece of celluloid on which the schedule headways are indicated by holes which have been slightly countersunk and then the countersunk portions blackened by ink so that the holes will show more clearly. After the master sheet or template has been laid over the actual record, a pencil point is pushed through each hole in the celluloid. Next the dots representing the planned and actual arrival of the car are joined up by a blue line, if the car was ahead of time, and by a red line, if the car was behind time.



Portion of Headway Record Showing Actual Time of Cars, Checked Against Schedule Time

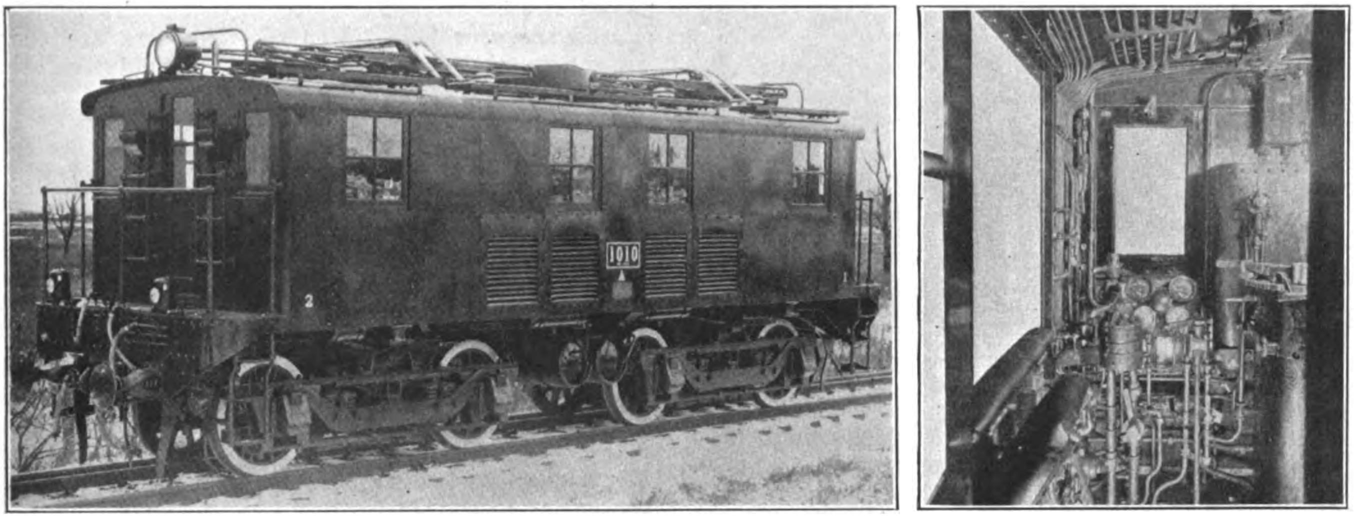
In the reproduced section the blue line is represented by a broken line, and the red by a solid line. The complete record can be checked up within half an hour.

The company has also made a change in the arrangement of hours on the sheet, beginning at 5 a.m. instead of 9 a.m. and resetting the clock movement accordingly. These hours are put on the sheet with a rubber stamp.

Electric Locomotives for Japanese Government

They Are Equipped with Motors Specially Designed for Narrow Gage, and Have High-Speed Circuit Breakers and a New Form of Electro-Pneumatic Control—They Are for 1,500-Volt, D.C. Operation

ON THEIR way to Japan are two locomotives ordered some time ago for the Imperial Government Railways of Japan from the General Electric Company and built at the G. E. Erie Works. These will be tried out on the Tokyo-Yokohama line, which was electrified in 1915 at 1,200 volts direct current. The government plans in future installations, however, to use 1,500 volts.



At Left, 1,500-Volt, 1,040-Hp. Locomotive for Trial Use of Japanese Government Railways. At Right, Interior of Operating Cab, Showing Left-Hand Drive

The locomotive is of the box-cab type, equipped with four GE-274 750/1,500-volt motors, geared for a maximum speed of 40 m.p.h. Its total weight is 132,000 lb., all on driving axles, and it is capable of exerting a tractive effort of 17,700 lb. on the one-hour rating. The continuous rating gives a tractive effort of 17,400 lb. at 22 m.p.h., with 1,500 volts on the trolley. In addition to the 1,500-volt rating the locomotive can be operated at 1,200 volts at a somewhat reduced capacity, and provision is made for operation at 600 volts direct current by the throwing of a commutating switch which connects all four motors in parallel. They are permanently in series for 1,500-volt operation. Protective devices are supplied to prevent damage due to accidental contact with the 1,500-volt trolley when the commutating switch is thrown to the 600-volt connection. The leading dimensions of the locomotive are as follows:

Length over all	37 ft. 2 in.
Length of wheelbase	26 ft. 0 in.
Rigid wheelbase	8 ft. 6 in.
Height over pantograph (locked down)	12 ft. 10 in.
Diameter of wheels	42 in.
Gage of track	42 in.

The GE-274 motors were designed especially for this locomotive and are the largest so far constructed for a 42-in. gage track. Each motor rates 260 hp. on 750 volts, and is insulated for operating two in series on 1,500 volts. The motors are arranged for ventilation by means of external blowers.

One of the most interesting features of the equipment is the new electro-pneumatic type of control known as Type PCL. Two master controllers, one in each operating cab, energize the magnet valves of the pneumatically operated contactors, which open and close the main motor circuits. These contactors are closed by air pressure and opened by a heavy spring acting against the pistons. Ten control steps are provided with four motors in series and eight steps with the motors in series-parallel.

Another important feature of this equipment is the high-speed circuit breaker, which is connected between the trolley and the main part of the locomotive equipment. Under normal operating conditions this circuit breaker is closed automatically on the first point of the master controller; it then remains closed unless tripped by an overload or short circuit or by momentary loss of the control circuit voltage. After being tripped for any reason, the breaker is again reset upon the first point of the master controller. Under normal operation, however, the high-speed circuit breaker does not open with the return of the controller to the off position. This circuit breaker has no mechanical latches or triggers, but is tripped electro-magnetically. This construction makes for durability and permanence of calibration.

To protect the locomotive motors against damage due to overload, an overload relay is provided, which is so connected that in case the motor current exceeds a certain predetermined value the relay contacts open the holding circuit of the high-speed circuit breaker, which then opens and thus relieves the overload.

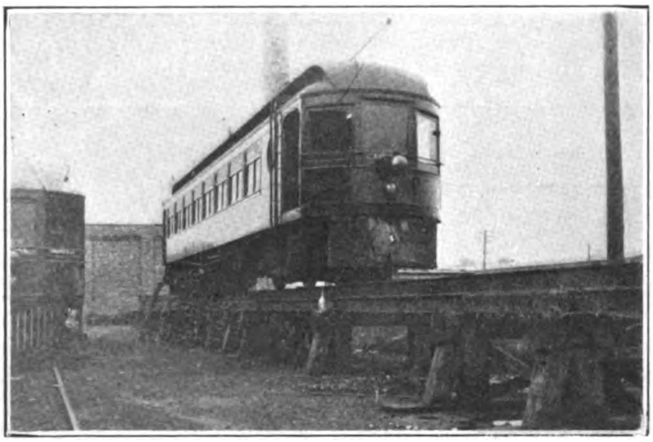
For collecting the 1,500-volt current, two slider pantograph trolleys (one a spare) are provided having a range of 7 ft. from minimum to maximum height. These pantographs are raised by admitting air to a set of cylinders and are held against the wire by springs, which are in turn held under tension by the compressed air in the cylinders. The contact elements consist of easily renewable copper wearing strips. A hand pump supplies compressed air for raising the trolleys for initial operation when there is no air pressure on the locomotive.

The control current is provided by a dynamotor arranged to supply 750 volts for the low-voltage control circuits and lights. In conjunction with this dynamotor there are two air compressors designed for 750-volt operation, but doubly insulated. The middle point of the air compressor circuit is connected to the midvoltage point of the dynamotor to insure equal division of the load between the two compressors. The two blower motors for ventilating the traction motors are also designed for 750 volts each and are doubly insulated.

In the engineer's cab the master controller is located on the left side of the cab to conform to the practice in Japan of running to the left instead of the right.

Elevated Track for Underbody Maintenance

IN MOST cases the amount of rolling stock used by electric railways has increased in a greater proportion than shop facilities. Many roads are doing inspecting in yards adjacent to the shop. Where work has to be done underneath the car body a pit is almost a necessity. A suggestion as to how tracks can be elevated to provide for outdoor work which would otherwise require a pit is shown in the accompanying illustration. This elevated track is in the yards of the Indiana, Columbus & Eastern Traction Company at Springfield, Ohio, and good use is made of it in taking care of interurban car repairs.

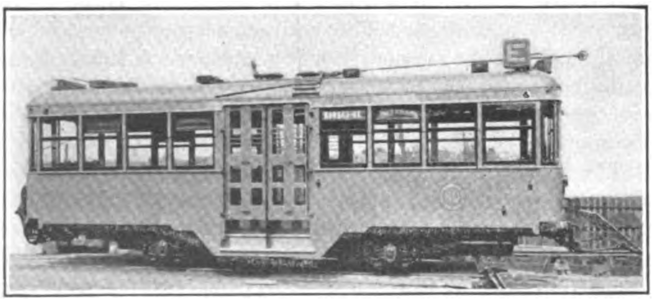


ELEVATED YARD TRACK FOR UNDERBODY CAR REPAIRS

New Cars of San Francisco Municipal Railway

THE San Francisco Municipal Railway has placed in service twenty small center-entrance cars built by the American Car Company. A sample car of this type was placed in service in the early part of 1921 and was described in the *Electric Railway Journal* for Jan. 29, 1921. The cars now placed in service are of the same type. A single-truck car with center entrance is somewhat of a novelty when compared with the general type of cars now being built. The San Francisco cars are but 29 ft. 10 in. over bumpers and have a seating capacity of thirty-two. Brill Radiax trucks are used. The underframe is constructed of steel commercial shapes and plates, and the upper framing, corner and side posts are of oak. The outside sheathing is No. 14 gage steel and the letterboard No. 10 gage steel. O. M. Edwards Company's trapdoors and steps are used. The accompanying table gives some of the principal dimensions and data.

Other parts of the equipment include Hunter illuminated destination signs, Garland B2 exhaust ventilators, Farraday push button signals, and Rico hand straps. The car has both air and hand brakes. The air brakes are furnished by the Westinghouse Traction Brake Company and the hand brakes are the National Brake Company's Peacock standard type. Type C Eclipse lifeguards are provided. The trolley catchers are Ohio Brass Company's, and Golden Glow headlights are used on these cars.



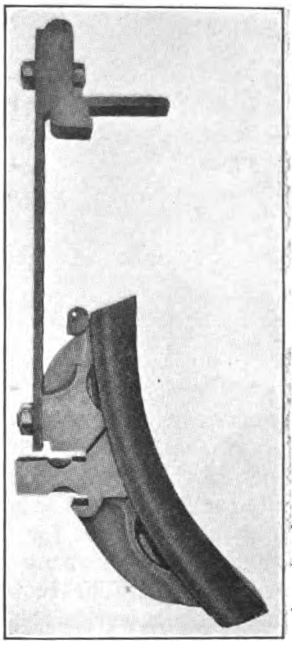
SAN FRANCISCO MUNICIPAL RAILWAY'S CENTER-ENTRANCE CAR

PRINCIPAL DIMENSIONS AND DATA OF SAN FRANCISCO MUNICIPAL CARS

Length over bumpers	29 ft. 10 in.
Maximum width over window sills	8 ft. 8¾ in.
Height from rail over trolley board	10 ft. 2 $\frac{7}{16}$ in.
Truck wheelbase	12 ft.
Seating capacity	32
Weight, complete	26,200 lb.
Type of truck	Brill "Radiax"

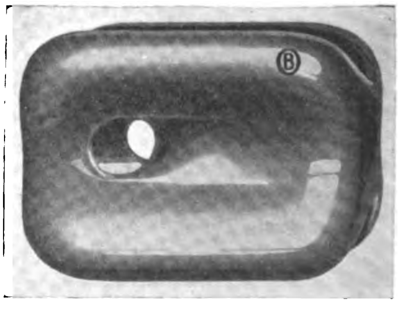
Simple Brakeshoe Hanger

THE accompanying illustration shows a new type of brakeshoe hanger which is being marketed by the National Safety Devices Company, Waterloo, Iowa. It consists of a flat spring which connects the upper casting of the brake head with the truck frame. It can be used either for inside or outside hung brakes and consists of but five parts, the upper casting, brake head, flat spring steel hanger and two short bolts. This is about one-third the number of parts required for other hangers. In addition to the fewer parts which are necessary, the manufacturers claim that a greatly reduced maintenance cost and even wear on brakeshoes will result from the use of this simplified hanger.



Small Size Insulator Brought Out

A NEW and small sized insulator has been brought out by the Ohio Brass Company, Mansfield, Ohio. It is 3½ in. long, 3¼ in. in diameter, and has a half-inch hole for stranded wire. It is made of high-tension wet-ware porcelain, and due to the X shape has a very long leakage path. This insulator is designated by the manufacturer as type XH.



SMALL SIZE INSULATOR

Letters to the Editors

Railway Publicity in Australia

NEW SOUTH WALES GOVERNMENT RAILWAYS & TRAMWAYS

SYDNEY, Sept. 19, 1922.

To the Editors:

The article in the July 1 issue of the *Electric Railway Journal*, describing the operations of the advertising section of the American Electric Railway Association, has been read with considerable interest here in the mother state of the Australian Commonwealth. Perhaps a little information of the growth of the publicity idea in Australian railway management will be of similar interest to readers of the *Electric Railway Journal.*

It will need to be emphasized first of all that the Australian railway systems are all government-owned and state-controlled. In New South Wales both the railway and tramway (street car) services are state-owned. They are administered by a board of commissioners who are vested with arbitrary powers by a special act of parliament, thus removing the control of what has grown into a huge industry from anything in the nature of political patronage. Some idea of the size of the New South Wales railway and tramway systems will be gleaned from the fact that in the financial period ended June 30, 1922, the total earnings amounted to £18,823,154 sterling (about $94,000,000). The total working expenses were £14,691,918 (nearly $71,000,000), the difference between these two amounts, £4,691,236 (nearly $23,000,000), being paid into the consolidated revenue of the state to assist in carrying the national debt.

Being state-owned, the point is continually emphasized that the railways and tramways "belong to the people." This, in its turn, has meant the creation of a large body of keen critics of railway administration. There are so many people really, especially people entirely untrained in railroad work, who think they could do the job very much better if they only had the chance. There, in a word, is the reason for the establishment of a publicity office; and there is, at the same time, a permanent and ever-varying field of operations for the publicity officer.

It may be that some time in the future the commercial side of the publicity department—the advertising section—will become associated with the new scheme. Up to date, however, the publicity office has been entirely concerned with the work of disseminating reliable and up-to-date information about the operations and administration of the services. In addition to replies to criticism and complaints which find expression in the public press of the country, the office is continually engaged in the preparation of up-to-date statistics and the compilation of valuable information with regard to every aspect of railway work and administration.

The article in the *Electric Railway Journal* declares that the "most constructive work done by the advertising section of the American Association has been that of giving electric railway news a real standing in the papers and periodicals of the country." It can be confidently asserted that the same desirable result has been achieved by the publicity office of the New South Wales Railways & Tramways Department. Practically the entire press of the country now receives with avidity the information which is sent out in a stream of daily communications from the publicity office. When this work started it was face to face with a blank wall of popular ignorance of railway affairs, and particularly of railway finance. Evidences of serious misconceptions of these things are now comparatively rare.

The importance of educating the public mind on these matters may be gaged from the fact that the chief commissioner of the New South Wales railway and tramway services controls more than 50,000 employees, which means that the railways and tramways constitute an industry embracing one-tenth of the entire wage-earning population of the state.

Attached to the publicity office of the New South Wales railways and tramways is an information bureau. The business of the staff of this bureau is to have in readiness, available for use at a moment's notice, up-to-date and reliable information and statistics in regard to railway and tramway operations, not only of our own systems, but also of the systems of other states of the commonwealth and of other countries of the world.

A similar experience to that indicated in your July issue in regard to the reliability of the articles, the statistics and general information supplied to the press, has been realized here in New South Wales. A plain intimation has been made to the entire newspaper-reading population of the state, and continually emphasized, that the state-owned railway and tramway administration has nothing to hide from the people, and is prepared at all times to supply the fullest information to those who are seriously concerned in the administration of the commissioners. This has had a most signal and beneficent effect. We invite criticism, but we say to all our critics: "Get the facts first; we will supply you with the facts if you will ask for them." The effect of this policy might be easily imagined. Without pursuing the subject further, it might be confidently asserted that the idea of a publicity office, attached to the various Australian commonwealth railway and tramway systems, will shortly become an integral part of the administration of these huge public concerns.

THOMAS CROUCH,
Publicity Officer.

Appreciates Assistance of Electrical Press

THE SOCIETY FOR ELECTRICAL DEVELOPMENT, INC.

NEW YORK, Dec. 19, 1922.

To the Editors:

At the meeting of the directors of the society, held at headquarters on Nov. 25 last, the assistant to the president, in his semi-annual report, called attention to the very excellent co-operation that the society is receiving from the electrical trade papers.

On motion, duly seconded and carried, the directors instructed me to convey to you their appreciation for the effective way in which you are bringing to the notice of the industry the work the society is doing. They further instructed me to express the hope that we may be favored with a continuance of your wholehearted co-operation and to assure you of their desire that the society work always for the best interests of the industry.

J. SMIETON, JR., Secretary.

Electric Railway Publicity

Devoted to How to Tell the Story

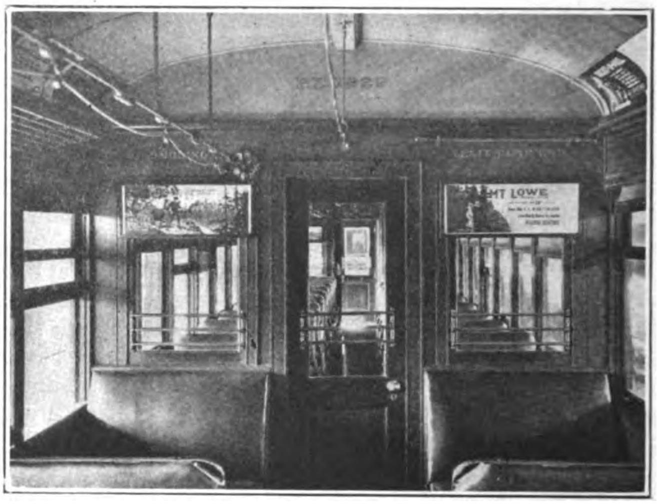
Selling Rides by Advertising

By Clifford A. Elliott
Cost Engineer Pacific Electric Railway,
Los Angeles, Calif.

THE Pacific Electric Railway's interurban lines, of more than 1,100 miles of track radiating out of Los Angeles as far as 70 miles and serving some fifty-seven cities in four counties in southern California, have innumerable points of interest for the large number of tourists who yearly visit this section of the state. It is not only the policy of the company's passenger traffic department actively to interest these tourists in the many attractive points of interest on the company's lines, but it is also the aim to attract the permanent residents of the various communities to visit such attractions. These attractions consist of resorts operated by the company or those operated by others conveniently reached by the company's lines.

In the summer season the large volume of travel tends to move to the many beach resorts located on the company's lines, while during the fall, winter and spring season the travel tends to move to the foothills, from which points of vantage travelers in large numbers move in numerous hiking parties to and from the wonderful mountains available for such purposes. In the large ranges of mountains located inland from the Pacific coast are operated many mountain resorts, which are a large attraction for vacationers during the summer season. Some of these resorts are open the year round, particularly the company owned and operated resort located 1 mile above sea level on Mount Lowe. This trip by trolley is nationally known.

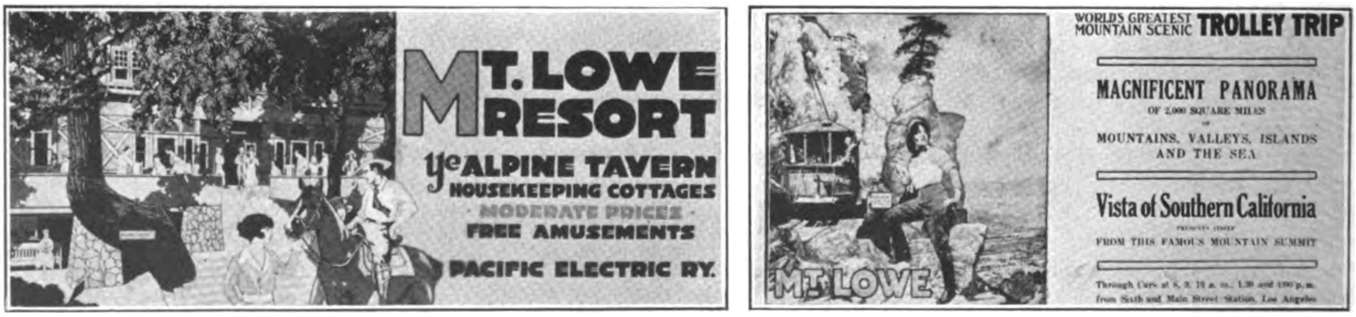
In interest of attracting travel to the many advantageous points for hiking among the mountains, the passenger traffic department circulates a twelve-page attractive folder on hiking. The interior section of the folder—17 in. x 24 in.—carries a very comprehensive detail map, showing the location of all the government trails, Pacific Electric lines, resort and mountain camp sites, various canyons, mountain ranges and other valuable information for the use of hikers.



How Ride-Inducing Advertisements Are Mounted in the Cars

Attractive lithograph cards are placed in wooden frames inclosed in glass, which feature the most important points of interest on the company's lines. Two sizes of cards are used. One 10 in. x 26 in. for small types of cars; the other size being 12 in. x 28 in. for large types of interurban cars. The cards are printed oversize with margin in order that they may be cut down to fit the particular frame in the cars in which they are displayed. In displaying these cards eight frames are available in the majority of the cars. One of the illustrations shows the position of the display frames in the cars. Four of the frames are in the smoker section and four in the other section of the car. This allows two frames to each end of each section so that a prominent view of the cards is always had, whichever way seats may be reversed for the car movement. The Pacific Railway Advertising Company rents the upper or roof section of all the company's cars for interior car advertising, displaying standard 10-in. x 20-in. cards held in place by standard metal containers.

However, the company reserves for its own use the car end sections, which are fitted with a special type of frame located at the right and left sides of the car doors, and easily observed by the traveling public due to their convenient location. These cards are changed every three to six months, whenever they become dirty; also the type of the card is changed from time to time with a view of getting the subject fresh in the public's mind from another angle. In previous


MT. LOWE RESORT
Ye ALPINE TAVERN
HOUSEKEEPING COTTAGES
MODERATE PRICES
FREE AMUSEMENTS
PACIFIC ELECTRIC RY.
WORLD'S GREATEST MOUNTAIN SCENIC TROLLEY TRIP
MAGNIFICENT PANORAMA
OF 2,000 SQUARE MILES
OF
MOUNTAINS, VALLEYS, ISLANDS AND THE SEA
Vista of Southern California
PRESENTS ITSELF
FROM THIS FAMOUS MOUNTAIN SUMMIT
Through Cars at 8, 9, 10 a. m.; 1.30 and 4.00 p. m.
from Sixth and Main Street Station, Los Angeles
MT. LOWE

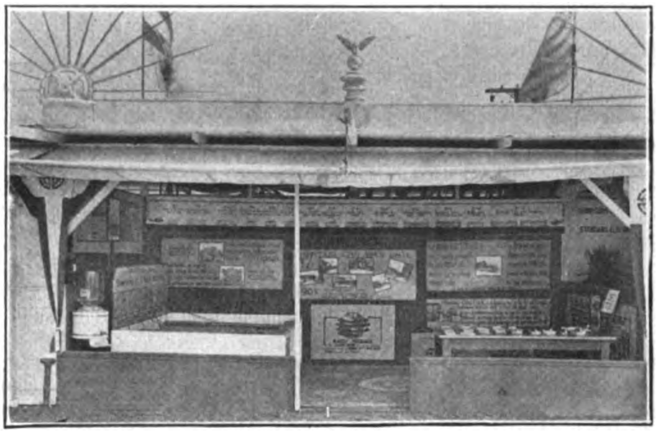
Samples of Car Cards Used by the Pacific Electric Railway years some of these display cards indicated the rate of fare for reaching the various points of interest, but of late these fares have been omitted due to occasional changes in passenger rates, elimination of war tax, etc.

The frames are made of ¾-in. molding fixed in place by two wood screws in each of the four sections that go to make up the frame. This type of frame permits its easy removal for renewing the display cards.

"The Street Car's Carpet"

THE material that goes into a street railway roadbed from earth to surface paving was illustrated as a feature of an exhibit used by the Los Angeles (Calif.) Railway in the Pageant of Progress and Industrial Exposition held in that city recently.

The roadbed construction was set in a box 8 ft. long and 6 ft. wide with a heavy glass at one end to show a cross-section. A top view showed the roadbed graduated down from surface paving to concrete sub-paving, the rail, ties, ballast, tile drain and earth. A large poster at the back of the box headed, "The Street Car's Carpet," was marked in squares, and each square was devoted to one of the articles in the track exhibit, such as rail, ties and ballast. Ribbon streamers connected the articles with the data on the poster, showing the amount of the various articles used in laying 1 mile of track. All figures were for double-track construction.

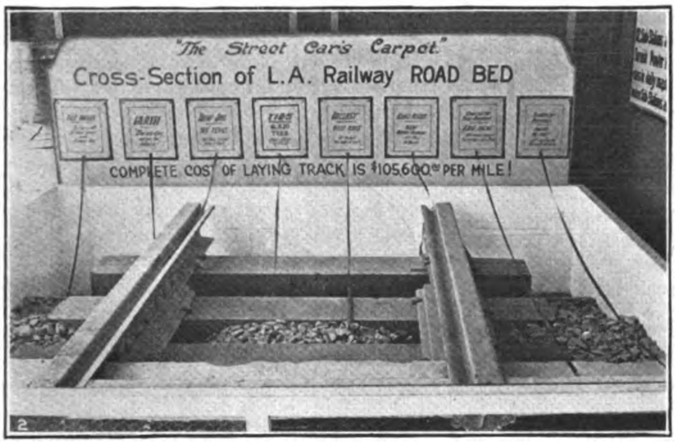


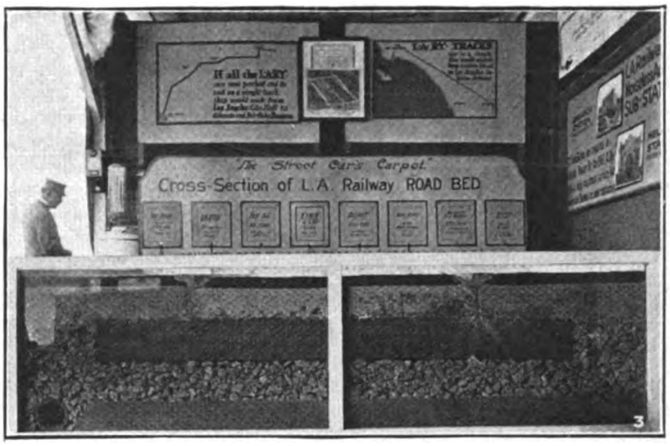
A cloth strip 20 ft. long occupied the full length of the booth with a "historical parade" of street cars used in Los Angeles from two-mule cars to two-car trains. The poster showed the years the various types served the city and the cost.

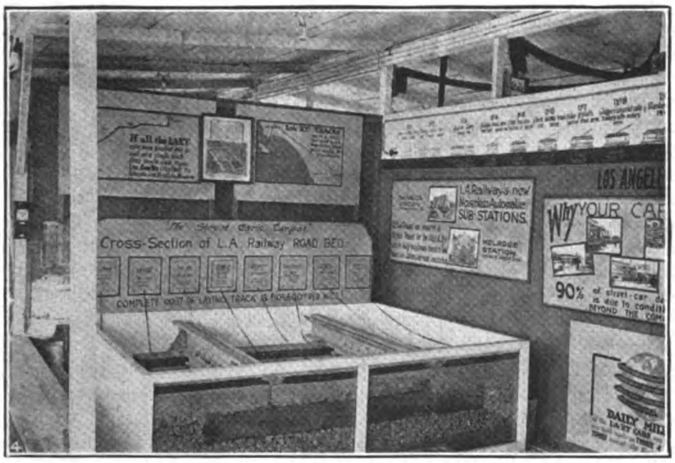
A poster that attracted considerable interest was headed "Why Your Car Was Late." This poster was made up of photographs of traffic blockades caused by broken-down trucks, street repair work and other causes beyond the control of the company. These pictures were procured by having a photographer ride on an emergency auto for a day.

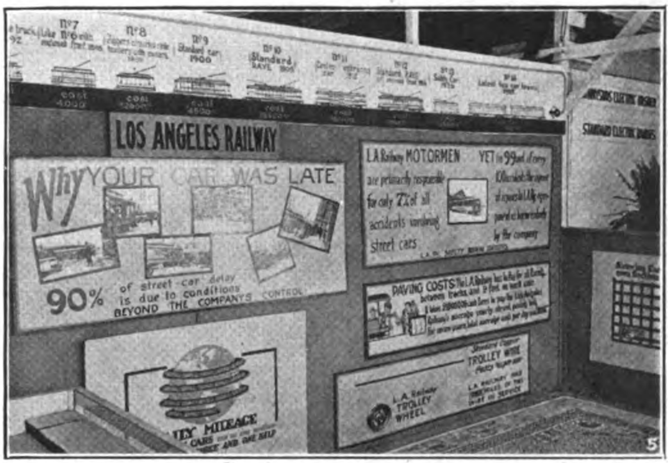
Other posters advertised the safety records of the company, the number of cars in service at various times, right and wrong way to board a car, and urged passengers to avoid delay by having correct change. A trolley wheel and piece of trolley wire attached to a poster showed the size of these articles and the number of miles of wire used, and its cost.

Two men were at the booth at all times to explain details of the exhibit and to distribute literature.


"The Street Car's Carpet"
Cross-Section of L.A. Railway ROAD BED
COMPLETE COST OF LAYING TRACK IS $105600.00 PER MILE!
2


"The Street Car's Carpet"
Cross-Section of L.A. Railway ROAD BED
3


Cross-Section of L.A. Railway ROAD BED
WHY YOUR CAR
90%
4


LOS ANGELES RAILWAY
WHY YOUR CAR WAS LATE
90% of street-car delay is due to conditions BEYOND THE COMPANY'S CONTROL
L.A. Railway MOTORMEN
PAVING COSTS
TROLLEY WIRE
L.A. Railway TROLLEY WHEEL
5

No. 1—FRONT VIEW OF LOS ANGELES RAILWAY EXHIBIT IN PAGEANT OF PROGRESS. No. 2—DETAIL OF TRACK CONSTRUCTION EXHIBIT
No. 3—CROSS-SECTION OF TRACK CONSTRUCTION EXHIBIT. NOS. 4 AND 5—CORNERS OF LOS ANGELES RAILWAY EXHIBIT

Kentucky Men Discuss Public Relations

A Meeting of the Kentucky Association of Public Utilities at Lexington on Dec. 12 Was Well Attended—All Classes of Utilities Were Represented

APPROXIMATELY 180 delegates registered at the meeting in Lexington on Dec. 12 of the Kentucky Association of Public Utilities. This is the seventh annual meeting held by the body, which represents all classes of utilities, and most of the addresses and papers related to the need of establishing good public relations. The principal paper relating to traction matters was presented by James P. Barnes, president of the Louisville Railway, whose topic was "Internal Public Relations," and was based on the idea that the inside working of an organization must be right before it can develop its outside relations correctly. An abstract of this paper appears elsewhere in this issue.

Sessions were held both in the Phoenix Hotel and at the University of Kentucky. In addition, there was a banquet on Monday evening at the Lafayette Hotel for those delegates who arrived on that day. The hosts were the officers of the various utility companies in Lexington.

The session on Tuesday morning opened by an address by the president, L. B. Herrington, vice-president and general manager Kentucky Utilities Company, Louisville. An abstract follows:

PRESIDENT'S ADDRESS

In his address Mr. Herrington pointed out that a year ago the utilities of the state were still suffering from the consequences of the war, but confidence in an early and complete recovery permeated last year's meeting. Scarcely was the meeting over, however, before the coal strike and the rail strike came, retarding recovery, but the way in which the utilities gave service during those trying days will be borne in mind by the public.

In spite of all that has been said and done, a considerable portion of the public has an opinion of utility companies which is not flattering. They will never be able to get all of the people on their side, but if they continue to take all of the people into their confidence, give good service, charge reasonable rates and give customers an opportunity to become partners in the enterprise, the utilities will gain the respect, confidence and good will of the large majority of people. Without this good will, capital for necessary utility extensions cannot be secured, and a community cannot grow unless its utilities are healthy and growing.

A utility gives more than it takes out of a community, and if a part of its capital is furnished locally, even the return on that part of the capital remains to build up that community. During the past year some of the utility companies in the state have conducted successful customer ownership campaigns, and this plan is recommended to those member companies which have not tried it. Further support of the work of the publicity bureau was also urged.

For the first time in the history of the association, women have a place on the program. They can contribute much toward a better understanding between the utility companies and the public. They have shown an aptitude for handling successfully several branches of the electrical business. They invest in the utility securities and are among the largest users of their service and are the molders of sentiment in their homes and in their communities. The women can be reached better through the women in the industry than in any other way.

SECRETARY'S REPORT

E. F. Kelley, secretary of the association, reported that forty-seven corporation and associate members were represented among the 178 delegates registered. A news service bulletin is issued twice a month and has a circulation of nearly a thousand copies, of which 350 go to Kentucky newspapers. The remainder go to the utility companies, public officials and others. Testimony to the interesting character of the material in this bulletin has been received. Cordial relations have been established with the press by letting it be known that the Bureau of Information is always ready to give out the facts about any utility event, whether they are favorable to the company or not. Arrangements have been made for speeches before civic organizations on utility topics on request, and many members of the association had spoken. The bureau operated last year on a budget of but $3,600, of which $2,400 had to be spent for the bulletin.

"THE PUBLIC SERVANT"

Donald McDonald, vice-president and general manager Louisville Gas & Electric Company, in the paper on "The Public Servant," said that the lawyer or judge who coined this expression to describe utility companies performed a real service, both to the companies and to the public. The relation of master and servant is older than written history, and it is interesting to note that the oldest codes of Babylon and Leviticus enjoin on the servant diligence, honesty and efficiency, but on the master justice, kindness and intelligence. Men often boast of how cheaply they bought their goods, but never of the fact that their servants are underpaid or underfed. Nevertheless men do sometimes boast that in their city the street carfare is 5 cents, although they know that the actual cost is more than that. The speaker thought that a better understanding is coming about. The rôle of public servant is an honorable one. It is desirable that the utility should take care to be a good servant, and the municipality should take care that it should be a good master.

NEWS IN ITS RELATION TO PUBLIC UTILITIES

In a talk on this subject Brainard Platt of the *Courier-Journal* and *Louisville Times* referred first to the greater willingness at present of utilities to give the newspapers information, even if not always favorable. He described news as: "That characteristic of any happening which gives to it an appeal beyond the circle of those immediately concerned," and pointed out that an item which might be news for a weekly in a town of a few thousand population would not be a news item to a daily paper in a city of the first, second or third class. The former might like to know when a new motorman was put on the interurban that passes through the town. The paper in a big town is interested only when the motorman serves for a long time without an accident and perhaps receives a medal for such service. The big activities of the utilities are also news, such as extension of facilities, development of old policies or change to new ones, floating a large loan or canceling one, defying a strike or settling a strike, organizing the employees in the union or out, increasing a wage scale or reducing one, etc. He commended the way in which the Louisville Railway gave news about its negotiations for a readjustment of fare, and how an electric road entering Louisville talked frankly of a severe accident some years ago.

He also declared that newspapers should know news confidentially only when a release date was coming. Their hands should not be tied perpetually on news given in confidence. Utilities should also be able to know the difference between news and propaganda. The former is welcomed by the papers through their reading columns. The latter should go into the advertising columns properly labeled.

Charles N. Manning, president Lexington Security Trust Company, gave an address in which he dwelt upon the importance of the utility as a community builder.

MEETING AT THE UNIVERSITY

At 11 o'clock at the conclusion of these addresses the convention delegates boarded special cars for the University of Kentucky, and after their arrival there held a meeting in the chapel, jointly with the students of the university. Dr. Frank L. McVey, president of the university, presided, and the principal speaker was Samuel Insull, president of the Commonwealth Edison Company, who told of the early efforts of Edison and technical developments down to the present day. He declared that opportunities in the electrical business for the young man of the present time are greater than fifty years ago, provided the man is willing to make the necessary sacrifices to succeed.

After an inspection of various departments of the university and a luncheon at the university cafeteria, the meeting reconvened in the afternoon in Mechanical Hall, where the first address was by F. Anderson, dean of engineering. Dean Anderson gave an interesting talk on training men for utilities, arguing that the men should be trained for executives rather than merely receiving a technical training, and A. S. Nichols, general manager Paducah Electric Company, spoke on "Looking Forward." There were other addresses, including one from Mrs. Florence A. Tate, chairman Women's Public Information Committee, East Central Division, N.E.L.A., who spoke about "Women's Interest in Public Utitilies." Mrs. Tate referred to the numerous opportunities for positions for women in the commercial department, accounting department, purchasing department, stock and bond department, information department, and public relations department of utility companies. She also pointed out how the utilities are partners in every home and have brought to the home devices to conserve women's time and strength and for the rich and poor alike.

Miss R. E. McKee, who occupies the same position with the Great Lakes Division, N.E.L.A., also spoke, as did W. S. Cramer, president American Water Works Association, Lexington. The subject of his address was "The Foundation of Public Service."

NEW OFFICERS

Officers elected at the meeting, just before the close, were as follows:

President, W. H. Harton, Covington, general manager Cincinnati, Newport & Covington Railroad.

First vice-president, J. P. Pope, general manager Kentucky Traction & Terminal Company, Lexington.

Second vice-president, James P. Barnes, president Louisville Railway.

Treasurer, P. S. Pogue, president and general manager Louisville Home Telephone Company.

Secretary, E. F. Kelley, secretary to James P. Barnes, president Louisville Railway.

Executive committee: John G. Stoll, Lexington; Donald McDonald, Louisville; A. S. Nichols, Paducah; L. B. Herrington, Louisville, and H. J. Cochran, Maysville.

Internal Public Relations*

The Public Relations of a Company Can Be Measured, Just as a Fever Chart of a Patient Illustrates His Condition

BY JAMES P. BARNES
President Louisville Railway

THE state of a public utility company's relations with the public it serves is an accurate thermometer of its health as a public service. Fever charts of the condition of a utility company could be charted therefrom as surely as the bedside fever chart of a hospital patient. Moreover, the public relations fever chart of the utility company bears much the same relation to its corporate health as would the bedside chart to that of a patient. When all is well, temperatures are normal and the fever chart becomes a relatively meaningless record, but let the pneumonia of broken promises (chill breaths that blow good to no one), or the blood poisoning of distrust (bred from that foul germ double dealing), affect the patient, and the fever chart becomes a mountain peak of threatening terror to nurses and physicians.

Now the parallel between individual and corporation can be developed to any desired extent and the similarity of the two is impressive. What we wish to consider especially now, however, is the very remarkable parallelism of the corporation and the individual in these important particulars:

1. The fever chart records symptoms, i.e. results, not causes.
2. The temperature goes up more rapidly and dangerously than it goes down.
3. The fever chart reflects an internal condition.

The clinical thermometer of medicine is a simple instrument readily applied and easily understood. Its indications are positive and strictly relative; are in terms of but one dimension, viz., degrees Fahrenheit. True, pulse and respiration are also of importance, but they are strictly relative and in the case of the individual, we deal primarily with not more than three major indications, all easy of observation and comparison.

Compare this situation with the difficulty of any honest attempt, even superficially, to gage the temperature, pulse and respiration, representing, say, the cordiality, prompt response and outspoken comment critical or commendatory of the public in respect to a public utility corporation in its service.

Observation must be made from widely varying angles. The cordiality of the banker will not be the same in kind or degree as that of the laborer, and only a fine discriminating intelligence can gage the relative importance of these two and all the other classes at any particular time. Here the element of the observer's judgment enters and becomes of prime importance and the value of his observations and determinations is all too apt to be, or become, tinged with self-interest or personal prejudice.

So the first of the symptoms—temperature, is neither easy nor certain of ascertainment.

Prompt response—the pulse of the public good-will is almost as uncertain. Mankind, generally, responds more quickly and more sharply to unpleasant than to pleasant disturbances. Complaints, therefore, are more numerous and more emphatic than commendations, and the just proportion between the two is again a matter for judgment to determine. A condition may exist in which complaints are not made because of a sense of their futility. This condition is more common than is generally or frequently supposed, and under this condition the absence or rarity of complaint certainly does not denote a healthy condition of the public pulse. Other criteria suggest themselves by whose application it is easy to demonstrate that in this respect, as in others, the public's attitude must be widely observed and carefully studied by the operator who would not commit the fatal blunder of fooling himself.

Let it be never forgotten that comment regarding the conduct of a utility is more outspoken in some places and under some conditions than at others. Seldom is it true that any one man, whatever his position in the corporation or in the community, can take the full measure of what is being said in all circles, and for this reason, if for no other, it is essential that the successful utility manager shall not only be a good listener, but that he shall also cultivate and encourage the people who tell him what they hear for and against, and particularly against, his methods of management and their results in service to the public.

Every one knows that unfavorable symptoms multiply and intensify more rapidly than favorable ones. History records many cases of individuals great in their achievements, strong in their personalities, slowly building reputation and place in the public esteem, then suddenly and completely ruined in that esteem almost in the twinkling of an eye. Public relations resemble an intricate and delicate edifice, to be reared only in painstaking care and devotion over long periods of time, but subject to sudden collapse if weakness develops in foundation or structure at any one of many important points.

The time has long passed when any public utility operator will deny or belittle the importance of correct relations with the public, and the time is fast approaching when no public utility operator will dare attempt to establish public relations on any but the basis of complete and open frankness of dealing.

CHART INDICATES INTERNAL CONDITIONS

This brings me to the third, and by far the most important consideration heretofore set out, viz., that the fever chart of public relations reflects internal conditions.

Men's relations in the day to day contacts of business are on a basis which presupposes a condition of normal healthy functioning on the part of each. Seldom does the unbalanced physical or mental individual continue for long to discharge the duties of normal relationship in business matters. True, there are cases, and very noteworthy cases too, of men who rise superior to physical limitations and mental or educational handicaps, and who command thereby and therefore the warmest admiration and devotion from their associates. These cases are the rare exceptions, however, and are in themselves abnormal.

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*Abstract of address presented at a meeting of the Kentucky Association of Public Utilities, Lexington, Ky., Dec. 12, 1922.

The corporation must follow the lines of normal functioning, for with normal public reactions it must deal. Reactions may be widely different as between communities, but always remember that the reaction of a given community is its normal reaction, for normality is based on the average, or the majority, and as thinks the average or majority of citizens, so will the community be governed.

Grant that a community can be but normal and grant that the internal condition of the corporation serving it may be measured in terms of the normality of its particular community.

Judge the health of the public service corporation by the esteem in which it is held by its community.

Then, lest the health—that is the public relations — fail, guard first against internal cause of failure. Look to the virtue of patience, courtesy, frankness and honesty to maintain an internal understanding and sympathy so firm that neither the agitator nor the fault-finder can shake the ideals of the organization.

REPUTATION IS FOUNDED ON CHARACTER

Men who work together in sympathetic understanding learn to weigh one another's problems and to respect one another's accomplishments. The mutual respect had by such understanding forms sterile soil for the seed of the agitator and trouble maker. When men know of their own knowledge that their associates are straight, hardworking folk, each in his own sphere, there's little tinder left for the flame of soap-box oratory to kindle. Defense of those we know and trust springs readily to the lips of all of us, and no finer or more lasting monument can or need be raised to an organization than that the men of which it is composed think well of it. And as they will think, they will speak, well or ill. No man and no organization can avoid the making of a record; sins of omission are recorded along with sins of commission. Sometimes one, sometimes the other is more serious, but always the record is made, and always the record is interpreted, discussed and spread abroad. Reputation cannot be avoided. It is our business to see to it that reputation is fair and clean.

Reputation is founded on character and will in the long run conform to character. So it is our primary business to see that character is kept fair and clean. Truth is, after all, the mightiest force in the world, and so far as its making lies in our hands it is our moral, civil and corporate duty to see that the truth of our relations to associates and customers alike bears a fair and not an ugly face.

Build then internally the health of these public service corporations on a relationship of truth, of understanding, and of sympathy. Maintain the confidence of mankind within and without by deserving it. Place service before reward—place obligation before privilege—place honesty ahead of all—honesty of purpose—honesty of method—honesty of thought and deed—and then sleep well o' nights secure in the knowledge that summer's sun, winter's frost, nor equinoctial storm shall destroy your house—strong from within and founded on a rock.

Union Internationale de Tramways Meets

This Was the First Convention Since the War of This Association, Whose Permanent Headquarters Are in Brussels—Four Days Were Given to Technical Sessions

DURING the same week that the American Electric Railway Association was holding its convention in Chicago last October, the Union Internationale de Tramways, de Chemins de fer d'Interêt local et de Transports Publics Automobiles held its eighteenth convention in Brussels, Belgium. This association, before the war, held meetings every two years and included in its membership electric railway companies and manufacturers from all the principal countries in Europe. The seventeenth meeting was held in Christiania, Norway, in 1912, and what was to have been the eighteenth meeting was scheduled to occur in Budapest, Hungary, in August, 1914. All of the preliminary arrangements for that meeting had been made and a number of advance papers had been issued to members when war was declared and the German forces entered Belgium. The headquarters of the association have always been in Belgium, so that all the activities of the association had to stop. Since the war, the association has been reorganized to include member companies from the allied and neutral countries only, and headquarters have been reopened in Brussels.

The first function of the eighteenth convention occurred on the evening of Sunday, Oct. 2, 1922, when the members of the association who had already reached Brussels met at an informal reception tendered at the Taverne Royale by the local committee of arrangements. About 300 delegates and many ladies were present. In many respects the meeting was one long to be remembered, especially by those who had attended earlier conventions of the association. Acquaintances who had not been seen for ten years were greeted and old friendships were revived. A number of delegates who had regularly attended other meetings were missing, but their absence, so far as numbers are concerned, was more than made up by new members who utilized this opportunity to become acquainted with each other and with the older delegates. Among those in attendance were a number of official representatives to the convention from foreign governments.

MEETING ON OCT. 3

The first official session of the association was held on Monday, Oct. 3, at the Palace of the Academies on the Rue Ducale. The chairman of the meeting was the Belgian Minister of Railways, Mr. Neujean. In his opening address he referred to the important place which the tramways occupied in the social and business life of large cities, which could not long survive an interruption of their services. Their suburban and interurban extensions supply a necessary connection between the city and country communities. In looking toward the future of city and suburban transportation the minister said that he believed the auto bus would be used for this service more extensively than at present. He then referred to the extent to which Belgian capital was invested in tramway enterprises abroad, as in Egypt, South America, Canada, etc. He extended the welcome of the government to the association and said he would follow its deliberations with great interest.

Constantin de Burlet, the honorary director general of the Société Nationale des Chemins de fer Vicinaux of Belgium and president of the association, then gave an address, the keynote of which was the need for courage in the circumstances.

Mr. de Burlet first referred to the various distinguished government officials commissioned to attend the convention, including M. Max, Burgomaster of Brussels, whose name became known throughout the world during the war. He then referred to the conditions which had interrupted the work of the association from 1914 to 1918, to the present peace which, while here, left many wounds unhealed, and to the services rendered to Europe during the war by Mr. Hoover. But progress, he said, must be forward in spite of the many difficulties which seem to block the road.

Reviewing the history of the association, he pointed out that it had been organized in Brussels in 1885, largely through the initiative of Gustave Michelet, general manager of the Brussels Tramways, who was elected the first president and continued in that office until his death in 1897. He was succeeded by Baron Janssen, president of the Brussels Tramways, who occupied the office for fourteen years, when he was elected honorary president. It was at the earnest wish of Baron Janssen that the present president accepted the office.

After referring to the dependence of the industry on engineering inventions, Mr. de Burlet then spoke of the essential difference between improvements in the electric railway industry and in manufacturing, because of the lack of rivalry between different electric railway systems. An improvement which means a reduction in cost of the article produced in an industrial enterprise is hidden jealously because of the advantage which it gives a company over its competitors. With local transportation companies, however, there is no feeling of this kind. Nothing is concealed, because there is no sales rivalry. Every improvement, every step toward progress, every new invention is made public, and no better place could be found, Mr. de Burlet said, for doing this than at meetings of the International Tramway Association. The advantages of this condition are great, though not always realized. Mr. de Burlet also spoke about the expansion of the association since the last meeting by the inclusion of the bus industry.

The speaker then sketched the history of motive power tried on street railways from the time of the presentation of a paper on electric traction at the 1886 meeting, pointing out that the present trolley system was largely the invention of a Belgian, then living in the United States, Mr. Van Depoele. Mr. de Burlet then referred briefly to the damage suffered by the tramway systems in Belgium during the war, due to track being torn up and cars and other equipment destroyed or removed. The total was estimated at pre-war exchange for the Société Nationale des Chemins de fer Vicinaux at Fr. 300,000,000 ($60,000,000) and for the principal tramway companies in Belgium Fr. 25,000,000 ($5,000,000). While this material loss was great, a greater loss was suffered through the death of officials and employees in engagements against the invader. It was a satisfaction, however, to see so many old faces back and to realize that in the present membership twenty-seven nations are represented.

After referring to several of the topics before the association, President de Burlet announced as the first paper on the program that by Mr. Mariage, general manager Paris Tramway System, on the "European Electric Railway Financial Conditions." An abstract of the paper appears on page 754 of the issue of this paper for Nov. 4. Owing to the absence of Mr. Mariage, his paper was read by Mr. Bacqueyrisse, one of his associates. This was followed by a paper by Mr. d'Hoop on "Welding in Tracks and Shops," which was abstracted in the issue of Nov. 4, page 753. The discussion was brief.

In the afternoon an excursion was made to the Colonial Museum at Tervueren, and this was followed by an evening theater party.

MEETING ON OCT. 4

The session on Tuesday, Oct. 4, was presided over by Mr. Norregaard, manager of the Copenhagen Tramways. The first paper of the session was on "Motor Service Organization in Great Cities," by H. E. Blain, managing director London Underground Railways and London General Omnibus Company group. In the absence of Mr. Blain the paper was read by James Dalrymple, general manager Glasgow Corporation Tramway. It appears in abstract in the issue of Nov. 4, page 750. At the conclusion of the paper, Mr. de Burlet extended thanks to Mr. Dalrymple for the clearness of the presentation of the paper and to Mr. Blain for the contribution.

Mr. Castaing, delegate from the city of Paris, added some interesting information in regard to the operation of the Parisian bus system. He said that at present there are 1,050 buses in Paris, but next year it is expected that there will be 1,400 buses, serving a total of sixty lines. These buses cover about 120 km. (75 miles) per day and use benzol as a fuel. Tests are being made with a new fuel consisting of 50 per cent benzol and 50 per cent alcohol. It is hoped before long that all the cars will be operated with this mixture.

Mr. Dalrymple said that in Glasgow with 1,250,000 population there was not a single omnibus.

The next paper on the program was by C. J. Spencer, general manager London group of tramway companies, on "Modern Improvements in Tramway Rolling Stock." An abstract was published on page 641 of the issue of Oct. 14. In Mr. Spencer's absence the paper was read by Mr. Beckett, chairman of the Municipal Tramways Association of London, who explained that Mr. Spencer and Mr. Blain had been detained from attending the meeting because of labor troubles.

In the following discussion Mr. Bacqueyrisse spoke about some work done by the Paris Tramways in building some new cars with center entrance. If progress in Europe in car design is not so rapid as in America, he said, it may be attributed to the fact that the European engineer is more conservative than the American engineer and has less money to spend on experiments. He indorsed the suggestion in Mr. Spencer's paper that rolling stock waste could be reduced to advantage and referred to some work along these lines in which his company was engaged. (See issue of *Electric Railway Journal* for Dec. 2, page 878.) He hoped to secure with this car an economy of energy of 9,375,000 kw.-hr. annually, equivalent to 15,000 metric tons of coal at a cost of about Fr. 2,800,000. Mr. Bacqueyrisse said that the weight of the motors on this car would not be more than 15 kg. per horsepower in place of 32 kg. formerly. He also referred to the novel method of braking, in which the brakes are applied to the shaft of the motor and are quick acting. The distance required to make a stop from full speed is reduced from 45 m. to 20 m. Mr. Peridier, technical expert of the same company, gave further particulars.

This concluded the morning session. The afternoon was spent in a trip to Charleroi to inspect the new shops of the A.C.E.C., large parts of which are new because the Germans removed the former equipment during their occupation. The wire works attracted special attention. In the evening the management of the Brussels Tramways tendered the delegates a reception at the Hotel Astoria.

MEETING ON OCT. 5

The chairman at this session was Mr. Pavie, of the Compagnie Générale Française de Tramways of Paris, and the first paper read was that by Mr. Sekutowicz of the Omnium Lyonnais on "Automatic Substations." An abstract appears in the issue of Nov. 4, page 753. This was followed by an address by Mr. Rochat, manager of the Geneva Tramways, who gave statistics on the increase in wages and cost of materials used in railway operation in Switzerland in 1913 as compared with 1920. Then followed a paper by Mr. Nieuwenhuis, manager Arnhem Tramways, on "One-Man Cars" (see issue of Dec. 2, page 881). It developed following this report that one-man cars had been tried by member companies only in London, Amsterdam and Arnhem. Mr. Thonet mentioned some experiments made with one-man buses in the small town of Huy, which had given complete satisfaction.

The chairman of the afternoon session was Mr. Rochat of Geneva, and the first paper read was that on "Mercury Arc Rectifiers" (see issue of Nov. 4, page 752). The chairman complimented Mr. Odermatt on this paper and the Brown-Boveri Company on their construction.

Mr. Peridier, Paris, said he had tested some of these rectifiers and the results had been satisfactory. The apparatus possessed one peculiar quality. This is its faculty of withstanding extreme overloads. While a rotary had to be figured for an overload of a maximum 200 per cent, the rectifiers could stand momentary overloads of 300 per cent without difficulty. This is a great advantage for small systems.

The next paper on the program was that by Mr. DeCroes, Société Nationale des Chemins de fer Vicinaux, Belgium, on "Gas Motor Cars for Interurban Railways." This is abstracted in the issue of Nov. 4, page 751.

Mr. Level pointed out that some companies wanted a light and others a heavy car. Either could be built. Cars could be produced as light as 2 to 2½ tons, but there was more danger of their derailment. Mr. Varcollier explained that his system used the gas car as an auxiliary during times of very heavy traffic. Mr. Castaing spoke of the advantages of the car for routes of very light traffic, but declared that it ought to be double ended to avoid the expense of turntables, loops or wyes. His system uses cars weighing 8 tons, seating forty people, and with a maximum speed of 40 km. (25 miles) per hour.

The final report of the day was by Mr. Pirard on "Different Systems of Electric Traction for Interurban Service." It is also published in abstract in the issue of Nov. 4, page 750.

In the discussion Mr. Latigue advocated 600 volts for city tramways and 1,000 volts in the open country. Motors wound for the latter voltage could then easily be speeded up on interurban cars when the distances between stops were longer, while the tramway cars could use the cheaper motors wound for the lower potential. Mr. Peridier was of the same opinion. After further discussion the convention adjourned the last of its technical sessions.

THE BANQUET AND BUSINESS SESSION

Oct. 5 closed with an official banquet at the City Hall, attended by prominent municipal and national officials. The twenty-seven delegates from foreign countries occupied the place of honor, and more than 400 delegates and guests were present.

The business session of the association was held on Friday, Oct. 6. The most important subject considered was the place of the next meeting, to be held in 1924. Invitations were received from Glasgow, Barcelona and Warsaw, but no definite decision was made. A list of the officers elected was published on page 883 of the issue of Dec. 2. In the afternoon the delegates visited the shops of the Société d'Electricité et de Mechanique, builders in Belgium of G. E. motors, and the following day took a trip to Yprès and visited many of the famous battlegrounds.

Southwestern Electrical & Gas Association

THE Southwestern Electrical & Gas Association will hold its 1923 convention in Fort Worth, Tex., May 15, 16 and 17.

The convention committee consists of G. H. Clifford, chairman; C. E. Calder, C. P. Dodson, A. J. Duncan, H. C. Morris, R. J. Irvine, J. H. Gill, Alves Dixon, P. E. Nicholls and E. N. Willis, secretary.

Plans to federate the Southwestern Association with the South Central Association were reported and given indorsement.

A National Standard of Conductivity for Aluminum

CHARLES R. HARTE, construction engineer the Connecticut Company, New Haven, Conn., has been appointed chairman of a sectional committee of the American Engineering Standards Committee in the matter of standardizing aluminum for electrical conducting purposes. The American Institute of Electrical Engineers has been designated as sponsor for this work. Mr. Harte represents the American Electric Railway Association on the committee. Interests other than those mentioned which are represented are the American Railway Engineering Association, the American Society for Testing Materials, the United States Bureau of Standards, the Electrical Power Club and the National Electric Light Association. The organization of this committee was completed at a meeting held on Dec. 20.

The organization meeting was held in New York City, with the following in attendance: Chairman Harte, J. D. Edwards, chief physical chemist Aluminum Company of America; F. D. Hall, electrical engineer Boston & Maine Railroad; William Nesbit, representing Dean Harvey, Westinghouse Electric & Manufacturing Company; Prof. F. A. Laws, Massachusetts Institute of Technology; Dr. Frank Wenner, United States Bureau of Standards; Dr. P. G. Agnew, American Engineering Standards Committee.

Two sub-committees were appointed as follows: On research, Dr. Wenner, chairman; J. M. Darke, General Electric Company, and Messrs. Edwards, Harvey and Laws. On policy, Mr. Harvey, chairman; William Hoopes, Aluminum Company, and Mr. Harte. The research committee will collect data on the properties of aluminum, and make original investigations. The policy committee will lay out a program and prepare arguments regarding the different possible bases of standardization.

Engineering Section of A.A.A.S.

IN CONNECTION with the annual meeting of the American Association for the Advancement of Science, to be held at the Massachusetts Institute of Technology, Boston, Dec. 26-30, the Engineering Section will hold a session on Friday afternoon, Dec. 29. F. M. Feiker, vice-president McGraw-Hill Company, Inc., is chairman of this section. There will also be joint sessions with the Social and Economic Sciences Section, Friday morning and evening. Among the speakers at these sessions will be President Ira N. Hollis, Worcester Polytechnic Institute; Prof. C. F. Scott, Yale University; W. S. Murray, consulting engineer, New York City; Harrington Emerson, New York City; Calvin W. Rice, and others representing national societies and other organizations.

Association Establishes Accounting Service Bureau

THE Wisconsin Utilities Association, through its executive secretary, John N. Cady, Madison, Wis., announces the establishment of an accounting bureau in connection with the secretary's office. This has been done especially to give the smaller member companies the benefit of expert accounting service. The director of the bureau is Prof. Karl F. McMurry, who is a certified public accountant and has had extensive experience in various lines of accounting work. As far as possible, the association plans to give service to member companies without extra charge, when the work can be done at the Madison office. In cases where extensive services are required, especially work involving trips to the utility's office, this unusual service will be charged for at cost.

American Association News

Special Committee on Wood Preservation

A MEETING of the special committee of the Engineering Association appointed to carry on the work formerly done along wood preservation lines under the auspices of the committee on way matters met in New York City on Dec. 19. A. P. Way, American Railways, Philadelphia, was appointed vice-chairman. The following sub-committee appointments were announced:

1. *Specifications for open-tank treatment of poles.*—E. F. Hartmann, chairman; A. P. Way, E. L. Morier.
2. *Specifications for brush treatment of poles.*—A. P. Way, chairman; E. F. Hartmann, C. A. Smith.
3. *Specifications for pressure treatment of poles.*—C. A. Smith, chairman; M. J. Curtin, W. H. Fulweiler.
4. *Specifications for treatment of crossarms.*—M. J. Curtin, chairman; W. H. Fulweiler, E. L. Morier.
5. *Perforation process for timber treatment.* — E. L. Morier, chairman; M. J. Curtin, C. A. Smith.
6. *Review of existing specifications of the association.*—W. H. Fulweiler, chairman; A. P. Way, E. F. Hartmann.

The meeting was occupied with general discussion of the principles involved in the year's work, and suggestions were made to the sub-committees as to the lines of work which each might profitably take up. Full advantage was taken of the fact that the membership of the committees comprises experts in each of the subjects covered by the committee's assignments. The upshot of the discussion was that the specifications which are prepared shall be drawn with full consideration of the practical conditions which pertain in the preservative manufacturing field and on the commercial side of the pole business. The importance of securing co-operation with other pole-using industries was also emphasized, in view of the fact that practice in preservation and pole production is affected, in fact controlled, by the demands of the large purchasers of poles and cross-arms. The work of the American Engineering Standards Committee in this connection was seen to be promising.

Among the practical questions discussed by the committee, that of pole rehabilitation was given careful attention. The practicability of brush-treating partly rotted poles will be especially considered by sub-committee No. 2.

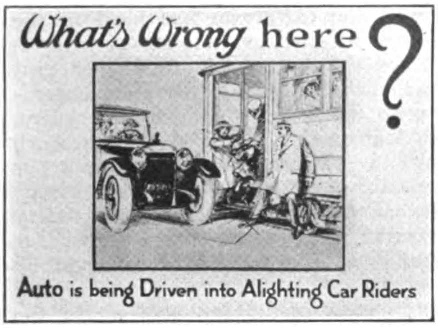
In closing the meeting Chairman H. H. George read a letter from the A.E.S.C., stating that a creosote-oil specification had been submitted to it by the Federal Specifications Board, S. W. Stratton, chairman, and that a committee is now considering the preparation of a specification which will bring the federal government's specification into line with the best practice. The American Electric Railway Engineering Association is asked to co-operate in this work.

The committee agreed, tentatively, to meet next in Washington, on Feb. 15.

Publication of Series of Accident Prevention Signs Begun

THE committee on co-operation of manufacturers, through the Advertising Section, American Electric Railway Association, has just prepared the first two of a series of accident prevention signs as illustrated. Similar signs, dealing for the present chiefly with collisions between automobiles and electric cars, will be sent out from time to time. These will be supplied in reasonable quantities to member companies without charge, and it is hoped that they will be displayed where automobile drivers will be most likely to see them. It is suggested that manufacturing and operating member companies co-operate in the placing of the signs in automobile clubs, public garages, etc.

J. W. Welsh, executive secretary of the association, is requesting that he be informed immediately by telegraph or letter how many copies of these signs will be needed.


What's Wrong here ?
Auto is being Driven into Alighting Car Riders

What's Wrong here ?
Auto Driver Trailing Car too Closely

THESE POSTERS ARE THE FIRST IN A SERIES DESIGNED TO FURTHER THE CAUSE OF ACCIDENT MITIGATION, PARTICULARLY THE REDUCTION IN NUMBERS AND SEVERITY OF COLLISIONS BETWEEN AUTOMOBILES AND TROLLEY CARS

One-Man Car Operation

A MEETING of the committee on one-man car operation of the Transportation & Traffic Association was held at the New York headquarters on Dec. 18. Those in attendance were J. P. Pope, Lexington, Ky., chairman; J. E. Duffy, Syracuse, N. Y.; A. L. Reynolds, Youngstown, Ohio, and Karl A. Simmon, East Pittsburgh. The subject especially assigned to the committee this year is one-man operation in suburban and interurban service. A questionnaire was considered, and it was decided to send out a short one asking for information which would be supplementary to a recent questionnaire on one-man cars which was sent out by the Information Bureau.

The committee will probably make a study of the safety features of this type of car and list the advantages and disadvantages.

Revision of Safety Code

AT THE recent meeting of the Engineering Association committee on power distribution, Sponsor C. R. Harte reported regarding the activities of the American Engineering Standards Committee in the revision of Part II of the National Electrical Safety Code and the preparation of standard specifications for wire crossings. He stated that, following out the suggestions of the Engineering Association on this subject, Dr. M. G. Lloyd, of the United States Bureau of Standards, in due course, named a committee which determined the representation of each of nine interests involved, to secure a balanced general committee. On Nov. 2, as reported in the issue of this paper for Dec. 2, page 883, this committee met at Washington, and elected Dr. Lloyd chairman, C. B. Hayden vice-chairman, and Roy M. Dwyer secretary. An executive committee was also appointed.

Following the adjournment of the general committee the executive committee met but took no definite action and adjourned to Nov. 27.

At that date, it was decided that the fundamental question at any crossing was the degree of hazard; that with this determined the rest of the problem was comparatively simple; but that until such determination was made little else could be done except to collect data as to permissible construction details. Accordingly there were appointed four committees, each interest being given appropriate representation.

The four committees are as follows: (1) *Grades of Hazards*—Thomas Sproule, R. A. Bloomsburg, C. R. Harte, A. E. Knowlton, M. G. Lloyd, S. M. Viele, K. L. Wilkinson. (2) *Allowable Clearances*—M. C. Wagner, M. G. Lloyd, J. H. Mathews, R. A. Smith. (3) *Allowable Ultimate Strength*—R. D. Coombs, J. A. Capps, R. C. Dwyer, W. L. Morse, W. C. Wagner. (4) *Underground Construction*—M. B. Rosevear, Arthur Halstead, W. H. Homer, A. L. Pierce, G. C. Post, F. K. Shinnen, W. C. Whiston. Others are to be added by the interests desiring representation.

The executive committee constituted itself a committee on correlation.

At the time Dr. Lloyd was forming the sectional committee, the Engineering Association appointed representatives to serve on each of the three committees which it was expected would be organized to deal respectively with power lines over railroads, power lines over signal lines, and signal lines over railroads.

The procedure now being followed in no way affects this plan; the present work is necessarily preliminary to the preparations of any working specifications and the latter will not be touched until the foundation is well established.

Educational Program Inaugurated

A LARGE attendance of the new American Association committee on education, at a meeting held in New York City on Dec. 8, attested the interest of electric railway managers in the training of their employees. No specific assignments had been made to the committee by the executive committee, so that the first task was to review the whole field of possible activity and select for this year's work the most promising part.

It was concluded that the first task is to secure co-operation of electric railway managers in putting educational plans actually to work on the several properties. The report of last year's committee outlined the possible educational activities clearly, so that the first thing now is to urge the putting into practice the suggestions of that committee.

Each company will be asked to appoint a responsible person to "head up" the local educational activities. Through these men the committee hopes to be of assistance to the companies in furnishing suggestions for actual procedure. It is expected also that the attention of managers will be drawn to the importance of this work through conventions of the sectional electric railway associations.

Efforts will also be made this year to utilize the experience of educational committees of other organizations.

The committee's plans assumed tangible form during the meeting, but will not be announced in detail until the local educational men are appointed, which should be soon.

The New York meeting was attended by Edward Dana, general manager Boston Elevated Railway, chairman; Dr. Thomas Conway, Jr., Aurora, Ill.; C. B. Fairchild, Philadelphia, Pa.; M. B. Lambert, East Pittsburgh, Pa.; C. E. Morgan, Brooklyn, N. Y.; H. H. Norris, New York, N. Y.; William von Phul, New York, N. Y., and Thomas S. Wheelwright, Richmond, Va., members of the committee, as well as the following guests: C. S. Coler, manager educational department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; Dr. H. E. Bricker, medical department Philadelphia Rapid Transit Company; W. A. O'Leary, director of vocational education State of New Jersey, Trenton, N. J., and Prof. W. H. Timbie, Massachusetts Institute of Technology.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Franchise Valid

Higher Court Rules in Favor of Des Moines Railway—Extensions and Improvements Expected

The Des Moines City Railway and the city of Des Moines won a sweeping victory on Dec. 15 when the Iowa Supreme Court held the Des Moines franchise valid.

The case went to the Supreme Court upon appeal by the city of Des Moines and the Des Moines City Railway from the decision of Judge James C. Hume of the Polk County District Court, who held that the franchise election held in November, 1921, which granted the city railway a sliding scale service-at-cost-franchise, was illegal. Suit against the franchise was brought by the North Des Moines Improvement League with Grant Van Horn as the principal.

OVERWHELMING RAILWAY VICTORY

Not only was the high court's ruling an overwhelming victory but it has the further strength of having been concurred in by all six justices of the Supreme Court. The decision was written by Truman S. Stevens, chief justice.

The Supreme Court held that the franchise was not a perpetual nor exclusive grant but that the publication clause, which was one of the points particularly aimed at by Van Horn, was entirely adequate. Justice Stevens held that the title was not defective on account of carrying more than one subject.

According to the ruling Van Horn held no vested rights in the former franchise which was abrogated by the one accepted by the voters in November, 1921. Justice Stevens held that a vested interest is not a mere privilege but an actual property right.

PUBLIC APPROVES OF FRANCHISE VALIDITY

The decision has been received with much approval on the part of citizens of Des Moines generally, for ever since the Des Moines City Railway was granted the higher fare by the new franchise the city has enjoyed a constantly improving service and there has been a great deal of improvement on the physical property. H. W. Byers, former corporation counsel for the city, who fought the city railway at every point during his ten years in office, and who was the principal attorney for Van Horn and the North Des Moines Improvement League, when interviewed, said the "opinion seemed to be a sweeping victory for the company."

Daily newspapers have accepted the decision as a further sign for improvement in conditions here, and even the daily which has taken an unfavorable stand all through the franchise proceedings commented editorially in a favorable vein.

F. C. Chambers, general manager of the Des Moines City Railway, is quoted in the daily papers as seeing decided improvement in service and plant with possible new extensions as a result of the high court's decision. Mr. Chambers calls attention to the fact that the company will now be able to market its securities more successfully in order to permit of the expenditures for improvements and extensions.

Mayor Garver has stated that with the legality of the franchise settled the city will now be in a position to ask the company to make the extensions which are necessary to catch up with the growth of the city.

The franchise moves have been noted previously in the ELECTRIC RAILWAY JOURNAL.

Plans for Rehabilitation Fail

The interurban line which until last March was operated between Cincinnati and New Richmond, Ohio, under the name of the Interurban Railway & Terminal Company, will not be rehabilitated and restored to service. This announcement was made by William E. Harton, president of the Cincinnati & New Richmond Railway, originally organized to take over this operation. Mr. Harton is general manager of the Cincinnati, Newport & Covington Traction Company.

Failure of shippers along the route to support the project is given as the chief reason for the collapse of the plan. Persons living along this line also will be deprived of electricity, as the new company expected to supply the vicinity bordering its line with power.

The work of dismantling the old Interurban Railway & Terminal Company line already has been started. The tracks will be torn up and all equipment and stock sold or junked. This work is under the direction of Charles Leslie, receiver for the company, with offices in the Second National Bank Building.

Those interested in the proposed successor company said that residents of New Richmond had enlisted in the project. Arrangements had already been completed whereby the new company was to take over the municipal electrical generating plant of that village. The shippers who refused to promise their business to the new line believed they could ship by trucks and river at a lower cost than offered by the traction company. An arrangement whereby the New Richmond line would use the Cincinnati, Georgetown & Portsmouth Traction Company's tracks between Coney Island and Cincinnati had been worked out by officials of the new company.

$95,000 Christmas Bonus

A Christmas bonus of approximately $95,000 was paid to trainmen by the Los Angeles (Calif.) Railway Dec. 15. This is the third annual bonus paid by the company under the merit system. Bonus checks were given to 1,976 men.

The bonus is $60 a year at the rate of $5 per month. When a man's efficiency rating is 100 per cent or better for a month he is credited with $5, unless he has been absent on leave more than the prescribed number of days.

A new trainman entering the service is entitled to participate in the bonus plan after he has been in the service six months. He starts with an efficiency record card of 100 per cent and receives merits or demerits, according to the type of service he renders. A clear courtesy record for a month gives a trainman ten credits or 2 per cent increase in his efficiency rating; the same applies to a clear safety record. Other credits are given for special acts of efficiency reported by passengers or supervisors, and a man may claim credit for acts above the ordinary line of duty which he reports himself.

Demerits are recorded for acts of discourtesy and careless operation, careless reports, and other miscellaneous offenses. Demerits may be offset by credits, enabling a man to maintain his record above 100 per cent.

When a trainman's efficiency record goes below 75 per cent, he automatically dismisses himself. Only three such cases have been reported in 1922, and all but thirty of the men participating in the bonus had records of 100 per cent or better each month.

Report on Bill in Prospect

Enactment of a public utilities bill, providing for the regulation of all public utilities to be vested in a commission of the state government, will be urged by the League of Texas Municipalities. Action looking to the drafting of such a bill and its enactment into law were taken last summer at the annual meeting of the league. At that time a committee was appointed to prepare a draft of a bill.

After several meetings this committee secured the services of Dr. G. C. Butte of the University of Texas. Dr. Butte was on leave from the university to pursue special studies in utility legislation, and has been busy for three months preparing the Texas bill.

At a recent meeting of the committee in Fort Worth, Dr Butte submitted a report as to what had been done. The bill, it is said, will be ready for introduction when the Texas Legislature convenes in January.

$8,513,000 Spent in St. Louis in Three Years

Impressive Talk by Manager for United Railways' Receiver—17,782 Items of Supplies Bought, 720 from Local St. Louis Firms or Firms with Local Offices—Electrical Board of Trade Surprised by Figures

COL. A. T. PERKINS, manager for receiver United Railways, St. Louis, Mo., appeared before the Electrical Board of Trade in St. Louis a few days ago and gave a succinct account of the last three and a half years' stewardship of the property under the receiver. He told his hearers what the city must have or should do in connection with a reorganization, which is expected to take place early in 1923.

As a manufacturer of street car rides, said the Colonel, he desired to outline a few things of interest from a little different point of view—items that form the background for next year, and in which the men present were interested as citizens and manufacturers, and also as occasional users of street railway transportation.

After several years of handling the property, the speaker stated, the management found to its own great satisfaction that a majority of the traveling public is behind it. There is still some criticism due to misunderstanding, but the active opposition comes from a few persons with the mistaken idea that as in the past it is still popular to attack a thing because it is big. He deplored apathy on the part of business men, who as a whole are not making much use of trolley facilities, but use other vehicles except when the weather gets bad. Then they come to the trolley.

SURPRISE EXPRESSED AT FIGURES

Expressions of amazement were heard at some of the tables when Colonel Perkins launched into the manufacturing feature of his talk by stating the extent of supplies purchased by the receiver. He is using 17,782 different items of supplies, according to a catalog recently completed. Last year these items were purchased from 720 different firms either manufacturing or having offices in St. Louis and of these 720 there are 413 enrolled as members of the Electrical Board of Trade, 243, or about 60 per cent, represent firms from which the management has been buying electrical supplies in amount more than $600,000.

In touching further upon electrical matters, the Colonel stated that the amount of electricity for power and lighting purchased in the city of St. Louis this year was 390,000,000 kw.-hr., from the main producers, of which 215,000,000 are for lighting purposes. Of the remaining 175,000,000 the United Railways uses 47½ per cent, or almost half of the entire output for power purposes. The system uses about 30 per cent of all produced.

Colonel Perkins told what had been accomplished by the receiver and his staff in the last three and a half years by quoting some of the compliments which were paid to the management recently by Mayor Kiel at the North Broadway new station celebration. While certain persons continue attacks from political motives, the Colonel commented, they do not represent the public. Contrasting conditions in St. Louis with those in Kansas City, he quoted a statement from the City Counselor of Kansas City before the Missouri Public Service Commission. The attitude of the Kansas City official was that an injustice would be done the people of that municipality who use the street cars if his office insisted upon a reduction of fares that would seriously impair street car service. In St. Louis the City Counselor is demanding a reduction from 7 to 5 cents. A lower fare would hurt service in St. Louis.

PERSONNEL DEVELOPED

The Colonel told how the personnel has been developed under the receiver along lines somewhat different from any other he knows of. This personnel of between 6,000 and 7,000 men is for the most part trying to give the public the best service possible with the facilities at hand. During the last three and a half years about 1,500 motormen and conductors have been replaced; about 500 have been discharged, because they were not doing their work well. The manager has arranged to meet the new men every week, talks to them, soon calls them by name, and establishes relations that quickly lead to efficient and courteous service. About 95 per cent of the men are doing good work. A small percentage of the men who lose their temper must go. And those who go cannot come back, Col. Perkins stated. He then said:

> In the last three years, we have reconstructed 100 miles of track at a cost of $4,000,000. We have rebuilt 100 old cars at a cost of $1,000,000. We have built 150 new cars at a cost of about $1,500,000. Another fifty new cars under way will cost $513,000. To handle the new equipment it has been necessary to build other things—a new station and shops, seven new power substations, besides spending $1,500,000 for street paving for the use of the public. Moreover, United Railways is the largest taxpayer in Missouri, nearly 1 cent of every cash fare being paid out for taxes.
>
> We really do not get 7 cents for a car ride, the average being 6.89. Leaving out firemen and policemen and figuring in the transfers the average is 4.48 cents per ride. Although there was no increase in travel, records show that in October, 1922, on week day mornings we operated 1,153 cars as compared with 1.099 in October of last year, while in the evenings this year the average was 1,337 cars as against 1,163 in 1921.

What can be done with the traffic has become a grave problem. Rerouting has become imperative. At Eighteenth and Washington automobile traffic has become so congested it is now impossible to get all of our cars through and therefore Park and Compton cars westbound are now sent over Fourteenth Street to Pine and Eighteenth Street. Last year the receiver put in half a dozen new curves at a cost of about $4,000 each, and more are needed.

Step by step and year by year the management is working on the scheme laid down by the City Plan Commission, toward rapid transit.

The needs of the United Railways will be more serious next year, Colonel Perkins stated. In this connection he said:

> We are reaching a crisis in the valuation case before the Missouri Public Service Commission. Our brief has been filed and the city's brief probably will be filed in January. It is a big case and the commission is expected to be fair in determining the value of a great property embracing 460 miles of lines, 525 miles of track, 1,530 cars and holdings scattered all over St. Louis, St. Louis County and St Charles County. An early decision is hoped for. A total of $11,000,000 of securities fall due in 1923. and at least $4,000,000 is needed for improvements. What are we going to do to get it?

In answer to his own question, Colonel Perkins said that in order to reorganize the property new franchises are essential. The old grants present a fearful mixture of different conditions, rates of taxation, etc. And speaking of taxes, the Colonel remarked that the management has paid the mill tax faithfully. In future franchises the city should be protected and so should the people who refinance the property for public service.

In referring to the 100th birthday anniversary of the late Erastus Wells, father of the receiver and St. Louis pioneer street transportation leader, and in sketching the history of transportation with which the Colonel has been connected since 1887, a year before the first electric line was operated, Manager Perkins drew the lesson that the public and its representatives must look far ahead in developing the street car service of St. Louis. Besides making the 1923 model the best possible, it behooves the people as a whole to prepare for the future by getting behind the transportation interests and thereby bring about a service of quality and quantity that is essential to the prosperity of the city.

Legislation on Cities' Contribution to Railway Operation

Among the recommendations which the Massachusetts Department of Public Utilities will make to the Massachusetts Legislature next January is one to the effect that cities and towns shall be authorized to contribute toward the cost of street railway operation. It is provided that the Public Utilities Commissioners shall investigate the situation where one city or town petitions for authority to make such contribution, and the commission shall make such recommendations as it deems shall best further the interests of the communities affected. It is proposed that the cities and towns shall be authorized to make contributions for the purpose of securing lower fares and for avoiding a reduction or discontinuance of service.

The main recommendations to the 1923 Legislature will come later when the commission reports on a number of measures that were submitted to it by the 1922 Legislature relative to transportation service in Greater Boston. In connection with its study of that problem the commission visited New York and Philadelphia to inquire into the operation of the street railway systems in those cities.

New Ordinances Adopted

Regulations Effective in January One Provide for Identification Card System Elimination of Bus Competition and Track Abandonments—Result, Means More Municipal Control

TRACTION line operation in Davenport, Ia., was put back on a permanent basis and the legal tangle between the public utilities and the city of Davenport unsnarled recently when the City Council adopted a new set of ordinances which provides for the adoption of the identification card system of street railway fares, elimination of jitney bus competition and authorization for the company to shorten its downtown loop by abandoning trackage. The new ordinance will also result in wiping out numerous court injunctions under which the street cars operate at the present time. The general effect of the Council action is to give the company considerable relief and provide for municipal instead of court control.

EIGHT-CENT FARE WITH CARD PLAN

The present 8-cent fare is adopted by the city. It was fixed by court order over a year ago following a protracted legal battle with the former socialist city administration. The original temporary injunction of May, 1920, put a 7-cent fare into effect and this was later modified by a court order to provide for an 8-cent fare.

Entry of the identification card plan of fare is provided for in a clause which gives the city authority to put this into effect at any time following a thirty-day written notice. Under this plan the passenger pays 50 cents per month for a card and 5 cents every time he rides. It is expected that this plan will be put in operation after the holidays.

The company is required to submit a monthly report of the number of passengers carried and a detailed statement of receipts and expenditures so that in the event of the revenues showing a material increase the city will feel justified in lowering the rate.

At present, according to City Attorney Thuenen, the company is earning less than 1 per cent on its investment, a figure which he states he has secured through months of investigation.

LOSS OF $1,000,000 SINCE WAR

Joe R. Lane, attorney for the company, stated that the Tri-City Railway Company of Iowa had lost approximately $1,000,000 since the beginning of the war, for he declared that a surplus of $500,000 had been used up and that at the present time the company was the same amount on the wrong side of the ledger.

The identification card system was submitted to the socialist administration but was turned down by the socialist majority. As a number of the present Aldermen have privately declared themselves in favor of the card plan, it is expected that the plan will go into effect shortly. The ordinance also allows the sale of four tokens, each good for one car ride, for 35 cents.

Licenses for jitney buses are made from $15 to $35 a year, depending on the seating capacity of the bus. Jitney competition was also practically wiped out by a provision which declares there shall be no bus lines on streets where there is a traction line, providing, however, that where a terminus in the business district is established and must be reached by prohibited streets, buses may operate on these prohibited streets for such distances as are necessary to connect the terminals. Bus routes will be established later by the Council.

No bus may stop, take on or discharge passengers within any street intersections on streets on which street car lines are located except at the opposite corner from the one at which street cars regularly stop.

Both the city attorney and the members of the street car committee of the Council held that direct competition of the bus lines with the company was unfair, although they said that the buses had a certain value. The ordinance adopted by the Socialist City Council in August of 1920 by which jitneys were allowed to operate has been repealed. The ordinance also provides that the buses must operate on a permanent schedule and outlines the service which they must give to the public. Inasmuch as the buses now running parallel to the Third Street and Rockingham car lines do not maintain a continuous service throughout the day, operating only during the rush periods, it is believed that the new ordinance will wipe them out of business.

Jan. 1 is the date of effect of all of the utility regulation provisions.

LOOP WILL BE SHORTENED

Another bone of contention between the old Council and the utilities was removed when the Council adopted another ordinance which allowed the shortening of the downtown loop by eight city blocks. The company is ordered to remove its track and ties on Second between Scott and Warren Streets and on Warren between Second and Third Streets. It is stated that the elimination of this waste is essential to reducing the cost of operating cars. The company is to lay a new base for resurfacing of the street in the area where its tracks are removed.

The ordinances also provide that the company shall assume the cost of "devilstrip" paving that portion of the paving between the tracks where there is a double track. This agreement will assess a considerable charge against the company which the utilities sought to be freed from.

The present City Council went into office in last April, following one of the hottest battles in Davenport municipal history. The defeated party charged the successful mayoralty candidate and his aldermanic colleagues with the active support of the car company and other utilities.

This is the first move toward utility rate readjustment made since the new administration came into office, but the settlement arrived at is the result of negotiations between city officials and company representatives extending over several months.

Albany Car Jumps Track, Injures Fourteen

Fourteen persons were injured when a crowded one-man car of the United Traction Company, Albany, N. Y., split a switch and jumped the tracks on the Second Avenue line on Dec. 16 and coasted down the hill on the sidewalk, carrying away the stoops of four houses, knocking down two electric light poles and traveling an entire block before its mad career was checked.

This accident is the third of its kind that has occurred at the same point. In the summer of 1912 a car going down Second Avenue left the track in attempting to make the switch and crashed into the house at the northeast corner of Broad Street and Second Avenue, injuring several persons. As a result of this accident the switch was changed to South Pearl Street and Second Avenue, a block below. About two years after this a car left the track at South Pearl Street and Second Avenue and nosed its way into the undertaking establishment of J. M. Foll, where the trolley car finally was halted in this recent accident.

A. E. Reynolds, general manager of the United Traction Company, said that it would be possible for both air and hand brakes to function and yet have the car slide backward down the rails, if they were slippery. He added that he did not know of any safety device that could prevent such accidents, provided brakes functioned and locked the wheels.

In addition to the air brakes, Mr. Reynolds said all the cars have the hand brakes in case of emergency.

Company Opens Bank Accounts for Babies

Announcement has been made at the offices of the Monongahela Power & Railway Company, Clarksburg, W. Va., that babies born into families of the employees in the year 1923 would be presented with a $5 deposit in a handy bank. The bank book will be mailed to the happy mother as soon as it is received from the bank.

The baby fund is one of the many features that have been introduced by the company since Capt. George M. Alexander of Fairmont has been its president.

The Employees' Beneficial Association, which provides benefits for sick and injured employees at a very small cost to the men, and the annual outings of the employees held at Parkersburg and at Clarksburg are other activities that are proving popular with the employees of the company.

Tentative Regulatory Program Announced

The tentative public service legislative program of the newly elected Democratic administration in New York State calls for the creation in the city of New York, under provisions of its city charter, of a transit department to supersede the present state appointed transit commission and a public utilities department to take the place of the jurisdiction of the Public Service Commission over other utilities not regulated by the transit department, excepting telegraph lines.

To these newly created city departments will undoubtedly be transferred the employees now in the Transit Commission and the New York office of the Public Service Commission. Appointive power of the heads of the newly created departments and their compensation will be vested in the city of New York.

For other cities and municipalities, it will be made optional whether they regulate their own public service corporations or accept the regulation imposed by the State Public Service Commission, which is to be continued.

The public service commissions law itself, of course, will be amended, stripping the commission of certain powers and duties in relation to the city of New York and other municipalities where such powers and duties are exercised by local commissions or departments of municipal government and that part of the public service commissions law relating to the Transit Commission will be repealed, as its provisions will, for the most part, be written into New York City's charter.

Order Prevents City Interference

A temporary restraining order preventing the city of Milwaukee from interfering in any way with one-man car service on three of the city lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was recently issued by Judge Schinz of the Circuit Court. The city claimed that one-man car operation was in violation of a 1914 ordinance requiring that every street car must be operated by a crew of at least two men. A warrant was recently sworn out charging a violation of this ordinance by the company. On the other hand the company claimed that it has been operating one-man car service with the permission of the Wisconsin Railroad Commission and that the city has no power to legislate over the matter. It therefore asked for a temporary restraining order and later to have the order made permanent.

City Responds to Railway Offer

The city of Kitchener, Ont., will offer the Waterloo-Wellington Railway, which operates between Kitchener and Bridgeport, $25,000 for its track, rolling stock and carhouse. The franchise expires in February and the company has asked the city either to grant a thirty-five-year franchise or to purchase the road.

The City Council will submit a bylaw to ratepayers to provide $70,000, of which $25,000 will be for the purchase of the assets of the road and the balance for equipment and operation in conjunction with the Kitchener & Waterloo Street Railway. W. H. Breithaupt, president of the road, wants $40,000 for the railway, but the city will only offer $25,000.

Buses to Be Tried in Toledo

The City Council of Toledo, Ohio, on recommendation of Street Railway Commissioner Wilfred E. Cann has authorized the Community Traction Company, to increase its capital by issuing $30,000 of preferred stock to provide funds to purchase four motor buses and provide housing facilities for them, the buses to be used in a service to be added to the Oak Street Railway line. The commissioner plans to purchase Garford equipment, each bus to have a seating capacity of twenty-five passengers.

Alleged Discrimination Stopped

The New York Central Railroad has decided to place the Northwestern Ohio Railway & Power Company on a parity with steam roads at Toledo, Ohio.

The railroad in the past has maintained a reciprocal switching tariff applicable between its tracks in Toledo, Ohio, and those of other steam railroads within the Toledo switching limits. The New York Central absolutely refused to consider switching between electric lines and its tracks on any other basis excepting as from an industry, the rate in which case was several times higher than that shown in its reciprocal switching tariff.

Immediately after the close of the Federal Railroad Administration the Northwestern Ohio Railway & Power Company filed an informal complaint covering this alleged discrimination with the Interstate Commerce Commission.

The conclusion to place the roads on a parity was based on the amount of business offered for interchange at that point and the equipment owned and operated was such as to make it impossible to classify same as an industry.

Mitten—A Hotel Promotor

Thomas E. Mitten, Philadelphia, chairman of the board of directors of the International Railway, Buffalo, N. Y., has subscribed to $10,000 of stock in the new $1,000,000 hotel which will be erected in Niagara Falls. The subscription was made on behalf of the International Railway because of the fair treatment accorded the company by the city during the recent railway strike, Mr. Mitten explained. The United Hotels Company will manage the structure. The fund for the erection of the building is being raised by the sale of stock. The Chamber of Commerce and the Niagara County Merchants' Association are co-operating.

Investigation On in Buffalo

Two secret indictments have been returned by the Federal Grand Jury in Buffalo in connection with the government investigation into the dynamiting of a high-speed train on the Buffalo-Niagara Falls interurban division of the International Railway last August. Colonel William J. Donovan, United States attorney for the western district of New York, who is in charge of the investigation being made by the United States department of justice, says the investigation has not yet been completed. Clarence F. Conroy, business agent of the Amalgamated in charge of the strike, was a witness before the Federal Grand Jury for forty minutes.

Whether or not the government investigation involves striking street car men and officers of the union has not been revealed by those in charge of the inquiry. Four men already are under arrest charged with the illegal possession of dynamite. One is Robert C. Lacey, former president of the Central Labor Council and state senator-elect from an East Side district. Lacey now is out under $5,000 bail. The International Railway Company has offered a cash reward of $100,000 for information leading to the arrest and conviction of those responsible for the dynamite outrages since the outset of the strike.

$195,000 for Power Betterments

A definite statement as to the purposes of the Minneapolis (Minn.) Street Railway has been made to the committee on street railways of the local Council by Vice President T. Julian McGill as to 1923 work. The program outlined will include $195,000 to be put into betterments of the power house, improvements of substations, reconstruction of rolling stock and cable work above and below ground. This leaves out of the renewal fund $500,000 for track extensions and paving between tracks. Of these extensions have been ordered as follows: Connection between the Twenty-fifth Street line and the Thirty-sixth Avenue line, five blocks, and extension of the latter line, to cost $170,000; extension of Monroe Street line, $17,000; Grand Avenue line, $43,900; Bloomington Avenue line, $54,500.

The proposed construction of several hundred light-weight cars, already announced, and the completion of other work will mean an expenditure of about $4,000,000, to cover which the company expects a market for its bonds after the rate decision is made by the State Railroad & Warehouse Commission. The addition of these cars depends, however, on the company getting additional funds.

An attempt of some of the Aldermen in attendance at the meeting to interrupt Mr. McGill was squelched when, in response to a statement by one of these Aldermen, Mr. McGill said that since April 1 no one had been discharged who had worked for the company two years or more.

Salary Expenditures Explained

James Couzens of Detroit recently addressed the annual dinner meeting of the Citizens' league at Grand Rapids. In the course of his remarks he called attention to a number of expense items that indicated an inflated overhead which he claimed bore the greater part of the responsibility for the high rates of fare in the operation of the Detroit street railway system. According to one of the Grand Rapids papers, Senator Couzens, then Mayor of Detroit, aroused the resentment of local city and street railway officials by suggesting that the city might find a remedy for the higher fare by investigating similar items.

In view of this circumstance City Manager Fred H. Locke, in co-operation with Louis J. DeLamarter, general manager of the Grand Rapids Railway, has made a study of many of these items as they apply to the Grand Rapids Railway Company and will publish a continuing report covering these factors as they apply to local charges.

The first of the series, signed by Mr. Locke, follows:

> There appears to be some misunderstanding or suspicion in the minds of some citizens relative to the financial affairs of the railway, and inasmuch as the operation of this company has to a considerable extent been placed under the control of the city manager, I will from time to time endeavor to give an account of the conditions as they actually exist.
>
> It has been related that the officials of certain street railway companies through high salaried officers have been milking the companies—that is, that they have taken in this manner from the stockholders and car riders the benefit of the earnings of said companies.
>
> It is reported and it is well known that in some cities large salaries have been and are being paid to the officials of public utilities including street railways.
>
> It has been hinted from certain quarters and by a few local citizens that such may be the condition existing here; in other words, that some of the officials and directors are drawing large salaries at the expense of the car riders.
>
> Under the terms of the franchise all operating and other expenses are subject to the approval of the city commission.
>
> As the city has full access to the books of the street railway company, the facts can be and have been ascertained and verified by an expert accountant for the city.
>
> The total of salaries paid by the local railway to its officials is as follows: President (in New York), vice-president and general manager, secretary and treasurer, assistant secretary and treasurer (in New York), comptroller, $18,200.
>
> The members of the board of directors receive $10 each for each meeting attended.
>
> It can be easily seen that the officials of the local street railway are not being overpaid, nor is Wall Street getting a rake-off through the payment of exorbitant salaries.

Action Delayed in Hollywood Case

It is estimated that it will be at least eighty days before the citizens of Hollywood, Calif., may expect any action of the California State Supreme Court on the matter of appeal made by the citizens to the courts for a decision of whether or not the city of Los Angeles or the State Railroad Commission has the power to order the Los Angeles Railway Corporation to extend its lines into Hollywood. It has been proposed that the West Sixth Street, the Vermont Avenue, the Heliotrope and the Temple Street lines be extended.

The Hollywood Chamber of Commerce recently petitioned the State Railroad Commission to order the Los Angeles Railway Corporation to extend its lines to Hollywood, as now served exclusively by the Pacific Electric local lines, but the state body stated that it was not certain of its authority to issue such order on the railway company, and the city of Los Angeles takes the same attitude under the terms of the existing city charter. Therefore, the matter was appealed to the Supreme Court for decision. Upon receiving the petition the court has requested the Hollywood Chamber of Commerce within thirty days from Dec. 6 to file briefs, the commission being given thirty days to answer and the Hollywood Chamber of Commerce twenty days to file another answer. The Supreme Court will then consider the case.

News Notes

Pamphlet Tells Four Years Story.—The Boston (Mass.) Elevated Railway has issued in pamphlet form the statistics on the four years' results under public operation. These figures were published in the *Electric Railway Journal*, issue of Aug. 5.

Trolley Service Started. — Railway service was recently established between Groton and New London by the Groton & Stonington Street Railway, Norwich, Conn. The line extends over the new Thames River bridge and opens up a service long desired.

Good Slogan Wins Prize.—"Any accident may be fatal" is the new slogan of the Boston (Mass.) Elevated Railway. The author of the phrase, now officially adopted, was awarded a $10 prize in a contest for employees, recently held by the company and in which a large number of men submitted suggestions.

Power Contract Approved.—The New Brunswick Government has approved a contract between the Provincial Electrical Power Commission and the city of St. John for the delivery of hydro power to the city from the Musquash plant. The signature of Lieutenant-Governor Pugsley has not yet been affixed to the contract.

Safety Week Saves Forty-seven.—The Safety Institute of America has issued its safety week bulletin, which gives the result of that important week in New York City, namely Oct. 8-14. There were only twenty-three deaths due to accidents compared with seventy for the same week in 1921. In other words, forty-seven lives were spared.

Arbitration Will Decide.—Arbitrators will be chosen to settle the differences existing between the Charleston (S. C.) Consolidated Railway & Lighting Company, and its employees. The contracting parties have been unable to reach an agreement with respect to working conditions and wages for 1923.

New Slogan in Fort Wayne.—The Indiana Service Corporation, Fort Wayne, Ind., has adopted an interesting slogan which is being used in all the company's advertising, in all of its literature and on all of its letterheads, billheads, envelopes, etc. This slogan is, "Service Is Our Middle Name."

Will Consider Wage Cut Appeal. — Trustees of the Boston (Mass.) Elevated Railway are expected to consider the appeal of the carmen's union for a postponement of the wage reduction scheduled for Jan. 1. The present arrangement was the result of a joint conference held last May, but according to the union's petition, costs of living have advanced to such an extent that the 2 cents an hour cut would work a hardship on the men. Operators of one-man cars now receive 73 cents an hour and the blue uniformed men 63 cents an hour.

Ordinance Demands "Stop" Lights.—An ordinance requiring the Cincinnati (Ohio) Traction Company to equip its cars with automatic rear stop lights has been introduced in the City Council by Councilman Otto K. Francis. The measure has been referred to the committee on street railways, which has scheduled it for a public hearing. By the terms of the proposed law the traction company is forced to equip half of its cars with rear lights within six months and all its cars with lights within a year. A provision of the ordinance demands that traction cars be operated with automatic stop lights.

Statistics on the First Pasenger Railroad.—An account of the bulletin for posting in cars and in other places, issued by the Georgia Railway & Power Company, Atlanta, Ga., called "The Empire State," has been published in previous issues of this paper. The issue of "The Empire State" for Dec. 11 brings out an interesting fact in regard to the first passenger railroad. The bulletin reads: "The first passenger railroad in the world ran from Augusta, Ga., to Charleston, S. C. The first trip was made in January, 1831. Now Georgia has 7,318 miles of railroad track, affording a network intercommunication and abundant outlets to the markets of the world. It is great to be a Georgian."

Speaks on Mitten Plan.—Dr. A. A. Mitten supervisor of industrial relations of the Philadelphia (Pa.) Rapid Transit Company was the speaker at the December meeting of the Industrial Relations Association of Buffalo. His address confined itself largely to the Mitten plan of collective bargaining, but he did touch upon the traction situation in Buffalo. He declared that the International Railway is now employing more men in the operation of cars than before the strike. Dr. Mitten was detailed to special service in Buffalo during the early months of the strike on the local and interurban lines of the International Railway. He was in charge of the health of the men held in carhouse camps and also in the sanitation of the camps.

Financial and Corporate

I.C.C. Act Interpretation

Electric Railways Oppose Steam Railroad Purchase Proposal from California at Washington Hearing

The Interstate Commerce Commission is expected soon to render its decision regarding the application of the Western Pacific Railroad for authority to acquire control of the Sacramento Northern Railroad, an electric system. In the determination of this case is involved a question of widespread interest to electric railroads in having decided the authority of the Interstate Commerce Commission over issuance of securities by interpretation of Paragraph I of Section 20a of the interstate commerce act.

The act, in this section, excepts from the authority of the Interstate Commerce Commission "a street, suburban, interurban electric railway which is not operated as a part of a general steam railroad of transportation." It is in the interpretation of these words that the greatest interest in the pending case rests.

Division Four of the Interstate Commerce Commission some time ago heard some of the questions bearing on this case and rendered a majority decision declaring, in effect, that the Sacramento Northern Railroad is not an interurban electric railroad, but probably an ordinary railroad operated by electricity, and therefore not excepted from the provisions of the law requiring an application to the Interstate Commerce Commission for permission to issue securities. Even if this were not so at present, Division Four held, acquisition of the Sacramento road by the Western Pacific would make it part of a steam railroad system. From this decision, an appeal was taken to the full commission.

At the hearing before the full commission, held on Dec. 6, four arguments were advanced in opposition to the decision of Division Four in interpreting the interstate commerce act, while one attorney appeared with notice that he desired to file a brief against the proposed merger on the basis of public interest if the division's decision were to be reversed. In opposition to the idea of including interurbans of the character of the Sacramento Northern within the securities-supervision jurisdiction of the Interstate Commerce Commission there appeared Carl Taylor of New York, representing the Western Pacific Railroad; Ben B. Cain, Washington, representing the American Short Line Railroad Association; Charles L. Henry, Washington, chairman of the committee on national relations of the American Electric Railway Association, and Frank Karr of Los Angeles, representing the California Electric Railway Association. Charles Warren, Washington, appeared as representative of Miles Standish, a minority stockholder of the Sacramento Northern Railroad, who opposes the transfer to the Western Pacific. Mr. Warren filed a brief, but made no argument on the point at immediate issue, although expressing approval of the finding of Division Four.

Arguments in favor of overturning the division's decision and against including electric lines within the commission's jurisdiction to supervise security issues were that Congress worded the act because parts of general steam railroad systems were electrified and that it was clearly intended to except interurbans, regardless of whether they handle freight or only passengers. It was shown that there is a difference between "control" and "operate" and that while, if the transfer takes place, the Sacramento Northern will be "controlled" by the Western Pacific, it will not be "operated" by that steam road. The Sacramento Northern does handle freight, but in its other activities is distinctly unlike a steam road.

This case arises because of an offer by the Western Pacific to acquire control of the Sacramento Northern. It was proposed that the Western Pacific issue $4,180,000 of bonds so that its holding company, the Western Pacific Railroad Corporation, might consummate the deal. Permission for this issue was granted by the Interstate Commerce Commisison in May, 1921, but without passing on the question of the right to acquire the Sacramento Northern and with the proviso that further application for such use of the proceeds must be made. It is proposed also that a holding corporation be created for the Sacramento Northern, because not all of its stocks and bonds can be purchased, all the stock in the holding company to be acquired by the Western Pacific Railroad Company as security for issues of securities. The California Railroad Commission has approved the application.

Part of North Shore Property Sold

The property of the New York & North Shore Traction Company, Roslyn, N. Y., outside of the limits of the city of New York, comprising tracks, power plant, cars and other appurtenances, has been sold to David Ziskind & Company, Lowell, Mass., for $125,000, subject to claims against the company for taxes. The purchaser has started dismantlement. On the part of the property within the city there remains a question to be settled—whether the claims of the city against the company come ahead of those of the bondholders. The receivers, Messrs. Allen and Moran, will remain in charge until the last of the matters in connection with the dissolution has been settled.

Reorganization Effected

West Virginia Property, in Receivership Since 1916, Has New Officers and Directors

New officers and new directors were named for the Morgantown & Wheeling Railway, Morgantown, W. Va., and the control of the road passed out of the hands of those who have held it since 1916 to a new faction which gained control of the majority of the stock at recent meetings of the stockholders, new directors and officers.

A resolution was passed by the stockholders to have the property and assets of the company returned to the stockholders. R. Hugh Jarvis was named vice-president of the company and statutory attorney.

Former Gov. W. E. Glasscock was named chairman of the meeting, with R. H. Jarvis secretary. A committee was named to examine the proxies and the number of shares represented and when those formalities had been disposed of the regular business was taken up.

The directors chosen were J. V. Thompson, Andrew A. Thompson, John R. Thompson, Uniontown; John F. Phillips, W. H. Conaway, Rolfe M. Hite of Fairmont and R. H. Jarvis, Frank P. Weaver and G. P. Russell of Morgantown.

The board of directors at a subsequent meeting named Josiah V. Thompson president, R. H. Jarvis vice-president and W. H. Conaway secretary and treasurer.

The railroad went into the hands of the receiver in 1916 following the institution of a suit by David E. Lemley and others. William E. Glasscock was the first receiver appointed by the court, followed by Raymond E. Kerr, and recently by Samuel Pursglove, the present incumbent.

The last record of a stockholders' meeting is that of Jan. 8, 1916, according to the vice-president.

The affairs of the railroad have been in confusion the past six years and suit after suit has been entered which has kept the case prominent in the court since that time. Large sums have been expended in court costs and attorneys' fees in that time and little if anything has been done to reduce the indebtedness of the road.

Early in the present year Samuel Pursglove, the present receiver, purchased for $162,500 bonds of the railroad of a par value of $325,000, with all the interest coupons attached that were held by the County Court. He is also said to have bought up practically all the other outstanding bonds at approximately the same rate and then asked the court, as the biggest creditor of the road, to be appointed receiver in place of Raymond E. Kerr, the incumbent at that time.

This marked the renewed activity in the affairs of the Morgantown & Wheeling which culminated in the reorganization meeting. The matter has been in progress since last April.

Details of Michigan United Reorganization

Outstanding Security Issues to Be Scaled Down Within Limits of Company's Earning Power—Earnings for First Ten Months This Year Sufficient to Pay New Bond Interest 1.55 Times

G. R. Cottrelle, chairman of the bondholders' protective committee, on Dec. 15 announced details of the reorganization plan of the Michigan United Railways, of which John F. Collins, the general manager, has just been made receiver. The statement outlining the plan was addressed to the depositors of the first and refunding mortgage bonds of the company under the bondholders' protective agreement, dated Nov. 8, 1921.

The plan provides for the formation of a new company, which will take over the property and assets of the old corporation. It will have an issue of first and refunding mortgage bonds to be known as Series A, of which $5,190,500 will be issued in exchange to depositors of the first and refunding mortgage 5s of the present company, and $1,800,000 will be given in exchange for the bonds of the Jackson & Battle Creek Traction Company.

The new concern will also have an issue of preferred stock, of which $6,000,000 will be given to depositors of the first and refunding 5s of the present company, while 100,000 shares of no par common will be issued in exchange for securities of the old company and for other purposes of reorganization.

Holders of the $10,381,000 old first and refunding 5s of the Michigan United Railways will receive 50 per cent of their face value in new twenty-five-year first refunding 5s and 50 per cent in new preferred stock. Holders of Jackson & Battle Creek first 5s and Jackson Consolidated Traction first 5s are to get 100 per cent face value of their holdings in the new bonds. Holders of the $703,800 debentures will receive one share of new common stock for each $100 face value of their holdings and the right to subscribe to the new bonds at 85. Those availing themselves of this privilege will receive one share of common stock in respect of each $50 subscribed and the further privilege of subscribing to additional common stock at $4 a share.

Present preferred shareholders are to get one-half share of common for each share of old preferred and the privilege of subscribing for bonds at 85 on the same basis as debenture holders with the additional privilege of a second subscription to common at $4 a share.

Common stockholders are to be given one-fifteenth of one share of new common for each share of old with subscription privileges similar to those of the preferred shareholders.

Subscription privileges under the plan expire on March 1, 1923, and time for deposit of stocks and bonds expires on Feb. 1, 1923.

The Michigan United Railways owns and operates the city street railway system in Kalamazoo, Battle Creek, Jackson and Lansing, Mich., the interurban lines connecting the cities mentioned, and also the interurbans from Lansing to St. Johns and Pine Lake and from Lansing to Owosso and Corunna; a total of 258 miles measured as single track. Passenger terminal stations are located in the main business sections of each city served. Through passenger service between these cities and Detroit is maintained over the lines of the Detroit United Railway from the city of Jackson, and direct connection with Grand Rapids is made through arrangements with the Michigan Railroad. Two hundred and seventy-eight cars are in operation.

The cities served by the company have shown steady and substantial growth, but the general depression which followed the period of war inflation was reflected in a marked degree in this industrial district. During the war years and for some time thereafter, all operating costs rose rapidly and to extreme levels. Further, with the development of good roads through central Michigan, the company has felt increasingly the competition of the unregulated jitney, the motor bus and the motor truck, as well as the diversion of a portion of its passenger business to the privately operated motor car.

A table of the earnings of the entire property and the bond interest charges against the same for the years 1912 to 1921, inclusive, and for ten months of 1922, follcws:

Year	Gross Earnings	Operating Expenses*	Operating Income	Mortgage Bond Interest
1912	$1,649,570	$1,025,027	$624,542	$519,900
1913	1,826,355	1,095,861	730,493	519,900
1914	1,801,696	1,069,263	732,433	527,095
1915	1,777,514	1,080,887	696,627	602,852
1916	2,067,591	1,269,550	798,041	621,969
1917	2,274,757	1,479,921	794,835	620,015
1918	2,320,737	1,751,416	569,321	622,399
1919	2,841,336	2,000,460	840,875	618,630
1920	3,160,152	2,576,600	583,652	620,595
1921	2,846,230	2,392,576	453,653	622,419
10 mos. 1922	2,268,102	1,804,049	464,052	516,113

* Includes taxes, rentals, current maintenance and repairs but not depreciation.

These figures show that the net earnings of the company, without provision being made for depreciation, are not sufficient to carry interest charges. As the reorganization committee points out, this fact, standing alone, shows the necessity of a reorganization of the property and a readjustment of its fixed charges. In addition to this, however, $1,200,000 face amount of 5 per cent bonds secured by a prior lien mortgage on the interurban division between Battle Creek and Jackson will become due on Jan. 1, 1923. The company is without funds to pay these bonds, and no securities are available with which the bonds can be refunded or which can be sold in the market for a price to produce the necessary amount. Furthermore, all bonds which may be issued for major extensions, betterments and improvements have been so issued. The company, therefore, is without means to finance extensions and improvements necessary to maintain its present business and develop the property in the future. The company is also in need of a substantial amount of additional cash with which to purchase the equipment presently operated under lease with option to purchase, and to carry on its business.

For these reasons the committee was forced to the conclusion that a reorganization is absolutely necessary and that a plan of reorganization must be devised and executed which in addition to yielding to bondholders the maximum advantage and protection possible, should also place the reorganized company in a position to meet the requirements to which reference has been made. The committee believes that the plan now presented does meet these conditions. Under this plan the interest charges against the property will be reduced to an amount which the earnings of the company should be sufficient to pay when due. For the twelve months periods ended Oct. 31, 1921 and 1922, the earnings of the property applicable to the reduced bond interest charges were as follows:

	1921	1922
Gross earnings	$2,905,777	$2,736,520
Operating expenses*	2,439,658	2,152,312
Operating income applicable to interest	$466,119	$584,208
Annual interest charges on $7,780,500 of mortgage bonded debt of the new company at 5 per cent		389,025
Balance		$195,183

* Including taxes, current maintenance and repairs, but not depreciation, or rentals on equipment now eased but proposed to be acquired in reorganization.

During the first ten months of the current calendar year the net earnings applicable to interest amounted to $500,733, as against the proposed mortgage bond interest charges for like period of $324,187, or 1.55 times mortgage bond interest requirements.

Under the terms of the new mortgage additional bonds are made available to the new company for financing necessary betterments, extensions and improvements. New money presently required by the new company will be supplied principally through the sale of $600,000 new bonds at 85 and accrued interest.

In a statement which he issued at Jackson Mr. Collins, the receiver, said in part:

> It is my intention to give service, same as heretofore, in the territory that I am acting as receiver for, providing the earnings will warrant the expenditure of operation in the future.
>
> When the Saginaw-Bay City Railway went into receivership, and later into bankruptcy, the receiver appointed ceased service, owing to the fact that the earnings did not warrant its continued operation.
>
> It is to be hoped that the lines of the Michigan United Railway will be patronized by the traveling public to provide sufficient funds to warrant operation, and that service can be continued.
>
> A great many street railroads throughout the United States are now in the hands of a receiver, this being brought about by the high cost of labor and material, as well as the development of automobiles, which have deprived the railways of a large amount of their previous earnings. Trucks and motor

buses being furnished free use of the highways by the taxpayer, handle a certain proportion of the freight and passenger business which heretofore went to the electric lines, as well as to the steam lines.

The receivership does not include the Michigan Railroad, which operates three interurban divisions between the following points: From Battle Creek to Allegan, Kalamazoo to Grand Rapids, Grand Rapids to Holland and Saugatuck, and from Bay City to Flint, which latter interurban division operates through cars to Detroit. J. F. Collins is vice-president and general manager of these three interurban divisions of the Michigan Railroad.

◆

Second Year Under Service-at-Cost More Successful

The New York State Railways in its second year of operation under service-at-cost in Rochester, fell short of reaching a full 6 per cent return by $94,000. This is the amount of return guaranteed to the company by the contract on the valuation of its property fixed at $19,298,602. The second annual report of Charles R. Barnes, city commissioner of railways, for the year ended July 31, 1922, submitted recently to the City Council, shows that the deficit for the second year is $38,999 less than it was a year ago. The total deficit is now $227,000. The report states that the lower deficit for the second year is encouraging in view of the promise it gives for a reduction in fare.

Total revenues amounted to $5,105,650, according to the report, while costs are shown to total $5,199,651.

The company received $1,156,098 as its return on its investment in Rochester. Under terms of the service-at-cost contract, the company gets a sliding scale of return each month on its total investment based upon the rate of fare. At a 7-cent fare rate, the company gets a return of 6 per cent. The base valuation as of July 31 was $19,298,602.

Operating expenses of the company totaled $3,725,000; taxes, $306,000. Total passengers carried numbered 98,976,000 and transfer passengers 23,731,000.

During the year $240,267 was put aside in the renewal and depreciation fund. Under the contract 2 per cent of the base value is charged off to this item. Last year $145,833 was so put aside. Of this total, $386,100, there remains $182,532 still on hand. Under the fund account, also, there is $135,144 on hand, the total cash on hand in various funds exceeding the present total deficit for the two years of operation under the service-at-cost plan. It is this fact which proves most satisfactory to city authorities, and gives rise to the hope that a reduction in fare soon may be realized.

Mr. Barnes tells about the studies of car service and the improvements made resulting in regularity of car movement.

According to the report accidents were greatly reduced. The number for the first year under the service-at-cost plan was 5,733 against 5,355 for the second year.

Operation Under Reorganization in Prospect

A final step in the negotiations looking toward a reorganization of the Atlantic Shore Railway, Sanford, Me., will be the decree in the United States District Court foreclosing several mortgages on the property.

Agreements have been made between all parties holding mortgages and the bondholders as well, to accept, after surrendering their securities, a proportional part of a new issue and to start a new operation of this railroad system with some prospect of success. Almost nine months ago efforts were started to accomplish this result and many conferences and short hearings have been held.

In order to salvage all that was possible for these investors, to give assurance of continuing the road as a going concern, it was essential that a single agreement be reached. That was done recently and decrees were drafted and submitted to Judge Peters, now busily occupied in the civil case on trial in the District Court.

◆

Railway January Maturities Total $7,997,000

In the public utility field corporate maturities for January total $34,259,600, according to the *Wall Street Journal*. Many small amounts are included in this figure. The bonds of the electric railway companies which will be realized in January, 1923, amount to $7,997,000 and are listed herewith:

Jan. 1	Ohio Traction notes.	7	$1,878,000
Jan. 1	Lake Shore Electric Railway cons.	5	1,630,000
Jan. 1	Jackson & Battle Creek Traction 1st..	5	1,200,000
Jan. 1	West End Street Railway 1st	4½	700,000
Jan. 1	Charleston City Railway 1st	5	680,000
Jan. 1	Milford & Uxbridge Street Railway 1st..	5	335,000
Jan. 1	Eastern Mass. Street Railway ref.	6	300,000
Jan. 1	Jamestown Street Railway 1st	6	300,000
Jan. 1	Jersey City & Bergen Railroad 1st....	4½	258,000
Jan. 1	Interurban Railway deb.	6	250,000
Jan. 1	Webster, Monessen, Belle Vernon & Fayette City Street Railway	6	250,000
Jan. 1	Oskaloosa Traction & Light 1st	5	216,000
	January total		$7,997,000

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Securities Sold at Auction

Electric railway securities sold by Adrian H. Muller & Company on Dec. 6 at the Public Auction Room, 14 Vesey Street, New York, were as follows:

$25,000 Oakland Railways Co. collateral trust 6% bonds, 1913, certificate of deposit; per cent 45⅜

$2,000 Milford & Uxbridge Street Ry. first mortgage 5s extended to 7% bonds, 1923; per cent 58

$6,000 Columbus & Ninth Avenue R.R. first mortgage 5% bonds, 1933, certificates of deposit; per cent....................14

$7,000 Columbus & Ninth Avenue R.R. first mortgage 5% bonds, 1933, certificates of deposit; per cent 15

$30,000 28th and 29th Street Railroad Company first mortgage 5% stamped bonds certificates of deposit; lot...........$20

$28,000 Chicago Elevated Ry. Co. 6 per cent deb. bonds, 1924, with coupon attached; per cent 14

1,000 shares Chicago City and Connecting Ry. Co. collateral trust participating preferred certificates; per share.......$3.50

Financial News Notes

Northern Ohio Bonds Offered.—The National City Company, New York, N. Y., is offering an issue of $1,000,000 general and refunding mortgage 6 per cent bonds, Series A, of the Northern Ohio Traction & Light Company, Akron, Ohio, due in 1947, at a price of 94 and accrued interest, to yield 6½ per cent.

Authorized Issue of Preferred Increased.—The directors of the Standard Gas & Electric Company, Chicago, Ill., have authorized the issue of $2,460,000 new 8 per cent cumulative preferred stock of $50 par value to take care of various conversion privileges of the company's funded debt and to provide capital for increased business. Stockholders rights to subscribe will expire Jan. 31, 1923.

Holding Company Preferred Offered.—Bonbright & Company, New York, N. Y., head a syndicate which is offering an additional $5,000,000 of 6 per cent cumulative preferred stock of the Electric Bond & Share Company. The offering price is 97 and accrued dividends, from Nov. 1, 1922, to yield about 6.20 per cent. The proceeds will be used to expand the business of the company and for general corporate purposes. Upon completion of the sale the company will have outstanding $16,200,000 preferred stock of an authorized issue of $20,000,000.

Venner Verdict Affirmed.—The Appellate Division of the Supreme Court in the matter of Clarence H. Venner against the Interborough Rapid Transit Company, New York, N. Y., has affirmed the judgment of Justice Davis of the special term of Supreme Court in substance granting to Mr. Venner a judgment against the defendant for $25,000 with interest at 7 per cent, from Sept. 1. 1921. The plaintiff was owner of twenty-five promissory notes of $1,000 each carrying 7 per cent interest, issued by the defendant as part of $33,400,000 of notes, dated Sept. 1, 1918, due Sept. 1, 1921.

Change in Stock Provisions Approved.—The stockholders of the Public Service Corporation of New Jersey, Newark, N. J., have approved the change in the charter dividing the authorized $50,000,000 preferred stock into two classes—one of 250,000 shares, 8 per cent cumulative preferred, and the other of 250,000 shares, 7 per cent cumulative preferred. This change is in accordance with the recommendation of the directors. They felt that there would be times hereafter when it would be practicable for the corporation to sell 7 per cent preferred stock. Reference to the intended change was made in the issue of the *Electric Railway Journal* for Nov. 25, page 862.

Traffic and Transportation

Railway Offers Five-Cent Fare as Experiment

The city of Bellingham has been granted a 5-cent fare on its car lines, according to a voluntary offer of the Puget Sound Power & Light Company. Under the provisions of the company's offer, the fare will be tried out as an experiment for ninety days, and the company will sell tokens at the rate of twenty for $1, valid until used by the buyer. It was planned to put the new arrangement into effect on Dec. 17.

The company's action came as a complete surprise to city officials, who four months ago had conferred with company officials in an effort to reduce the fare, and had finally agreed to let the matter rest for a time. Under the new plan, the passes now in use will be discontinued and every one will be requested to use tickets. The traction company will undertake an extensive advertising campaign to popularize the new system, with the hope of making the idea a permanent one. In a letter addressed to the City Council, notifying that body of the new carfare, the company, through Manager Harry B. Sewall of the Bellingham division, calls attention to the fact that with the exception of the commutation tickets provided for no other changes in fare will be undertaken, the cash fare remaining at 7 cents for adults and 2½ cents for school children.

Attention was also called to the fact that when the city and company officials conferred on fare problems in September the Council was "not unwilling to approve of such tickets being limited to certain hours in the morning; that is, from 6 to 9 o'clock, and certain hours in the evening, from 4 to 7," but that the company had decided that no limitation of hours in which the reduced fare might be used would be set.

It is pointed out that the ninety days embracing the holiday season and the period of inclement weather would naturally be the most favorable period in which to determine whether such a rate will, as the City Councilmen believe, justify the substantial carfare reduction. Company officials express doubt that the expected increase in travel will offset the reduction in rates, but state that if such increase develops the 5-cent tickets will be continued.

Fare Increase Refused

Expressing the view that with service changes and economy a reasonable return can be earned, the Railroad Commission of California has dismissed the application of the Bakersfield & Kern Electric Railway for an increase in fares in Bakersfield. In the event that conditions should make impossible the expected savings, the company will be permitted to renew its application.

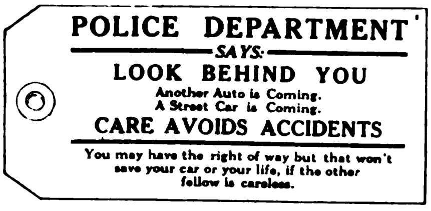
The commission found a rate base of $568,314 upon which it was calculated the company is earning at the present time the rate of return of 3.52 per cent. With suggested savings in operation this return, it was computed, could be increased to 5.82 per cent. The commission was urged by the Boosters Club to order an extension of the system to serve East Bakersfield, but no order was made on this matter pending a separate consideration of grade crossing problems involved.

In commenting on this matter the commission said:

> This commission has, we believe, the power to order an extension, but such an order cannot be made where the evidence indicates the extension would be operated at a loss, and as to an increase in fare designed to take care of such a loss, it must be obvious that this cannot be determined until the cost of the facilities necessary is found, and since the crossing of the Southern Pacific may add to the costs above stated, it is impossible at this time even to estimate the added operating costs which will undoubtedly result from rail service into East Bakersfield.

Tags for the Purpose of Accident Prevention

The tag reproduced herewith is part of the Accident Prevention work carried on by the Elmira Water, Light & Railroad Company, Elmira, N. Y. The company had the tags printed and is having them tied on the steering wheels of all automobiles in the downtown section.



POLICE DEPARTMENT

SAYS:

LOOK BEHIND YOU

Another Auto is Coming.
A Street Car is Coming.

CARE AVOIDS ACCIDENTS

You may have the right of way but that won't save your car or your life, if the other fellow is careless.

Hearing Held on Freight Traffic Discontinuance

Public Service Commissioner William R. Pooley has reserved decision on the application of the International Railway, Buffalo, N. Y., to abandon its freight traffic in western New York. The company asks to discontinue this arm of its service altogether. C. P. Franchot, counsel for the International, explained that the purpose of the move was to cease making a gift to shippers of service at less than cost and to cease to lay the burden incurred by this business on the passenger business.

Several representatives of Chambers of Commerce in western New York attended the hearing and there was some objection to the railway's plan. The International maintains a freight and express station at Main and Virginia Streets and operates a number of interurban freight and express cars between Buffalo, Niagara Falls, Lockport and Olcott and intermediate points.

Passenger and Freight Interchange Arranged

Arrangements have just been completed between the Nickel Plate (steam road) and the Northern Ohio Traction & Light Company (electric system) whereby freight and passengers will be handled from points on the Northern Ohio Traction & Light Company's lines to Chicago and intermediate points on the Nickel Plate and to points west and south of Chicago over connecting steam lines. This is one of the few arrangements of its kind to be perfected in this country between an electric line and a steam road. The tariffs were filed with the Interstate Commerce Commission on Dec. 15 to become effective on Jan. 15, 1923. This action on the part of the Northern Ohio Traction & Light Company opens the way for freight shipments from points on its lines to all points west via the Nickel Plate.

Commission Reports Further on Traffic Congestion

In connection with the activities and surveys of the Los Angeles Traffic Commission to determine practical methods and schemes to be adopted for relieving the traffic congestion in the business district of the city of Los Angeles a recent survey just concluded by the commission reveals some very interesting data in connection with these conditions. Following are some of the contributory causes of congestion, which include the growth of the city and the increase in number of automobiles.

In 1919 there were 62,000 automobiles registered in the city of Los Angeles. On Dec. 1, 1922, the city's automobile registration was in excess of 165,000. In the 1900 government census Los Angeles ranked as thirty-fifth in population among the cities of the United States. The government census of 1920 ranked Los Angeles the eleventh largest city in population.

During October, 1922, a total of 4,079 traffic accidents were recorded in Los Angeles by the police department, as against 2,047 in October, 1921.

In 1921 the death rate from automobile accidents in Los Angeles per 100,000 population was 27.9, as against:

For the whole United States	11.5
Average of all large cities	15.0
Manhattan	18.8
Chicago	20.3

Based on recent checks, the following volumes of traffic are handled daily between the hours of 5 to 6 p.m. at Seventh and Broadway:

Pedestrians	18,000	to	20,000
Automobiles	1,200	to	1,400
Street cars	320	to	350

The intersection of Seventh and Broadway handles the largest volume of automobile traffic in the downtown district. From 7 a.m. to 6 p.m. shows a total of 13,468 passing automobiles.

Fifth and Broadway is the busiest intersection in point of pedestrian traffic, checks showing a maximum of approximately 25,000 pedestrians per hour, as against a maximum of 23,000 at Seventh and Broadway.

Company Will File Supplementary Brief

A delay of sixty days or longer is likely before a decision is made in the litigation arising out of the fare fight in Fort Worth, Tex. This is indicated in the announcement by counsel for the Northern Texas Traction Company that the company would file a supplementary brief. The case was recently heard before N. A. Dodge, special master, who gave attorneys for both sides thirty days in which to file briefs in the case.

In the litigation, the city of Fort Worth seeks to compel the Northern Texas Traction Company to reduce fares from 7 cents to 5 cents claiming that increased patronage arising out of a 5-cent fare would more than offset the reduction in revenue brought about by a reduction from 7 cents to 5 cents. Under its franchise provisions, the Northern Texas Traction Company can charge any fare deemed adequate to produce a fair return on the invested capital, and during the period of high prices and low revenues the company announced a 7-cent fare. The city at once began a fight to compel a reduction, whereupon the company went into Federal Court to seek relief, setting forth that a 5-cent fare is confiscatory and that a 7-cent fare is necessary to produce a fair return on the invested capital.

N. A. Dodge was appointed as special master and after extensive hearings, in the course of which all phases of the operation of street car lines in Fort Worth were investigated, announced that he would give counsel for both sides thirty days in which to file briefs, after which he would render his decision. These briefs were filed nearly a month ago, and now before the referee has rendered his decision comes the announcement from the traction company that it will file a supplementary brief.

Recommends Consolidation With Uniform Fare

The question of uniform street car rates in the Twin Cities (Minn.) has come to a head in St. Paul in the report of the subdivision on public utilities of the St. Paul Association of Public and Business Affairs, as approved by the board of directors. This report reads:

> 1. The subdivision on public utilities is agreed that it is important that the rates of fare for street railway transportation shall be uniform in the cities of St. Paul and Minneapolis.
>
> 2. The subdivision recommends a consolidation into one operating company of the St. Paul City Railway Company, the Minneapolis Street Railway Company and subsidiary companies operating street railway lines within, between and out of the cities of St. Paul and Minneapolis and that a metropolitan transit district be established which shall consist of all territory now being served for one fare by the Minneapolis Street Railway Company combined with all territory now being served for one fare by the St. Paul City Railway Company, in which said metropolitan transit district only a single fare shall be collected from any point to any other point therein, together with transit privileges to all connecting lines.
>
> It is apparent a proper solution of this situation cannot be accomplished without a unification or consolidation of these lines. Their unification or consolidation is an absolutely necessary essential to accomplish any of the objects above specified. Without such action the Railroad & Warehouse Commission is without power to fix such uniform rates and, even if it were by legislation given the power, the grant in our opinion would be invalid.

The fare in either city is now 6 cents, to the city limits separating St. Paul and Minneapolis, but the fare in either city has been determined in the past by City Council action. Under the new law of the state the Railroad & Warehouse Commission has the power of establishing a fair fare rate return on the valuation of the property of the railway, so that the 6-cent fare rate in the Twin Cities is now an emergency or temporary rate until hearings shall be set and accomplished on the property valuations to be presented to the commission for action.

Speed Limits Fixed—Limited Service Continued

A speed limit has been fixed by the Massachusetts Department of Public Utilities for the cars of the Springfield Street Railway and the Holyoke Street Railway, over a section where the service and the speed became a matter of investigation.

The residents of a section of West Springfield and the residents of a section of Holyoke, Mass., asked for the discontinuance of the limited stop service between the two cities, and a speed limit of not more than 20 m.p.h.

In its investigation the department found that the cars operating on the limited stop basis had the tracks on the side of the road, where there are not many buildings and not many grade crossings, and it decided that 25 m.p.h. would be reasonably safe. It issued an order to this effect, and that the cars should reduce to 10 miles at certain crossings, to 5 miles when approaching school children and come to a stop before passing a car loading or unloading. The petition that the limited service be discontinued was dismissed.

An investigation of accidents covering 1,495 days before the limited stops arrangement went into effect in West Springfield showed seventy-seven accidents; during the 1,495 days after the limited stops were adopted there were eighty-three accidents, but forty-two of them were due to local cars. There were 6.29 accidents per 100,000 car-miles with limited stops and 8.82 accidents per 100,000 car-miles with local cars.

Buses Replace Cars

A new era in city transportation began in Everett, Wash., on Dec. 1, when the first gasoline-power buses replaced some of the electric street cars of the Puget Sound International Railway & Power Company with a 5-cent fare on the buses and on all electric lines, and the weekly $1 pass on all street car lines. The motor buses started on the Colby Avenue line first, the new service extending considerably beyond the outward terminal of the electric line, giving service to new territory.

Transportation News Notes

Seeks to Operate Buses.—The South Carolina Gas & Electric Company, Spartanburg, S. C., has petitioned the City Council to operate buses in connection with its local railway system.

Reduced Transfer Charge Allowed.—The Alabama Public Service Commission has granted permission to the Mobile Light & Railroad Company, Mobile, Ala., to reduce its transfer charge from 2 cents to 1 cent. The company applied for this privilege on Oct. 18.

"Stop" Signs on Cars.—The Nashville Railway & Light Company, Nashville, Tenn., is equipping its cars with semaphore signs reading "stop." This act is the latest move on the part of the railway company to lower the number of street or traffic accidents. The "stop" signs will serve as signals to automobile drivers not to pass a standing car.

Rule of Road Changed.—On Dec. 1 the rule of the road was changed from left to right in New Brunswick. The car lines in Moncton and in St. John and suburbs were changed to the right drive and the cars were operated vice versa from the way they have always been operated in New Brunswick. It is believed that accidents can be reduced to a minimum by the advertising campaign that is being conducted by the New Brunswick Department of Public Works.

5,965 Passes per Week.—The sale of weekly tickets by the Indiana Service Corporation in Fort Wayne, Ind., has reached a maximum of 5,965 per week, according to Robert M. Feustel, president of the corporation. This figure was reached in the forty-first week of the system. Officials of the company expect the sale will reach the 7,500 mark in a few weeks. A campaign is now on to increase the sales to 10,000 per week. The first week in which the pass was in use the sale totaled 2,800.

Proposes Seven-Cent Fare.—A new proposition has been placed before the City Council of Danville, Va., by the Danville Traction & Power Company. Instead of urging the one-man car issue, which has been before the Council and the public for the past three months, the company through its president, C. G. Holland, proposed that if the Council were unwilling to sanction use of one-man cars the company would be satisfied with a 7-cent cash fare and with the present ticket rate of five for 30 cents. The Council, therefore, voted to adopt a resolution providing for the publication of a change in the ordinance raising the cash fare from 6 cents to 7 cents. The Council at the same time charged the finance committee with making a definite recommendation as to the one-man car or the 7-cent fare.

Personal Mention

Mr. Harton Heads Kentucky Operators

William H. Harton, Newport, was elected president of the Kentucky Association of Public Utilities, at Lexington, Ky., Dec. 12. Mr. Harton is general manager of the South Covington & Cincinnati Street Railway with offices in Covington. He was promoted to this office after having served for several years as superintendent of transportation. He has been with the Green Line company for many years, and has reached his present position through a series of promotions resulting from efficient service. He is one of the active members of the Covington Rotary Club. He was one of the organizers of the Covington Penny Clinic, and acted as treasurer of that organization during the campaign to raise funds to establish the clinic. Mr. Harton is widely known in transportation circles.

Change in Pacific Electric Personnel

C. Mort Stuart, manager of the Pacific Electric Railway Company Club, Los Angeles, Calif., has resigned to enter other fields. N. B. Vickery has been appointed to the position vacated by Mr. Stuart. H. D. Priest has been appointed manager of Alpine Tavern Resort as operated by the company at the terminus of its Mount Lowe line, vice Mr. Vickery. N. B. Vickery commenced service with the Pacific Electric lines in 1905, serving in various capacities until his appointment as manager of Alpine Tavern in February, 1916. Mr. Vickery was one of the original organizers of the Pacific Electric Club, which places him in a familiar position with his new duties.

H. D. Priest, who succeeds Mr. Vickery as manager of Alpine Tavern, entered the services of the company in the passenger department in the year 1916. Previous to his present appointment he was employed as traveling passenger agent. In his new position he will return to a field of endeavor in which he has had much experience, having followed hostelry work for many years previous to his connection with the Pacific Electric Railway.

Glenn H. Shaw with Northern Ohio Company

The Northern Ohio Traction & Light Company established an accident prevention department with Glenn H. Shaw, formerly of the Cleveland Railway, in charge. Associated with Mr. Shaw as accident prevention supervisors are Charles Speigle for the northern division; C. J. France for the Akron city lines; H. L. Farmer for the southern interurban division, and Hugh Wilson for Canton and Massillon city lines.

The plan calls for committees from various departments of the system to work in conjunction with the superintendent and supervisors. There is also an executive committee, consisting of the head of the railway, light and power and commercial departments in conjunction with the general manager.

Mr. Reynolds Resigns

Manager of United Traction and Hudson Valley Railways, at Albany, Retired on Dec. 16

Albert E. Reynolds, general manager of the United Traction Company, Albany, N. Y., resigned on Dec. 16 to enter other business. The successor to Mr. Reynolds is Ernest G. Murphy, who has been assistant general manager.

A. E. REYNOLDS

Mr. Reynolds began his street railway career in Plattsburgh, N. Y., and was for several years manager for the Plattsburgh Traction Company, a subsidiary of the Delaware & Hudson Company, his management of that system being such as to attract the attention of the officers of the holding company, and in recognition of his valuable services they promoted him to the management of the Hudson Valley line, with headquarters at Glens Falls. At the time that he assumed the management of the affairs of this company conditions along the line were anything but pleasant and encouraging. The company had in some manner secured the enmity of many of the people along the line, and the system was not in the best of shape. He set about at once to correct these things and quickly succeeded in doing so.

With the reputation thus established it was quite logical that Mr. Reynolds should be appointed in 1917 to succeed Charles F. Hewitt as general manager of the United Traction Company, for both that company and the Hudson Valley line are controlled by the Delaware & Hudson Company. Upon the resignation of Mr. Hewitt, Mr. Reynolds, in fact, received the title of acting general manager at Albany, but in February, 1918, was formally made manager. Thereafter he continued in charge of both the Hudson Valley Railway and the United Traction Company with offices in Albany.

Cited for Bravery

Willard Cope, secretary of the committee on public utilities information of Atlanta, and former newspaper man in Atlanta, was paid a glowing tribute by the Georgia Industrial Commission in a report awarding Mr. Cope compensation under the recent workmen's compensation act for injuries suffered in a railroad wreck some months ago. At the time of the accident Mr. Cope was on duty as a reporter for an Atlanta newspaper. He was pinned beneath the wreckage in such a way that his entire body except his head was submerged beneath the water. At the same time he was badly crushed and bruised, his left leg was broken and his shoulder fractured. When rescuers arrived he told them to get the women and children out first. It was several hours before Mr. Cope was finally extricated. As a result of the injuries he received in the accident Mr. Cope was confined to his bed in the hospital four months. The report of the commissioner, Hal M. Stanley, said:

"We have here one of the most conspicuous examples of bravery that has been brought to the attention of the Industrial Commission since the Georgia workmen's compensation act was enacted into law."

Detroit Work Divided Among Commissioners

William B. Mayo, chief engineer for Henry Ford, will not assume the management of the Detroit Municipal Railway, as was stated in newspaper articles, but will take over only part of the duties in the same manner as the other two commissioners.

Mr. Mayo has been a member of the commission for some years and the work of the street railway department has been divided so that he, G. O. Ellis and H. H. Esselstyn, the other commissioners, will participate in the management.

The three commissioners have ararranged to divide the work as a temporary plan to be worked out for thirty days. The city will construct fifty new trailers in the Highland Park shops and it is understood that Mr. Mayo will assume supervision of this work. A. C. Colby, superintendent of equipment, will be actively in charge of this work. Ross Schram, assistant general manager of the Municipal Railway, also announced that the city was considering the advisability of constructing its own motor cars.

The commission also will institute a plan whereby motormen will receive a bonus for the safe operation of their cars. This plan is being instituted by the commission as a means of preventing accidents.

Mr. Brooks Goes Into Automobile Business

Charles A. Brooks, local manager of the Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., has resigned from that company to go into the automobile business for himself in that city. He will act as local agent for a well-known make of car and in addition conduct a general supply and repair business. This is a logical move by Mr. Brooks. He has long been an auto enthusiast, and this with his long experience in mechanical work make a rare combination of talent. It is nearly ten years since Mr. Brooks entered the employ of the local railway at Poughkeepsie. In fact, it was in April, 1913, to be exact, that he entered the service of the company there. Before that he had been engaged in similar work, mostly on the mechanical side, with the Third Avenue Railway, New York, the South Shore Traction Company, New York, and on properties in the Central West.

James P. Barnes, president of the Louisville (Ky.) Railway, has been nominated for re-election as a director of the Louisville Industrial Foundation, the so-called $1,000,000 factory-getting enterprise of Louisville. It was founded a few years ago to aid in bringing industries to the city.

Obituary

W. B. Everest, general traffic manager of the Westinghouse Electric & Manufacturing Company, died on Dec. 5. He had been holding the position of general traffic manager since 1914.

William C. Smith, for many years claim agent for the International Railway, Buffalo, N. Y., is dead. Mr. Smith resigned from the International Railway some years ago and at the time of his death he was associated with the Merchants' Mutual Casualty & Liability Company of New York City. He was fifty-two years old. Mr. Smith was a graduate of the Buffalo Law School and played an active part in Masonic affairs in Buffalo.

Gen. Luke Wright of Memphis, Tenn., eminent lawyer, is dead following an illness of several weeks from paralysis. General Wright had served as Secretary of War, Ambassador to Japan and Governor-General of the Philippine Islands in his relation to the federal government. Before that he had served as attorney general of Shelby County and practiced law with great success at the Memphis bar for a decade. General Wright served as counsel for the Memphis Street Railway and was a director of the Memphis *Commercial Appeal.*

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Production Advancing

Continued advances in production, transportation and distribution in November are noted in figures compiled by the Department of Commerce in its "Survey of Current Business." The largest consumption of cotton since 1917, and further high records since 1920 in the output of pig iron, steel ingots, zinc, coke, locomotives, and upper leather, emphasize the sustained and basic character of industrial production in November. The usual seasonal decline in building contracts in November failed to materialize.

The car shortage on the railroads was slightly relieved, but coal cars were still in great demand and coal loadings have been kept up to the maximum; total loadings of all classes were very high for November. Increased orders were made for locomotives and freight cars to overcome congestion.

Price levels continued to increase in November, with both the total wholesale and the retail food indices the highest since the end of 1921.

The final crop reports for the year 1922 indicate a large production of the principal crops, especially wheat, potatoes, corn and rye, and should make for increased prosperity in the farming sections.

Seek Authority to Purchase Sixty More Cars

The Pittsburgh (Pa.) Railways, through Receivers Fagan, George and Tove, has petitioned the court for authority to purchase sixty more cars, making a total of 125 new cars costing $1,450,000 within two years.

The sixty new cars are expected to cost $660,000. They will be delivered as completed during the next six months.

As the seating capacity of each car is fifty-nine passengers, the 125 new cars, those already purchased and put into service, with the sixty to be ordered now, provide 7,375 additional seats.

The new cars, like the previous purchases, will be the standardized double-truck, low-floor, low-step cars, with automatic doors and other approved equipment.

"Al" Green Returns to Galena Company

Galena Signal Oil Company, Franklin, Pa., has announced the return of A. A. Green to the position of sales and engineering representative. Mr. Green has long been connected with the industry, first on the operating and then for a number of years on the supply side. After passing thirteen years with the Galena organization, in 1917 he went over to the Columbia Machine Works, Brooklyn, as general sales manager, from which position he returns to the Galena company. He has been associated with the Brush Electric Company, the Memphis Electric & Power Company and the Rochester Railways, now known as the New York State Railways. Mr. Green has made a special study of the subject of lubrication and has contributed articles on that topic to this paper.

New Freight Equipment for Pacific Electric Railway

Rapid growth of its freight business necessitates the Pacific Electric Railway, Los Angeles, Calif., placing orders for new freight equipment, representing an approximate expenditure of $1,500,000.

The present freight equipment will be augmented through the purchase of 400 new dump cars, 150 flats and 200 box cars. A new freight switching electric locomotive is being constructed in the company's shops at Torrance, which will be a duplicate of the present 1,600 class type of freight locomotive used on the company's lines. A steam switching locomotive has just been purchased and placed in service at Los Angeles harbor to assist the present gas-electric locomotives now used by the company at that point in switching at the municipal docks and on the municipal tracks of Los Angeles, all of which switching is performed by the Pacific Electric Railway for the city of Los Angeles and the steam road lines serving the harbor.

United Electric Railways Installs Automatic Block Signaling

The United Electric Railways, Providence, R. I. is installing automatic block signaling on its line between Providence and Woonsocket. The complete installation involves a total of thirty-two protected blocks using signals of the Union color light type, Style "N" with all units provided for three color indications. Ten "DW" Automatic Flagmen (3 aspect) with Crossing Bells, all operating on alternating current, are being installed at various highway crossings in this territory and are incorporated as a part of the signal system.

The entire installation is supplied with energy by means of 2,300-volt 25-cycle, single-phase transmission which will be served from a transmission located approximately in the center of the signaled territory. The Union Switch & Signal Company has the contract for the complete erection of this signal system.

Westinghouse to Decide on Huge California Plant

Whether a $1,000,000 assembling plant for the Westinghouse Electric & Manufacturing Company shall be built in Los Angeles or at a point on the San Francisco Bay will be decided, says information from the East, by officers of the company at New York. H. D. Shute and H. P. Davis, vice-presidents of the electric manufacturing company, are just returning to the East after a visit to the Pacific Coast, where they have been investigating their interests, having visited Los Angeles and San Francisco, where were presented to them the claims of both cities as to advantages as the Western distributing point for the company. The Westinghouse company has already established in Los Angeles its general Western offices and headquarters and has just completed the erection of large buildings in San Pedro Street to serve those purposes.

Large Track Projects Completed

The New York State Railways, Rochester, N. Y., during its second year of operation under the service-at-cost plan completed the following track projects:

1. Construction of track in Clinton Avenue north, Norton Street to Ridge Road; 4,800 ft. of track.
2. Reconstruction of track in Clinton Avenue south, Court Street to Monroe Avenue; 625 ft. of track.
3. Reconstruction of track in Central Avenue; 1,050 ft. of track.
4. Reconstruction of track in Main Street east, Winton Road to Culver Road; 9,940 ft. of track.
5. Replacement of light tee rail on Charlotte line with heavy tee rail; 4,500 ft.
6. Replacement of wood-block paving along rails in Genesee Street; 10,200 ft. of track.
7. Installing cross-over in Central Park, near North Goodman Street.

Increase in Power Resources

An increase of 30 per cent in the total power resources of the Indiana Service Corporation, Fort Wayne, Ind., is reported with the placing in full commission at the power house in Fort Wayne of the new 6,000-kw. steam turbine, which has been under construction for several months. The addition of this equipment gives the plant a total of 20,000 kw. capacity. Installation of a 12,500-kw. turbine, at a cost of $500,000, during the coming year is also being considered by the traction company officials.

Metal, Coal and Material Prices

Metals—New York	Dec. 19, 1922
Copper, electrolytic, cents per lb.	146.25
Copper wire base, cents per lb.	16.50
Lead, cents per lb.	7.25
Zinc, cents per lb.	7.30
Tin, Straits, cents per lb.	38.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7.875
Somerset mine run, Boston, net tons	4.125
Pittsburgh mine run, Pittsburgh, net tons	2.625
Franklin, Ill., screenings, Chicago, net tons	2.70
Central, Ill., screenings, Chicago, net tons	2.00
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No 14, per 1,000 ft	6.50
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	93.00
White lead, (100-lb. keg), N.Y., cents per lb.	12.125
Turpentine, (bbl. lots), N.Y., per gal.	$1.38

Rolling Stock

Maumee Valley Railway, Toledo, Ohio, has ordered seven one-man cars from the Cincinnati Car Company.

Interborough Rapid Transit Company, New York, N. Y., plans to convert 465 cars with new conveniences and comforts. The new cars will have vestibules and sliding doors with glass panels.

West Penn Railways, Pittsburgh, Pa., has placed an order for 161 Economy watt-hour meters with car inspection dials for use on its coke region and other divisions. This order follows earlier purchases totaling seventy-four Economy meters.

Boston (Mass.) Elevated Railway has placed an order for thirty motor equipments and control with the General Electric Company. These equipments will be General Electric 264A motors and K-71 control. They are intended for use on some of the cars the railway is now having built at the plant of the Laconia Car Works.

Los Angeles (Calif.) Railway has ordered twenty-five more cars of the two-car train type. The bodies and trucks are being purchased from the St. Louis Car Company and the electrical and air brake equipment will be installed at the South Park shops. The cars cost in excess of $15,000 each. Delivery of the cars is scheduled to start next May. This order will give the Los Angeles Railway 100 cars which will be suitable for two-car train operation.

Track and Roadway

Salt Lake, Garfield & Western Railway, Salt Lake City, Utah, has extended its lines to Garfield, Utah.

Hydro-Electric Commission, Windsor, Ont., has been authorized by the City Council to proceed with the construction of a single track on Sandwich Street east. Work is already under way.

Little Rock Railway & Electric Company, Little Rock, Ark., is spending $70,000 on new rails and construction work on Main Street. Standard rail is being used. The city is repaving from Markham to Ninth Streets and the company will later pave between its tracks.

Savannah Electric & Power Company, Savannah, Ga., during the first nine months of this year completed 23,131 yards of paving between its tracks and 2 ft. outside on West Broad, Bay, Habersham, Abercorn and Gurnnett Streets on account of the paving or repaving of those thoroughfares.

New York, N. Y.—Work has started on the contracts to alter the Bridge Plaza rapid transit station, Long Island City, to permit dual operation of the Astoria and Corona extensions in Queens Borough by the Brooklyn (N. Y.) Rapid Transit trains as well as the Interborough trains. The Board of Estimate approved the necessary appropriation of $107,000 at its meeting on Nov. 10. The contracts have been executed by the Transit Commission—one with the New York Municipal Railway Corporation for the laying of extra tracks to permit the operation of shuttle trains, and the other with the Jobson-Gifford Corporation for the construction of the steel work to support the new tracks.

Trade Notes

Standard Crane & Hoist Company, Philadelphia, Pa., has been taken over by the American Engineering Company.

The Texas Company, New York, N. Y., has been awarded a renewal of its contract for all rolling stock lubricants with the Brooklyn Rapid Transit Company and the New York Consolidated Railroad for the year 1923.

The National Railway Car Cleaning Company, Jersey City, N. J., has been incorporated at Trenton with $25,000 capital to engage in car cleaning. The papers of incorporation were filed by Butler & Butler.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has leased a six-story building to be erected on a lot 100 ft. x 150 ft. at Jones Avenue and Marietta Street, Atlanta, Ga., at a cost of $360,000. The building, which is to be known as the Westinghouse Electric Building, will be constructed according to the company's specifications and will be used as an office, warehouse and service station. Construction work was started Dec. 1 and will probably be completed by next May.

New Advertising Literature

Irving Iron Works Company, Long Island City, N. Y., has issued Catalog 3A82 which describes the generous lighting afforded in dark places where Irving Subway is used overhead.

The Linde Air Products Company, New York, N. Y., started in August of this year the publication of a monthly entitled *Oxy-Acetylene Tips*. It was announced that the purpose of the booklet was to convey to members of the organization "information which may be used to promote a larger application of the process by existing users, and encourage its employment by present non-users."

Ingersoll-Rand Company, New York, N. Y., and A. S. Cameron Steam Pump Works announce the opening of a branch office at 718 Ellicott Square Building, Buffalo, N. Y. This new office is equipped to render full service to those interested in air, gas and ammonia compressors, vacuum pumps, turbo blowers and compressors, condensers, oil and gas engines, pneumatic tools, rock drills, centrifugal and direct-acting pumps and other of the numerous products manufactured by these companies.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review
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Good Merchandising as Important as Economical Operation

A GOOD MERCHANT, when congestion of purchasers at the counter becomes noticeable, puts on another clerk, and another and another, as needed to handle sales as rapidly as they come. That same merchandising principle applies to the street railway business. If the sale of transportation were properly handled, more cars would be put on a line just as rapidly as the space in them was bought. In other words, the best merchandising would be always to have room for all passengers who presented themselves.

To do this, without running into car miles operated at a loss, requires comprehensive knowledge of the general riding characteristics of a line; coupled with some means of promptly sensing the detail fluctuations in the passenger traffic that take place from day to day. These two aspects of the scheduling of cars are what have been worked out with fine success (as measured by increased net revenue) in Brooklyn, as related in the leading article this week. A traffic check now and then gives the general characteristics of each Brooklyn surface line. The daily graphs showing early this morning the results of yesterday's operation give the information from which to direct more or fewer seats per hour, in order to have on hand when and where wanted all the rides that will be bought, but not any wasteful surplus.

Many railway managements make quite a point of avoiding any unnecessary car mileage, but overlook the importance of the other aspect of always having enough service. The latter is about equally important with the former in making profits. These managements are good at saving but poor at merchandising. They are good economizers but poor spenders—poor "gamblers" on expenditures to increase riding. The experience of Brooklyn has furnished a striking example of how more service will bring more patronage. A blanket increase of 1 per cent or more in number of car miles called for on a timetable for a line has promptly resulted in such an improvement in riding that it was but a comparatively short time until another increase in service seemed warranted from a loading standpoint and desirable from a merchandising standpoint. For example, on the Graham Avenue line, a 2.8 per cent increase in car mileage in August, 1922, as compared to July, 1922, resulted in 1.7 per cent increase in revenue; 1.2 per cent additional increase in service in September over August resulted in 1.6 per cent increase in revenue; 2.1 per cent service increase in October over September brought 2.1 per cent increase in revenue. In another case a 9.2 per cent service increase brought 11 per cent revenue increase; and the following month 4.8 per cent additional increase produced 8 per cent more revenue. Compared with the corresponding month of the previous year this was a 13.7 per cent increase in service and a 19 per cent increase in revenue. These two examples are cited because the increased revenue was traceable directly to the better service, there being no other contributing causes.

This cycle has happened repeatedly in Brooklyn in the last three years and has resulted in several cases in increasing the earnings of a line in the three-year period by 40 or 50 per cent, when it was thought that all the business available was being handled before. Other companies have experienced the same thing. The installation of safety cars on more frequent headway than was operated with larger cars has furnished this same experience in many cities all over the United States. Up to certain limits, the patronage in the street railway business does respond to more service. And often these limits are much higher than was thought before the service increases were made. Of course, this is the way to improve the net earnings. The more passengers at a small profit per passenger, the better the net.

On the other hand, the value of putting the cars where the traffic is, spacing them properly, and avoiding waste mileage is demonstrated by the Brooklyn experience in 1921, when, as compared to the year 1920, the car mileage that was operated was 10 per cent less, but between 7 and 8 per cent more passengers were carried without overcrowding.

What Is Arithmetic Between Friends?

SHOULD estimates be made of the deficit which will result from the establishment of a 5-cent fare on the Seattle Municipal Railway, and if the loss appears to be considerable, should this fact deter the City Council from ordering such a fare? The *Post-Intelligencer* of that city evidently thinks that in these matters mathematics are a pretty poor substitute for politics. In an editorial in its issue of Dec. 4 it says, in part:

> Council proceedings in recent weeks do not give encouragement for the future regarding this 5-cent fare question, which every one but the honorable legislators thought settled at the last election. When it was finally agreed by competent authority that all legal impediments to reducing the rate had been cleared away there seemed no further bar to progress.
>
> Then up bobs one scheme and another, each based on reams of solemn arithmetic concerning the probable financial return of a 5-cent fare plus ordinary transfers or a nickel fare plus transfers at 2 cents or a nickel straight and tokens in quantity at a reduced rate plus the transfer privilege. . . .
>
> The finance and public utilities committees of the Council meet next Thursday morning at 10. It would be a fine move if representatives of the people who wish Seattle to grow and prosper, and its working people given relief from extortion, should gather at the meeting and tell the lawmakers what they think of the Fitzgerald ordinance and the obstructive tactics delaying its adoption.

It must be a satisfaction to the taxpayers of Seattle to realize that some members at least of the Council are thinking of arithmetic. It is one thing for a City Council to order a low fare on a privately owned property, whose stockholders are few and possibly non-residents in considerable part. It is another matter when the resulting deficit has to be paid by the city as a whole. It is no wonder that one Councilman demanded more time to study his estimates of what would happen if the 5-cent fare was adopted and for another to present figures showing "the dire results of reduction in varying amounts."

The recent incident at Seattle illustrates one of the great dangers of municipal ownership and operation of business enterprises. Whatever may be said by the politicians before the undertaking is begun about the profits which will result from municipal direction, it is pretty safe to say that after the enterprise is under way there will be continuous demands for unprofitable extensions and lower fares, and it will take a brave mayor and council to resist these demands.

The newspaper whose opinion has just been quoted follows the practice of printing at the head of its editorial page each day a text suggested by a different local clergyman. The text to guide the readers of the paper on the day in which this editorial appeared will be considered by some to be very appropriate. It was: "Be not deceived: evil communications corrupt good manners." And if the famous apostle who wrote these words were living in the present day the chances are that he would have added that very often they corrupt politics as well.

The Index Furnishes the Key for Much Valuable Information

IN HIS presidential address at the convention of the Union Internationale de Tramways at Brussels last October, M. de Burlet pointed out that the electric railway industry has no trade secrets like most of the manufacturing industries. Each discoverer of a better way of accomplishing a certain result is glad to give the information which he has to all other companies because there is no commercial rivalry for business between them.

This is as true in America as in Europe and it is largely for this reason and for the conditions which grow out of it that the *Electric Railway Journal* has always made a feature of its volume index. The editors realize that many of the problems which come up as new on some railway properties actually have been successfully solved in the past by others and that the method followed has been described in previous issues of this paper. Hence they have made an effort to make each volume index as complete as possible and to include it with the last number of each half year, so that every subscriber will be sure to have his copy of the index as soon as the volume is completed. This makes binding more easy, and a larger number of the subscribers of this paper are finding it is worth while to bind their copies each half year.

The index for this volume contains between 3,000 and 4,000 entries or cross references, and a continuous policy of treatment is assured by the fact that the same indexer has done the work for a number of years. A feature is the list of key words by which the entries to any topic sought can easily be found. The index as printed represents to the publishers probably a higher cost per page than any article which has appeared in the paper, but if it accomplishes its purpose this expense is considered well worth while.

New Norfolk & Western Locomotives Add Notably to Road's Electric Equipment

IN JUSTICE to the Norfolk & Western Railway electrification, as much publicity should be given to the ways in which mechanical defects in the early locomotives were overcome as was given to the existence of those defects. The mechanical parts of the original locomotives were built along steam locomotive lines, utilizing the best information available at the time. However, there was lacking previous experience with electric locomotives in such extremely severe service. The result was a straining of the underframes with consequent bearing and other troubles, and in due course the frames went to the scrap heap, where they have served as a constantly unpleasant reminder of now happily bygone days. Stouter frames replaced the weaker ones, with excellent mechanical results but with an unpleasant effect on maintenance figures while this was taking place. A point that is sometimes overlooked, however, is that the dozen machines kept an enormous tonnage moving right through war time and were rebuilt without detriment to the service. The troubles which were encountered were not due to the electrical system used, but to the unprecedented severity of the traffic.

Four new locomotives have recently been ordered and will soon be under construction. They embody all of the mechanical lessons taught by experience with the first machines, and also the results of experience with recent enormous steam locomotives used in similar service. The side frames will be heavy vanadium steel castings, with steel cross members of corresponding strength. Each half unit will have a rigid wheelbase as long as the curvature of the track will permit; in other words, the articulated joint will be used only between units. The twin-motor drive has also been abandoned in favor of the single-motor drive, with two jackshafts per unit.

A number of interesting electrical changes also have been made in the new design, the most notable being the use of a synchronous rather than an induction phase converter. This puts into the system what was lacking before, a piece of apparatus which permits correction of the motor power factor. Oil-cooled transformers form another improvement.

The new machines have a one-hour rating of 4,000 hp., an enormous concentration of motive power. This is, to be sure, less than that of the experimental single-phase-three-phase locomotive built for the Pennsylvania Railroad six years ago, shown at the Atlantic City convention of the steam railroad associations in 1917 and heralded as the most powerful locomotive ever built. The N. & W. machines will, however, be the most powerful in regular service. The two types of locomotives are comparable in several particulars. The Pennsylvania machine, for example, has a synchronous converter, like the N. & W. It has twin-motor drive through a jackshaft to three driving axles, whereas the new N. & W. machines have single-motor drive to two driving axles. The rigid wheelbase includes these three axles as compared with four drivers on the N. & W. machines. And there are two articulated trucks to the Pennsylvania locomotive, a plan also abandoned on the newer N. & W. locomotive as compared with the earlier one. An illustrated account of the Pennsylvania locomotive appeared in the issue of this paper for June 9, 1917, page 1048. References to articles on the earlier N. & W. locomotives will be found in one on the new machines appearing in this issue.

Fitting Service to Traffic in Brooklyn

How the Data Developed by the Transportation Department of the Brooklyn Surface Lines Are Used to Follow the Trend of Service Requirements and Adjust Schedules Accordingly so That Losses May Be Avoided, but, More Important, so That as Much Service as Will Be Purchased Is Always Available

BY A. L. HODGES
Assistant Treasurer and Assistant Secretary Brooklyn (N. Y.) City Railroad

THE successful building up of revenue and the conservation of its expenditure must be based on a close study of service requirements and the cost of producing them. This study must be a continuous one, for in every cosmopolitan city there is an ever-changing riding habit. This is particularly noticeable in Brooklyn, where the population at the present time is increasing at a very rapid rate as indicated by the new building operations carried on during the calendar year 1922, which, it is said, will considerably exceed $200,000,000. This figure, it is claimed, far exceeds that for any other community.

In order to keep pace with these ever-changing conditions the transportation department must keep its hand on the pulse of the car rider, so to speak. It must gather, compile and analyze its own information as to operating costs and service required. To do this effectively the transportation officials must avail themselves of "up-to-the-minute" information in advance of the formal figures furnished by the accounting department. They must not be forced to wait for figures furnished by other departments, which, as a rule, are fifteen to thirty days behind the actual operation.

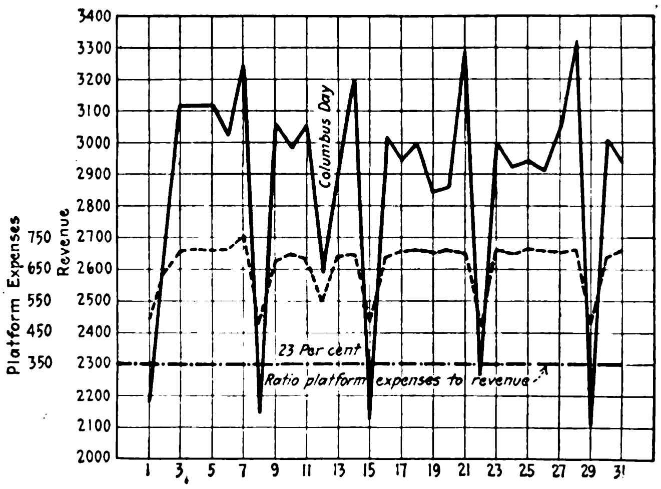
One of the essential phases of electric railway operation is to furnish the proper transportation facilities at the time and place required by the car rider; not only fitting the schedules to the habits of these riders but also providing sufficient service to attract additional business. No one ever tells the transportation department how many people are going to ride on any given line, or the time they intend to use the service. So it is up to the railway to outguess the car riders and always to have ample service to attract the business, not drive it away with overcrowding.

This is not so different from any other industry or business which sells direct to the consumer. The merchant must display his merchandise in sufficient quantities to meet the demand, and when his stock runs low he must replenish it promptly or lose trade and profit. With the railway companies, it is about the same. They must plan not only the transportation they expect to sell each day, but the service must be such as to anticipate the growth of traffic so that new riders may be provided for and new friends made.

Further than this, it must be borne in mind that if the operating schedule is not fitted to the service requirements it develops high operating cost with its resultant waste.

The operation of the Brooklyn surface lines during the past three years has demonstrated to us more than ever what a tremendously important thing the keeping of schedules adjusted to the ever-changing traffic requirement is. To show what the application of these principles will accomplish, one needs but glance at the reports of the Brooklyn surface companies for the fiscal year ended June 30, 1922. Here it is seen that a large deficit for the previous year was turned into a substantial surplus by June 30, this year. In fact, the directors of the Brooklyn City Railroad on Nov. 8, 1922, declared a division of surplus earnings among its stockholders amounting to 20 cents per share, par value $10. At the same time the directors suspended the collection of a second fare on the Flatbush Avenue line, thus sharing the company's prosperity with the car riders by relieving them of this additional charge.

The ability to turn a deficit into a profit is attributable in very large part directly to the close attention given to the development of efficient service on each line, thereby avoiding waste and attracting business to the cars.

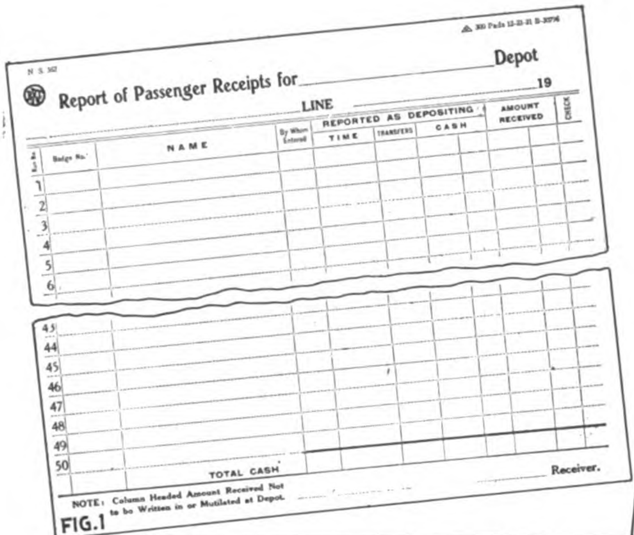


MONTHLY GRAPHIC INDEX CHART MADE FOR EACH LINE AND BROUGHT UP TO DATE DAILY. EXPENSES AND REVENUE ARE IN DOLLARS

The platform cost, which is a fairly constant part of the total operating cost, is used in determining the proper ratio between operating costs and gross revenue for the purposes of the transportation department.

If this operating ratio drops below a predetermined point it may mean that insufficient service is being operated and in that case a revision of the schedule is immediately effected, relieving any excessive loading of cars. By a like token, if the operating ratio barometer rises above a predetermined point the service is promptly indicated to be more than the line requires, due perhaps to changes in industrial conditions or seasonal changes. A closer study of the line may reveal that a complete readjustment of the schedule can be made to advantage. Thus, the value of a scheme that immediately calls attention to over or under service is readily seen, the corresponding change in service requirements being then promptly made before any loss accumulates.

The method by which the management keeps its hand on the operating costs of each of the sixty-eight routes comprising the Brooklyn surface lines is predicated on graphically analyzing the conductors' daily revenue turn-ins with respect to the expense of platfrom time and making frequent cross-section checks of the traffic actually handled over each route so as to know where the maximum load point is on each line, as well as the manner or degree in which the traffic builds up or tapers off from this maximum loading point. A check of this kind gives the riding characteristics of the line, by direction, and this having been determined the next step is to rebuild the schedules and fit the car service so that the point on the line at which the maximum number of seats are operated will correspond to the maximum load point, and so that the service furnished will taper off from this point in the same ratio as the passengers carried.


N. S. 362 — 300 Pads 12-22-21 B-3796

BRT

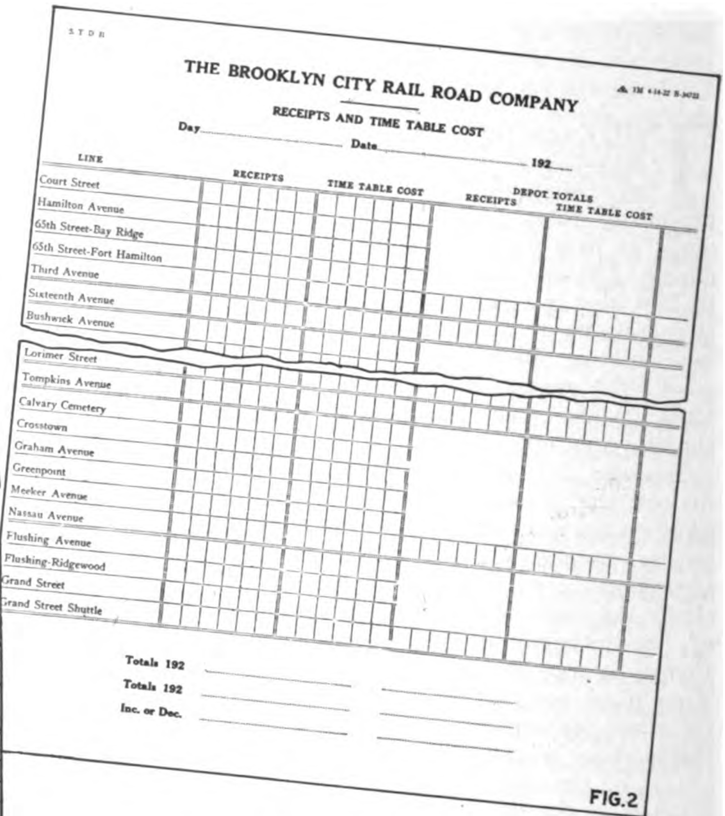
Report of Passenger Receipts for ____ Depot
____ LINE ____ 19

	Badge No.	NAME	By Whom Entered	REPORTED AS DEPOSITING TIME	TRANSFERS	CASH	AMOUNT RECEIVED	CHECK
1								
2								
3								
4								
5								
6								
43								
44								
45								
46								
47								
48								
49								
50								
		TOTAL CASH						

____ Receiver.

NOTE: Column Headed Amount Received Not to be Written in or Mutilated at Depot.

FIG. 1


S. T. D. 11 — 1M 4-14-22 B-3423

THE BROOKLYN CITY RAIL ROAD COMPANY

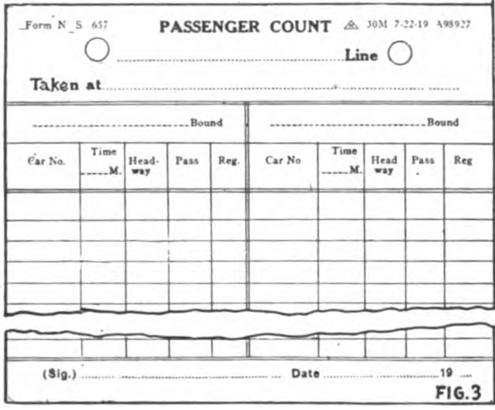
RECEIPTS AND TIME TABLE COST

Day ____ Date ____ 192__

LINE	RECEIPTS	TIME TABLE COST	DEPOT TOTALS RECEIPTS	DEPOT TOTALS TIME TABLE COST
Court Street				
Hamilton Avenue				
65th Street-Bay Ridge				
65th Street-Fort Hamilton				
Third Avenue				
Sixteenth Avenue				
Bushwick Avenue				
Lorimer Street				
Tompkins Avenue				
Calvary Cemetery				
Crosstown				
Graham Avenue				
Greenpoint				
Meeker Avenue				
Nassau Avenue				
Flushing Avenue				
Flushing-Ridgewood				
Grand Street				
Grand Street Shuttle				

Totals 192 ____ ____
Totals 192 ____ ____
Inc. or Dec. ____ ____

FIG. 2


Form N. S. 657 PASSENGER COUNT 30M 7-22-19 A98927

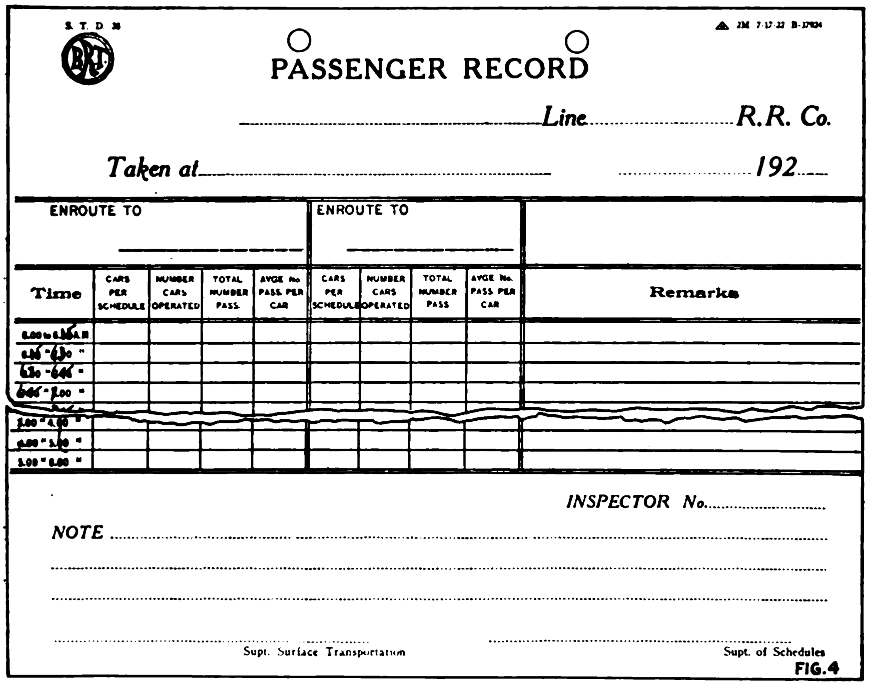
○ ____ Line ○

Taken at ____

____ Bound					____ Bound				
Car No.	Time ___M.	Head-way	Pass	Reg.	Car No	Time ___M.	Head way	Pass	Reg

(Sig.) ____ Date ____ 19__

FIG. 3


S. T. D. 38 — 2M 7-17-22 B-37924

BRT

○ ○

PASSENGER RECORD

____ *Line* ____ *R.R. Co.*

Taken at ____ ____ *192*__

ENROUTE TO ____					ENROUTE TO ____				
Time	CARS PER SCHEDULE	NUMBER CARS OPERATED	TOTAL NUMBER PASS.	AVGE No. PASS. PER CAR	CARS PER SCHEDULE	NUMBER CARS OPERATED	TOTAL NUMBER PASS	AVGE No. PASS PER CAR	Remarks
6.00 to 6.15 A.M									
6.15 - 6.30 "									
6.30 - 6.45 "									
6.45 - 7.00 "									
3.00 " 4.00 "									
4.00 " 5.00 "									
5.00 " 6.00 "									

INSPECTOR No. ____

NOTE ____

____ Supt. Surface Transportation

____ Supt. of Schedules

FIG. 4

Fig. 1—Form used at depots for recording conductors' turn-in. Fig. 2—Form used in transportation superintendent's office to record turn-in or receipts by lines. Fig. 3—Form used for recording passengers on cars at each of various points along route. Fig. 4—Form on which data from "passenger count" forms are tabulated by fifteen-minute periods for use in graphing cross-section check.

This idea of a graphical analysis of schedules, riding, costs, etc., is not entirely new, but the application to a large city system had apparently not been tried previous to its introduction here by C. E. Morgan, vice-president and general manager. Since 1920 Mr. Morgan has been in direct charge of all the surface lines in Brooklyn, now being operated as a unified system through arrangements between the Brooklyn City management and Receiver Lindley M. Garrison of the Brooklyn Rapid Transit Company. The Brooklyn Rapid Transit surface lines which Mr. Morgan operates in connection with the Brooklyn City Railroad are the Nassau Electric Railroad, the Brooklyn, Queens County & Suburban Railroad and the Coney Island and Brooklyn Railroad, and these companies, together with the Brooklyn City Railroad, comprise 525 miles of track. During the fiscal year ended June 30, 1922, these companies operated 46,433,818 car-miles, 5,702,141 car-hours and carried 431,700,214 revenue passengers.

With the primary purpose in mind of producing adequate and satisfactory service on a basis that will make a profit, a complete survey of operation is continuously carried on. The object of this undertaking is to ascertain where the patrons are located, their riding habits and the distance they travel. This learned, the next step is to adjust the service to their needs. In doing this some novel methods have been developed and are now being regularly used in addition to those that are in more or less general application throughout the country. Under the general scheme of handling conductors' remittances at the carhouse, a record is kept by lines (Fig. 1), showing the amount of each conductor's turn-in. Inasmuch as the ticket fares under the scheme of fare collection used are counted as cash, the cash turn-in takes into consideration all of the revenue from passengers carried on the line. This record sheet had been developed to give a summary of the day cards for the convenience of the accounting department in checking off the contents of the different bags when taken out of the carhouse safes the following morning.

How Operating Data Are Recorded

The next step is to get the information not only to the transportation department but to the management by 9 o'clock in the morning of the following day. This is being done by having each of the several depot masters telephone this information during the early morning hours to the office of the superintendent of transportation, where the night clerk tabulates it on a special form (Fig. 2.). The depot master, when reporting his route receipts, also reports the corresponding timetable or platform cost for each line, which takes into consideration extra service, overtime on account of delays, etc. It is but a simple matter then for this clerk to foot up the columns, first by depots, then as a whole, add the corresponding depot figures and totals from the duplicate records of a year ago and deliver this tabulation to the operating officials and the management. This tabulation then gives the operating officials access to the two most essential figures with which they are concerned—receipts and platform costs. Actual checking with the final figures for passenger revenue furnished by the accounting department has indicated that these preliminary figures are within 1 per cent of being correct, which is sufficiently accurate for the purposes.

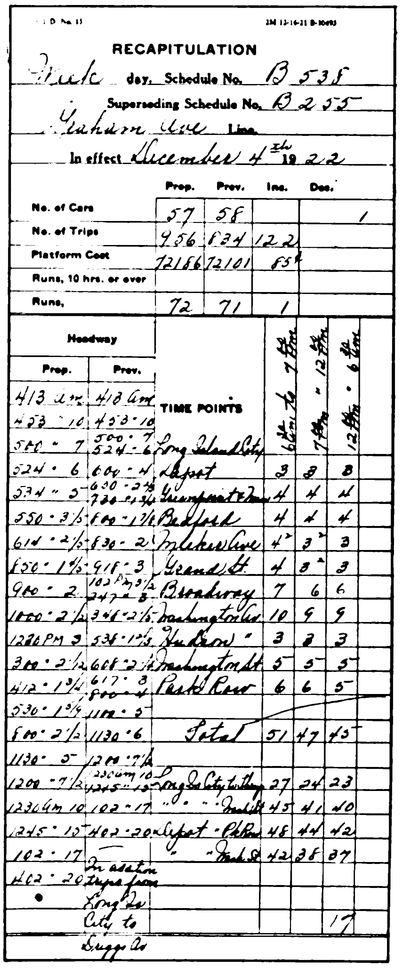
Upon receipt of these forms showing the individual route receipts and platform costs for the previous day in the general manager's office, they are transferred to individual monthly graphic route charts, sample of which is illustrated on page 1001. It takes but a few minutes for a clerk to transfer the figures to these route charts, so that shortly after the opening of the office there is available an actual picture record of the performance for the previous day, together with the platform cost of producing it. At the end of each fifteen-day period the percentage of timetable cost to the passenger receipts is calculated for the period and is likewise shown on the route charts.

As shown on the chart reproduced, this percentage is 23, which indicates the ratio of platform cost to gross receipts for the period and enables the management at a glance to determine whether the line is going ahead or falling back. If the latter is the case the management can then focus its attention on lines needing an adjustment of service. In this case it will be noticed the ratio of 23 per cent obtained during the entire month.

Of course there are certain conditions which are reflected in the charts each day, such as interruptions to headway, etc., which shows the necessity for closer application by the supervisory forces. Any irregularities with respect to fare collection are also readily discernible, indicating when a concentration of the special service force on any route is desirable.

Coincident with the plotting of the platform expense, these costs are scrutinized in comparison with the schedule allowances, to determine their correctness. Thus a check can be made of the operation of any unauthorized service or the failure of any division to operate the schedule as provided.

A recapitulation of a schedule is shown in the form reproduced as Fig. 5. This shows the number of cars, number of trips, platform cost, number of runs, and headway—all of these figures being compared with preceding schedule showing increases or decreases in service proposed. The running time between various time points is also shown, as well as changes in running time during the different hours of operation. The graphic index charts are then compared with these recapitulations as to earnings and cost of operation, and any extraordinary events or any circumstances that could tend to divert traffic are at once noticeable and the reasons therefor can be noted on the chart, which altogether forms a very complete daily log of the operation of each line. A study of these daily index graphs and a comparison with those of the preceding day, month or corresponding month of a previous year will tell whether the traffic over any line is changing and the degree of such change. With personal knowledge and observation of conditions surrounding each line, it is then possible to prepare a fairly accurate prospectus for future guidance.



I D No 13 3M 12-16-21 B-10493

RECAPITULATION

Week day, Schedule No. B 538

Superseding Schedule No. B 255

Graham Ave Line

In effect December 4th 1922

	Prop.	Prev.	Inc.	Dec.
No. of Cars	57	58		1
No. of Trips	956	834	122	
Platform Cost	72186	72101	85	
Runs, 10 hrs. or over				
Runs,	72	71	1	

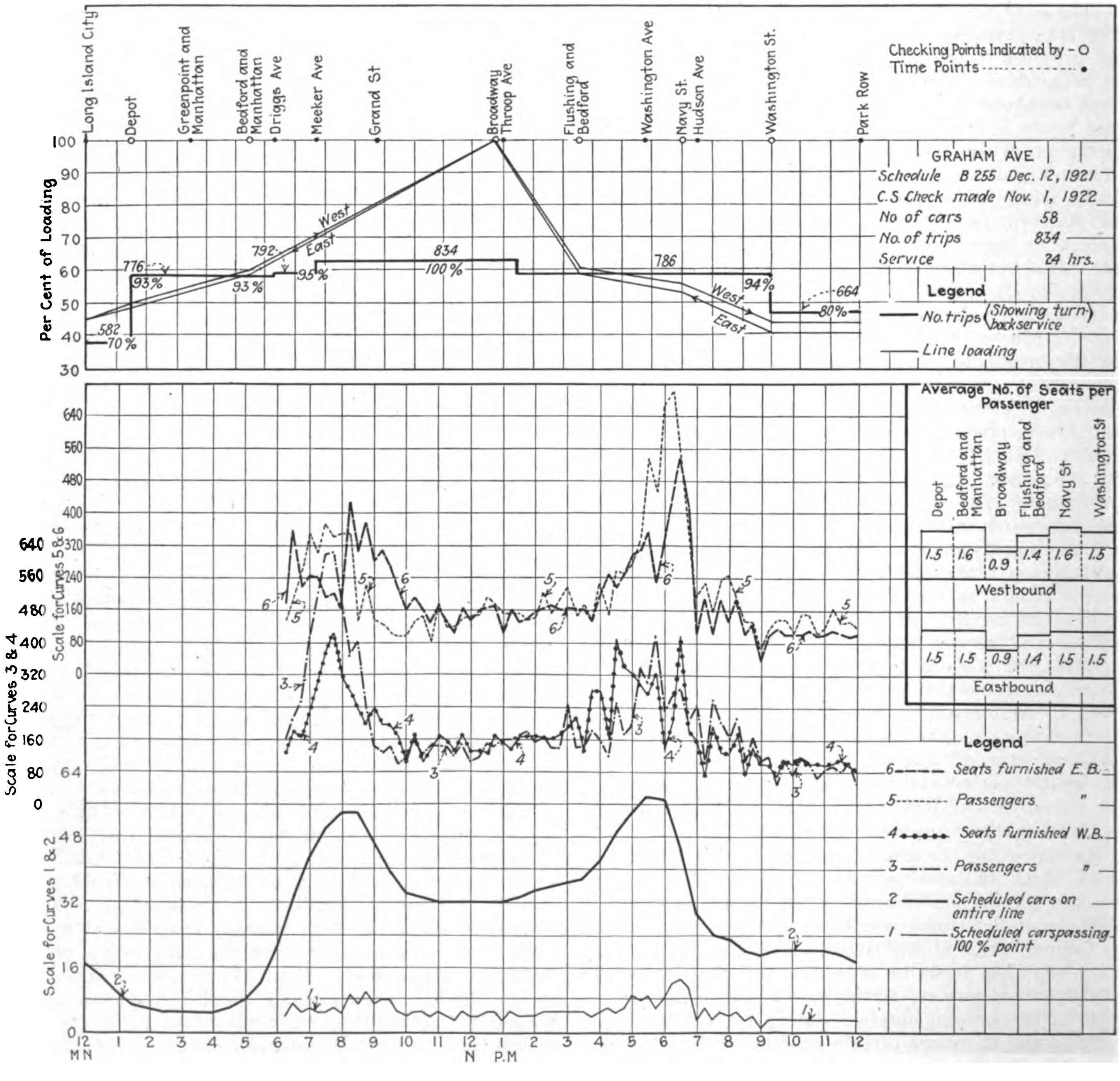
Headway Prop.	Headway Prev.	TIME POINTS	6am to 7am	7am " 12pm	12pm " 6pm	
413 am	418 am					
453 " 10	453 " 10					
500 " 7	500 " 7 524 " 6	Long Island City				
524 " 6	600 " 4	Depot	3	3	3	
534 " 5	630 " 2½ 730 " 1¾	Greenpoint Av	4	4	4	
550 " 3½	800 " 1½	Bedford	4	4	4	
614 " 2½	830 " 2	Meeker Ave	4	3	3	
650 " 1½	915 " 3	Grand St.	4	3	3	
900 " 2	102 PM 3½ 347 " 3	Broadway	7	6	6	
1000 " 2½	346 " 2½	Washington Av	10	9	9	
1220 PM 3	538 " 1½	Hudson "	3	3	3	
300 " 2½	608 " 2½	Washington St	5	5	5	
412 " 1¾	617 " 3 800 " 4	Park Row	6	6	5	
530 " 1¾	1100 " 5					
800 " 2½	1130 " 6	Total	51	47	45	
1130 " 5	1200 " 7½					
1200 " 7½	1230 am 10 1245 " 13	Long Is City to [illegible]	27	24	23	
1230 AM 10	102 " 17	" " " [illegible]	45	41	40	
1245 " 13	402 " 20	Depot - Pk Row	48	44	42	
102 " 17	—	" " [illegible]	42	38	37	
402 " 20	In addition trips from					
	Long Is					
	City to				17	
	Diggs Av					

Fig. 5—Recapitulation of a Schedule

Should the study of these graphic charts indicate that the schedule does not fill the requirements of efficient or economical operation, a study of traffic conditions on that particular line is undertaken by making an actual check out on the line. A squad of experienced passenger traffic checkers is maintained for this purpose. These men work under the supervision of the timetable department. While they are available for special checks, they ordinarily operate on a fixed schedule so that an observation check of each line is furnished the transportation department every eighth day. This check will develop any sudden change in the riding habits along a certain route and is also one of the factors in determining the necessity for a closer check and a schedule revision.

When any one of these preliminary reports, graphic charts or service checks develops a condition requiring adjustment of schedule the next step is a cross-section check, so to speak, of the line. The schedule running time of the line under observation is divided into approximately five-minute periods from the initial point to the destination, and a traffic checker, trained in this work, is stationed on the street at each of these points to note the actual number of passengers on the cars passing in each direction. These data are entered on the form shown in Fig. 3. For this purpose the regular passenger traffic checkers are used. They work in shifts covering the entire day's operation.

These checks serve as a basis for the determination of whether or not the schedules fit the traffic over the line. All the information collected by each checker is first tabulated by fifteen-minute periods on a special passenger record form shown in Fig. 4. This form in addition to the total number of passengers on the car indicates the number of seats furnished, the number of cars called for by the schedule, the actual number of cars operated on the line as well as calculated figures showing the average number of passengers per car at the checking point. The different items are then totaled for the checking period to determine the maximum loading point on the line as well as the falling off in number of passengers to be handled at the various other checking points. These figures are subsequently tabulated by checking points to determine the relationship that exists between each of these points and the maximum loading point. This relationship is plotted on a curve to indicate how the traffic builds up to the 100 per cent load point. Corresponding to this traffic curve, the number of trips furnished by the timetable in effect when the check was made is shown on the same graphic chart. This trip curve shows the points between which short-line service has been established, the number of trips furnished between cut-back points in percentage



MANNER OF GRAPHING CROSS-SECTION CHECK OF A LINE TOGETHER WITH OTHER DATA FOR PURPOSES OF STUDYING THE FITTING OF SERVICE TO TRAFFIC. THE CHECK PICTURED HERE SHOWED LOADING THAT NEEDED CORRECTION of the maximum service on the line, and the amount of service between such short line points. The next step is graphically to survey and analyze the operation of the schedule for each hour of the day, divided into fifteen-minute periods, at the maximum point.

HOW THE TRAFFIC CHECK IS GRAPHED

Thus the actual number of cars passing this point in the direction of heaviest riding for the entire period of the check is plotted as indicated by Curve 1 in the large charts on this and the opposite page. This curve shows whether or not the operating department is moving the cars as scheduled at this point.

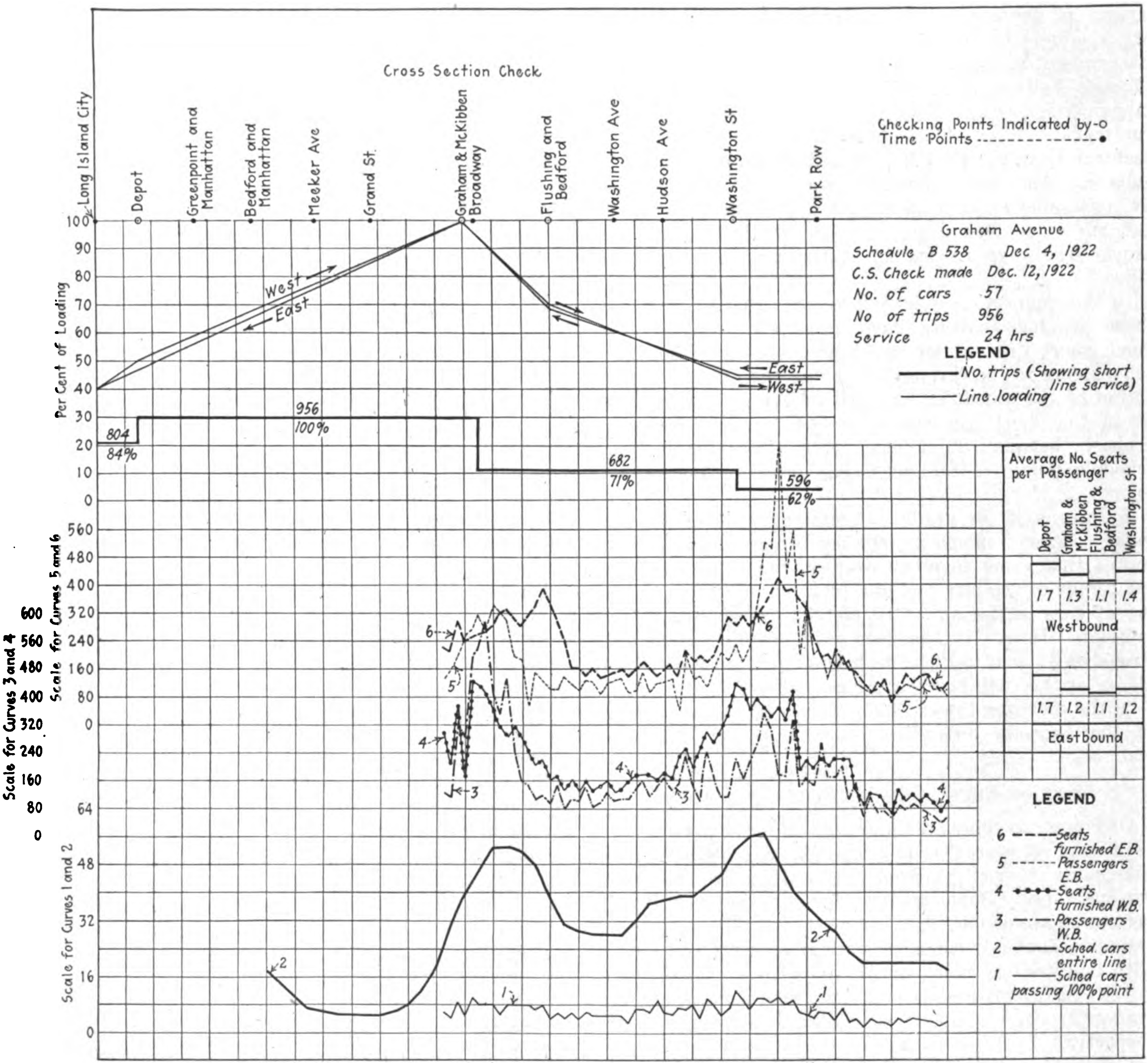
Above this curve is plotted the actual number of cars on the entire line at each hour of the day; that is, the number called for by the schedule in effect at the time the check is made. This is plotted in thirty-minute periods and is shown as Curve 2.

Following this the actual number of passengers carried in each direction past the maximum point is shown graphically by fifteen-minute periods, and this is compared with the adequacy of the schedule in terms of seats furnished. The results of these studies are shown in Curves 3 and 4, respectively, for one direction, and similar information is shown in Curves 5 and 6, respectively, for the opposite direction.

There is also shown on these charts a graphic study of the average number of seats per passenger furnished past the various checking points during the period of the check.

After the preparation of the chart, the data are then ready for the attention of the management. Careful consideration is given to how the service furnished fits the particular needs of the line in question. Such a study may show the need of an entirely new schedule so as to place more service at this or that point to take care of short riders, or it may indicate that closer observation and application by the supervisory force are necessary.

The two charts that are reproduced herewith are both



GRAPH OF CROSS-SECTION CHECK MADE TO DETERMINE WHAT HAD BEEN ACCOMPLISHED BY NEW SCHEDULE PUT IN AS RESULT OF STUDY OF GRAPH ON OPPOSITE PAGE for the same line, the one on page 1004 showing that considerable alteration of schedules was necessary to fit properly the service to the traffic requirements. The second chart was drawn from data obtained by a check made to show the results accomplished after introduction of a new schedule. Analysis of this chart (page 1005) shows considerable improvement in placing the service to meet more nearly the traffic demands. The chart shows the results obtaining after a week's operation of the new schedule and indicates that the new schedule has not altogether met requirements and that further adjustment of the service is necessary.

Our schedule department compiles on an average of 300 timetables a year and it usually requires about fifteen days from the time the cross-section check is made to place a new schedule in effect. In cases of extreme emergency, however, a new schedule can be arranged on a temporary basis in a few hours by "patching" the existing timetable.

Graphic studies are always made of new schedules before they are placed in operation. This really means laying out the schedule in picture form for the entire period of operation, in most cases twenty-four hours. A sample of such a graphic timetable was reproduced in *Electric Railway Journal* for Sept. 24, 1921, page 499, in connection with an earlier article on some phases of our traffic studies. This chart shows the movement of each car from the time it pulls out of the depot until it pulls in. Any non-productive time allowances are readily noticeable as well as any errors in the scheduling and one is enabled quickly to see whether or not the proper headways or spacing of the cars has been provided.

In this connection it is well to state that in Brooklyn these graphic analyses have developed the fact that much short line service could be operated without inconvenience to the through rider and the graphic preparation of the schedules has enabled the management to fit in the short line service so as to space the cars properly between all points. It has also insured the schedule going to the operating force in the proper form.

By means of the graphic timetable it is also possible to lay out for even spacing the headways of two or more routes that come together over a trunk line reaching the center of the city and eliminate unnecessary bunching of cars in the congested districts as well as on the individual lines. It has been said of the Borough of Brooklyn that it is "the bedroom of Manhattan." A glance at the rush-hour riding as pictured in the charts —in the morning toward New York and in the evening in the opposite direction—shows the basis for this statement.

TYPE OF EQUIPMENT MUST BE CONSIDERED

Of course in figuring these schedules the type of car used must of necessity be given considerable attention. Like many other cities, Brooklyn has its share of cars of various types. Some are standard single-truck safety cars, some are double-truck one-man, others are one-man, two-man, double-truck, some with cross seats and others with longitudinal seats, and besides these classes there is the center-entrance type of car, with center-entrance trailers. For rush-hour scheduling, car capacity, irrespective of type, is figured on the basis of one standee for each 1½ sq.ft. of floor space in the aisles, except on the longitudinal-seat cars, where 9 in. of knee room is deducted for the seated passengers. A seat width of 17 in. per passenger is the basis used in calculating the seating capacity of cars with longitudinal seats.

In addition to the daily graphic records of receipts and platform cost, a monthly tabulation is maintained showing by routes the total monthly receipts, platform cost, passengers carried, mileage operated and receipts per car-mile. Comparisons are also carried in separate columns with the month of the previous year. These figures are not those furnished by the accounting department, but are predicated on the monthly totals of the figures worked up each day by the transportation department. By this means the transportation department and the management can have available within a very few days after the close of the month nearly accurate statistics showing what the transportation department has actually accomplished in the way of handling traffic, with the cost thereof. This gives a monthly check on the conditions surrounding the operation of each line over a period of several years and any fluctuation in earnings or the cost of securing such earnings is readily discernible.

When the figures are received from the accounting department, showing the actual receipts and total operating costs for each line, the cost figure is proportioned among the various lines, on a mileage basis, taking into consideration the various types of units run, whether single-truck, one-man, two-man, double-truck cars or double-truck, one-man cars, etc. This gives a revised unit figure for use in estimating expenses in advance of actual figures. Naturally the ratio of expenses between these types of cars varies on different properties and each management must prepare its own ratios as to the car-mile cost of each unit used.

This unit cost or yard stick having been determined for each type of equipment in use on the individual line, then the actual operating expenses for each line may be ascertained by multiplying the mileage operated by each type of equipment used on the line by this unit cost, which gives a fairly accurate allocation of the operating expense to the respective lines. This enables the management readily to ascertain which of the lines operated are adding red or black to the balance sheet, and should a line not meet its operating expenses, action can be taken immediately to secure the desired results without permitting any unnecessary accumulation of loss.

The complicated duties of the transportation department of any railway, large or small, makes any effort to simplify this labor quite worth while. The procedure followed in Brooklyn and the results obtained therefrom have been pointed out for whatever help they may be to other properties in getting more effective use of the cars.

The management of the Brooklyn street car systems is likewise guided by similar data and charts which are used in checking other departments of the organization, particularly the maintenance departments. These are not only of great value in connection with formulating the budget requirements, but also assist in securing more efficient operation with reduction of costs.

According to a statement issued by the United States Department of Commerce, the Midi Railroad in France is making rapid progress with its electrification work. It was expected that the Pau-Tarbes line would be completely electrified by Jan. 1, 1923, that the system will be extended to Montrejeau by March, and that during the summer of 1923 the Dax-Toulouse line will be electrified.

Moving a 740-Foot Steel Bridge

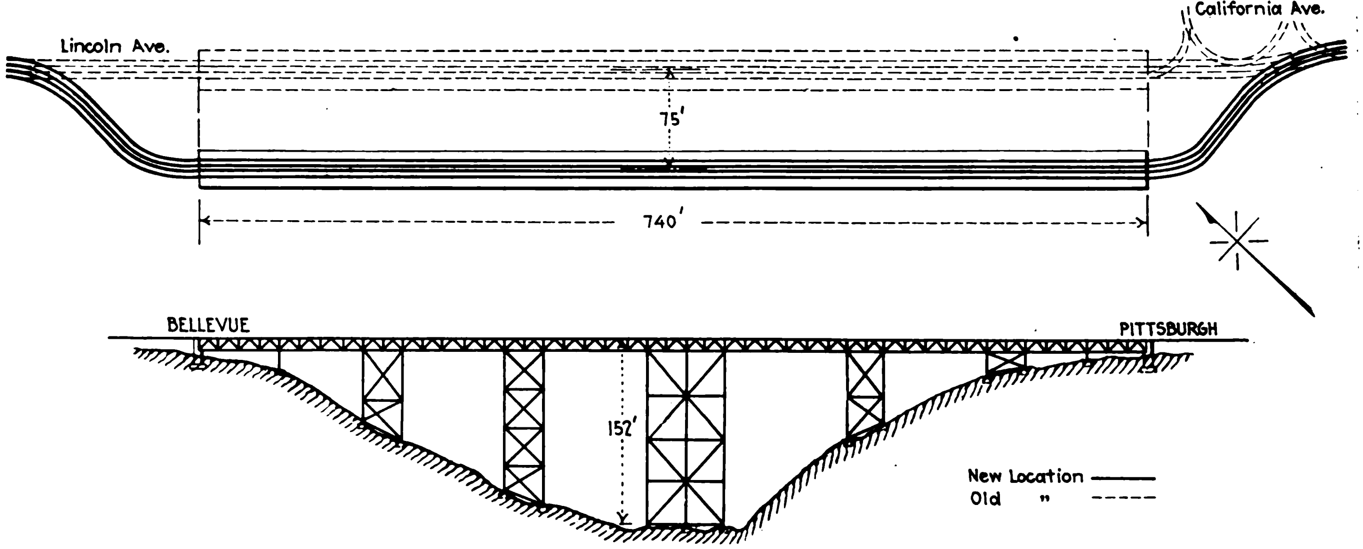
This Structure, Weighing 1,000 Tons and Reaching a Maximum Height of 152 Feet, Was Moved 75 Feet Down Stream by the Pittsburgh Railways in Order that Continuous Service Might Be Provided During the Construction of a New Concrete Highway and Railway Bridge

MANY people have gazed in wonder at the spectacle of a building being moved around the block, sometimes with the home life or business going on as usual in transit. It is not an unusual occurrence for a small bridge to be shifted in position, and occasionally a story appears of the moving of large structures. The moving of the Jack's Run Bridge at Pittsburgh proved to be a matter of considerable public interest locally as well as one of engineering importance.

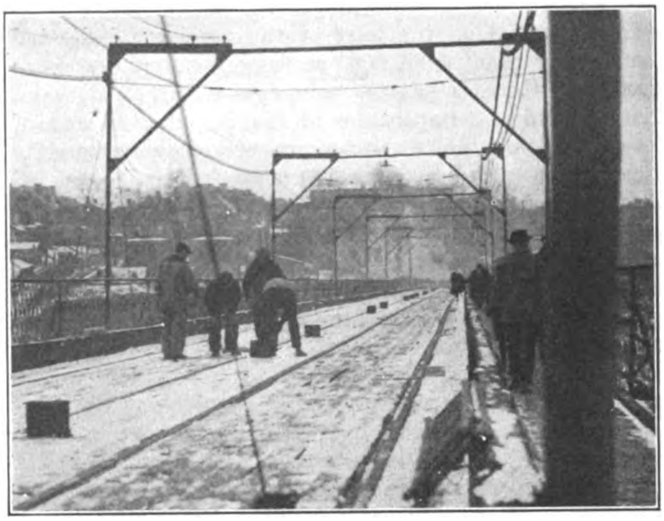
This bridge is a steel viaduct 740 ft. long and has a maximum height of 152 ft. above Jack's Run, a stream at the bottom of a ravine which forms the line between the city of Pittsburgh and Bellevue Borough. The steel structure comprises fourteen spans, varying from 30 to 96 ft. in length, of Warren type trusses 8 ft. deep with two lines of intermediate stringers and supported on masonry pedestals and with masonry abutments at each end. The deck carries a two-track roadway for vehicular traffic with a double line of street car tracks and two sidewalks.

The Jack's Run bridge was erected in 1893 by the Schultz Bridge & Iron Company of Pittsburgh, for the Jack's Run Bridge Company, a corporation whose stock at that time was owned by the same interests that controlled the Federal Street & Pleasant Valley Passenger Railway. This road operated from Pittsburgh into the boroughs of Bellevue and Avalon and later to Ben Avon and Emsworth and furnished the original electric car service to those communities.

The bridge connected California Avenue, Pittsburgh, with Lincoln Avenue, Bellevue, over the ravine mentioned and at the time of its construction was considered the largest steel structure then in use for electric railway purposes. It was also used by all classes of vehicular traffic and foot passengers. Tolls were collected until it was taken over by the County of Allegheny in 1917 and then made free to all traffic except electric cars.



OLD AND NEW LOCATIONS OF JACK'S RUN BRIDGE



DURING THE MOVING CAR SERVICE WAS INTERRUPTED, BUT PASSENGERS WALKED ACROSS TO TRANSFER FROM ONE LINE TO THE OTHER

The principal through local highway route, as well as the Lincoln Highway, leading west from Pittsburgh, crosses this bridge. This, together with the largely increased population of the suburban districts to the west, had resulted in a volume of vehicular traffic entirely too heavy for the capacity and strength of the structure.

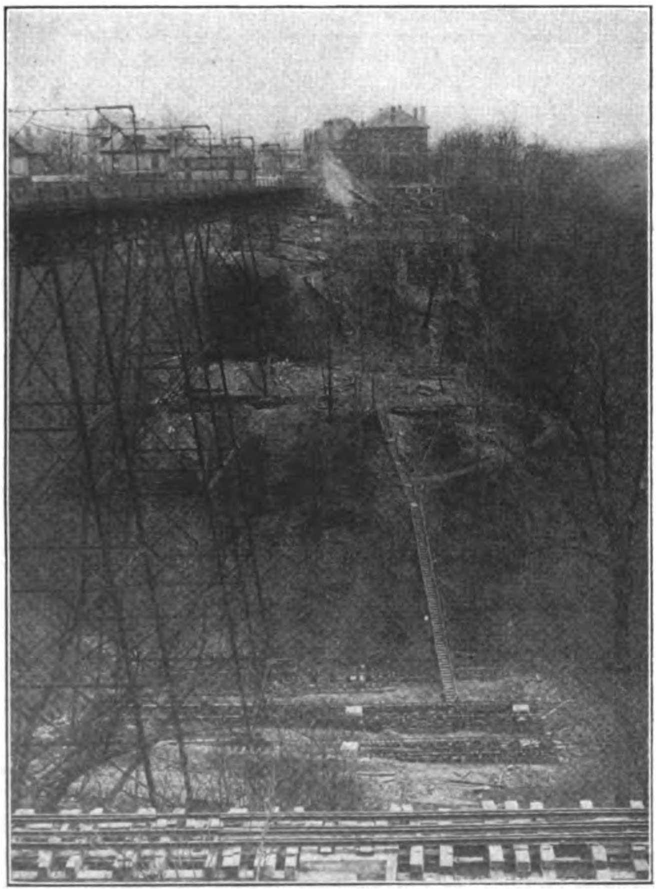
It was therefore considered necessary either to make extensive repairs to the old bridge to strengthen it or entirely to replace it by a new structure. As the bridge is now owned by Allegheny County, the county commissioners decided to replace the bridge by a reinforced concrete arch viaduct having a width of 60 ft. To do this required the immediate dismantling of the old bridge, and the receivers of the Pittsburgh Railways Company were requested to cease operation of cars over the bridge on or before Dec. 1. They were also informed that it would be at least a year before traffic could be resumed using the new bridge.

The commissioners proposed to erect over the ravine a foot-bridge for temporary use by persons desiring communication between the districts at each end of the bridge. They also proposed that electric railway passengers be carried to each end of this structure and there transfer on foot across the ravine by the foot-bridge and that through car service be provided by use of an alternative car line passing West View Park over a route several miles longer.

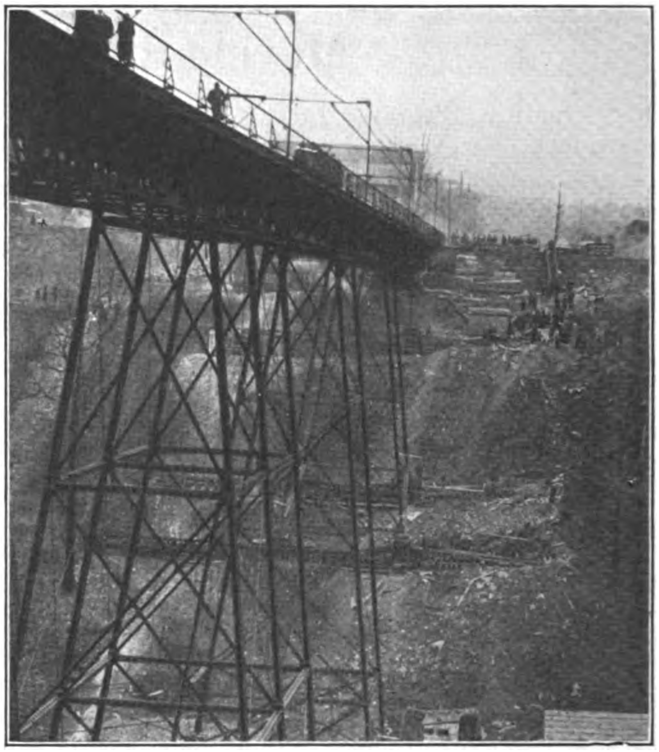
Investigation on the part of the receivers indicated that more than 4,000,000 passengers annually were carried on the cars passing over Jack's Run Bridge and that it would be impossible to furnish at each end of the bridge terminal facilities properly to accommodate them. It would also be most unsatisfactory to ask all passengers to walk across a temporary foot-bridge for at least twelve months extending over two winter periods. The alternative West View route requires from twenty to thirty minutes longer between Pittsburgh and the Bellevue district and it was deemed to be impracticable.

Consideration was then given to the possibility of moving the bridge down stream a sufficient distance to permit the construction of the new bridge without interference. Estimates secured from contractors as to the cost of certain reinforcements to the old bridge and for moving it laterally to a temporary location indicated the feasibility of this plan and at a not unreasonable cost.

A contract was made by the receivers of the Pittsburgh Railways Company with the county commissioners whereby the former undertook the work and assumed the cost, toward which the commissioners paid an amount estimated to be about the cost of the temporary foot-bridge originally proposed by them.



THIS VIEW LOOKING TOWARD THE PITTSBURGH SIDE WAS TAKEN ON NOV. 21 AND SHOWS THE HIGHEST TOWER, NEW TIMBER ABUTMENTS, PEDESTALS, RUNWAYS, ETC.



THIS VIEW LOOKING TOWARD THE BELLEVUE SIDE WAS TAKEN AT NOON ON NOV. 25 AFTER THE BRIDGE HAD BEEN MOVED ABOUT 35 FT. THE OLD ABUTMENTS AND CERTAIN RUNWAYS AND JACK SETTINGS ARE CLEARLY SEEN

It was decided to move the bridge 75 ft. down stream to a parallel location and then to dismantle it after the completion of the new arched viaduct. The engineers decided to construct concrete pier supports for the temporary position and timber crib abutments at each end with double timber bents as supports for the ends of end trusses. The timber cribs were of No. 2 crossties, laced together, well doweled and filled with slag and stone.

The work of placing the runways and foundations was commenced on Oct. 25. During this work various reinforcements were placed in the floor system, and tower members and new tracks and overhead lines were constructed from the original tracks on California Avenue and on Lincoln Avenue at each end, over the new approaches to the timber abutments.

Crossovers were placed on the main tracks on the streets at each end of the bridge, whereby cars would transfer passengers during the moving of the structure. Platforms were erected in such position that foot passengers could continuously traverse the bridge sidewalks during the progress of the bridge to its new location.

Steel beams were clamped to the capstones at the base of each pair of columns and rested on 4-in. steel rollers. Under these were steel runways in pairs—one on each side of the column bases. It was decided that the use of jacks would insure a more uniform movement of each part of the bridge than could be secured by the use of cables and hoisting engines, and accordingly single screwjacks were placed at the back of each pair of columns.

Street traffic was discontinued and actual moving was begun at 7:30 a.m. on Nov. 25 and completed at 10 p.m. the same day. Special attention was given to moving all parts of the bridge laterally at a uniform rate. The operators of the jacks each gave five turns to their jacks on whistle signals from a hoisting engine. The engineers had sights fixed on the floor over each pair of towers and line stakes at the bases of the columns by means of which constant observations were taken and any variations were distinguishable and corrected.

The runways proved so level and accurately set and blocked that not all the jacks were necessary and at times twelve men were moving the entire structure, comprising a weight of more than 1,000 tons.

On completion of the movement at 10 p.m., the column bases were locked up on the pedestals, and electric car traffic was resumed on the morning of Nov 26. Inspection of the trusses and their supports on the columns showed that the movement had been so uniform as not to crack the paint nor disturb the dust on the steel work at truss ends at any points.

The Bell Telephone Company had several hundred pair of wires in five cables carried in steel conduits underneath the bridge floor and connecting at each end to terra-cotta conduits. These cables were cut into at each end and sufficient loop cable added to cover the distance the bridge was to be moved. As the movement of the bridge progressed the extra loop cable straightened out and uninterrupted service was maintained.

The new bridge will have a total length of 770 ft. and a width of 60 ft., including a 38-ft. roadway. There will be one 320-ft. two-ribbed arch span over the ravine with six 20-ft. spans at each end, a 120-ft. abutment at the Pittsburgh end and a 60-ft. abutment at the railway end. The construction will be reinforced concrete arches.

The work of moving the steel bridge was planned and carried out under the direction of W. C. Boyd, chief engineer for the receivers of the Pittsburgh Railways, and J. C. Godfrey, of R. W. Hunt & Company, and J. K. Martin of Bellevue as consulting engineers and V. R. Covell, county engineer. The contractors were F. Wilsman, Sr., on the masonry and John Eichleay, Jr., Company of Pittsburgh on the moving of the structure.

The County of Allegheny will contract for the new bridge, proposals for which will be advertised within a few weeks. The plans are being prepared and the construction will be supervised by N. S. Sprague, consulting engineer, Pittsburgh, Pa.

New York Railways Tries Turnstile Car

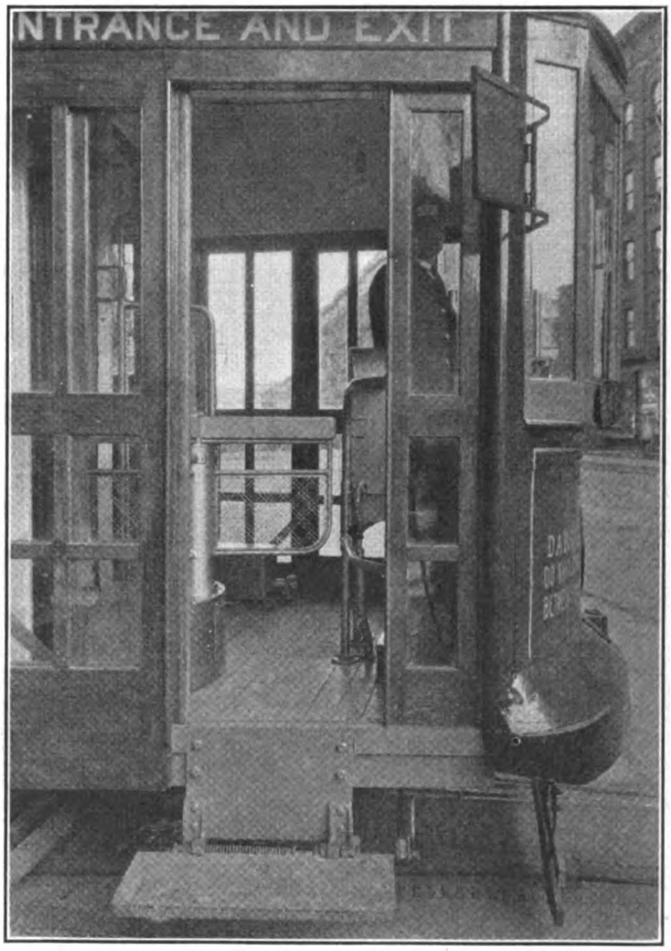
New One-Man Pay-as-You-Leave Turnstile Car Placed in Service by New York Railways Designed to Load and Unload Passengers at Both Ends—Has Provision for Limiting Number of Passengers at One Time

A NEW type of one-man pay-as-you-leave turnstile car has been developed by the engineers of the New York Railways and was placed in service on its Lexington Avenue line Dec. 18. The car used is one of the company's standard closed cars, 42 ft. long, 7 ft. 4½ in. wide and having a seating capacity of thirty-eight inside the car body. The car, before its last remodeling, was a converted pay-as-you-enter car. The platforms are 6 ft. 6½ in. long and originally had double folding doors. In the remodeling the length of the platform was not changed, but the door openings, steps and method of operation were changed to meet the new conditions.

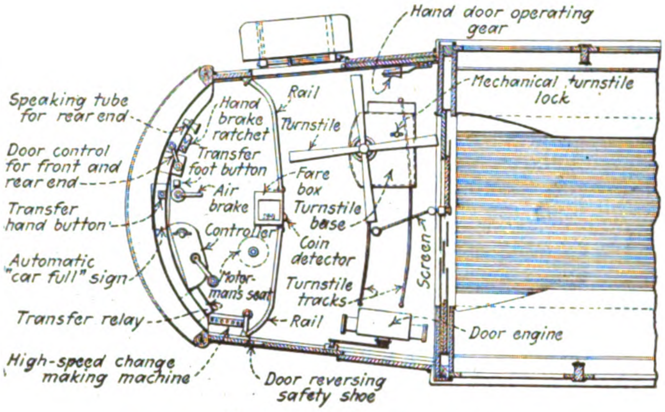
The noteworthy feature of the equipment which is now being tried is in the use of a turnstile at either end of the car, so arranged that it can slide from one opening to the other on the same platform to provide for double-end operation. Through the use of the pay-as-you-leave turnstile, similar in design to those used in the New York subway, both ends of the car are used for loading and unloading passengers and for collecting fares. These turnstiles are of a double-acting type, which permit entrance to the car without obstruction, but which require the placing of a 5-cent piece in the slot of the coin box in order to unlock the turnstile for exit. The turnstiles have four arms, which are wooden at the top with screened pipe barriers underneath.

FEATURES OF NEW EQUIPMENT INSTALLED

An accompanying drawing shows the platform layout and location of the equipment used. As originally designed these cars had sliding doors at the bulkhead. These consist of two doors sliding into pockets on either side, with the opening in the center. These doors have been left as originally used, but only one-half is used



SLIDING DOORS AND FOLDING STEPS PROVIDE FOR ENTRANCE AND EXIT


Hand door operating gear
Speaking tube for rear end
Hand brake ratchet
Rail
Mechanical turnstile lock
Door control for front and rear end
Transfer foot button
Turnstile
Fare box
Air brake
Transfer hand button
Controller
Turnstile base
Coin detector
Automatic "car full" sign
Motorman's seat
Turnstile tracks
Screen
Transfer relay
Rail
Door engine
High-speed change making machine
Door reversing safety shoe

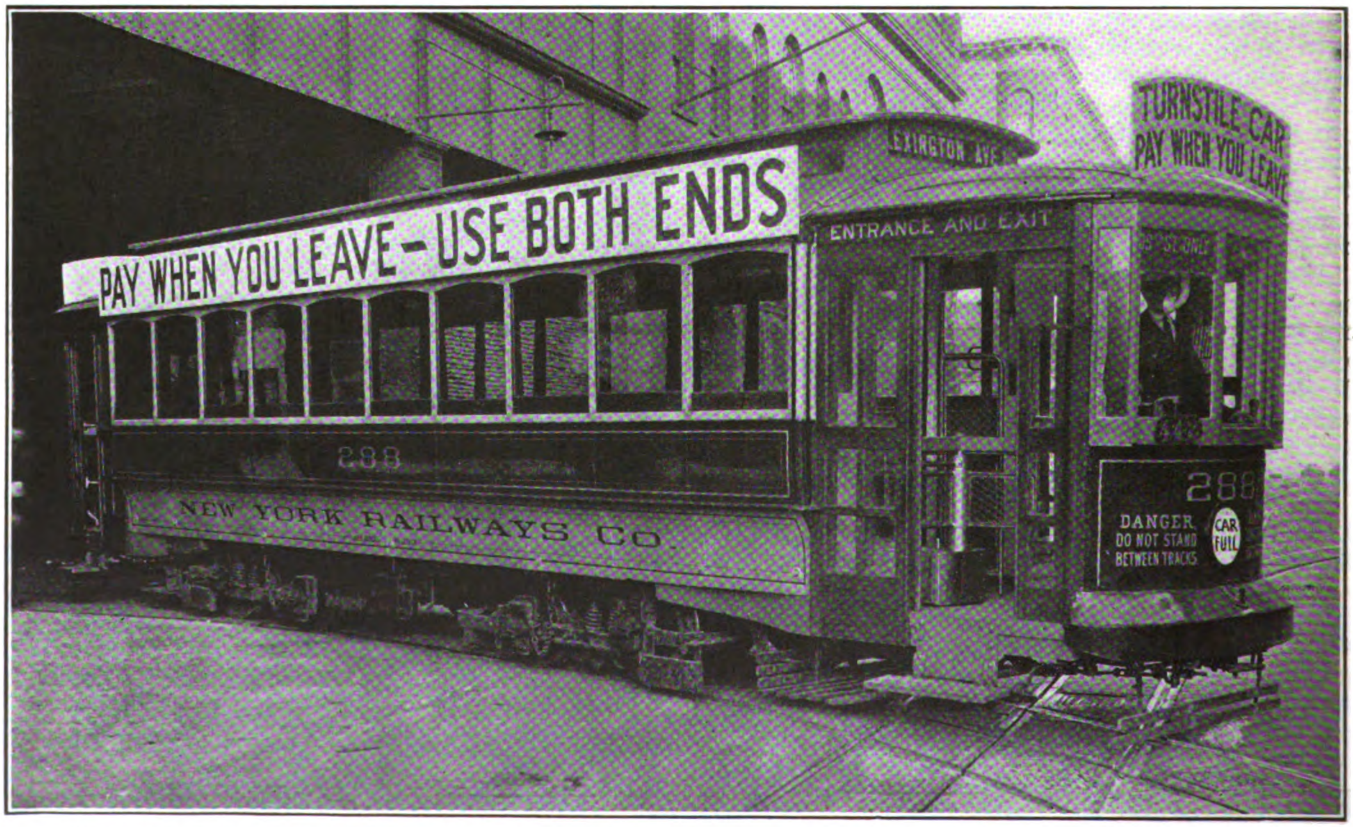
[illegible] ARRANGEMENT OF [illegible]

at a time, the other half closing up to a screened railing, which directs the passengers through the turnstile as desired. The position of the turnstile at each end is at the side of the door opening being used and the passengers after passing through the turnstile enter the car or leave, as the case may be, through the bulkhead doors at the opposite side of the car. When the direction of operation is changed and it is desired to use the doors at the other side of the platform the turnstile is unlocked from its position by the raising of a lever and it can then be pushed to the other side, its movement being guided by two depressed tracks. It is locked in position as desired. The screen which extends from the center of the bulkhead door opening to the inside end of the turnstile arm rotates about a stanchion on the center line of the car at the bulkhead. This railing and screen are changed to the required position by lifting the stanchion at the end of the turnstile and replacing it in another socket.

The folding doors which were originally on the car have been replaced by sliding doors and the openings are closed off to give space for the entrance and exit of but one passenger at a time. The opening door slides on the inside toward the bulkhead. When operated by one man the door and step at the operator's right are hand operated, the rear door on the same side being electro-pneumatically operated. The door which has the door engine operation is provided with a safety shoe for reversing the door in case it should strike an obstruction. Its operation is controlled through a push button at the right of the operator. The door engines used are of a standard type made by the National Pneumatic Company and are installed on the platform floor next to the bulkhead. In order that the operator can see conditions at the rear of the car, a mirror is located on the right-hand front side, and he views the steps of the rear door through this mirror. Another mirror is located immediately in front of him and just above his head so that he can watch conditions inside the car without turning around.

The coin box, which releases the turnstile for exit of passengers, is located on the center line of the car just to the right of the motorman and railings extend from the front edge of this fare box to the door openings on either side of the platform. These serve to guide the passengers and also to prevent interference with the operator. In order to assist in making change a high-speed change-making machine is used, which is installed at the operator's left hand. The fare box is locked, but the operator can gain access to the money for change by unlocking the fare box and removing the coins as desired.

The fare boxes are provided with coin detectors which magnify the coins through a lens, after they have been deposited, so that they can be viewed and seen distinctly through half the length of the car. This is a safety measure intended to prevent the use of slugs to operate the turnstile.


PAY WHEN YOU LEAVE—USE BOTH ENDS
TURNSTILE CAR
PAY WHEN YOU LEAVE
LEXINGTON AVE
ENTRANCE AND EXIT
288
NEW YORK RAILWAYS CO.
288
DANGER
DO NOT STAND BETWEEN TRACKS
CAR FULL

WHEN THE CAPACITY OF THE CAR HAS BEEN REACHED A "CAR FULL" SIGN IS ILLUMINATED ON THE DASH. THE PICTURE SHOWS HOW PATRONS WERE ADVISED OF THE NEW PAYMENT SYSTEM IN AN INESCAPABLE MANNER

A FREE PASSAGE IS ASSURED FOR THE EXIT OF PASSENGERS

Whenever a transfer is tendered for fare, the operator pushes either a hand button or foot button which rings a gong and registers the transfer on a transfer register installed inside the car body over the bulkhead opening. The pushing of the transfer button also operates a transfer relay and this relay remains in its raised position until the turnstile has been operated to allow the passenger to leave the car. It then drops and is in position so that the operator can record another transfer if desired.

Another interesting feature of this equipment lies in the provision made for limiting the total number of passengers on the car at one time. This is accomplished through a totalizing mechanism which is operated through the two turnstiles. The arms of this totalizing equipment move in one direction for each entering passenger and in the opposite direction as passengers leave, so that the combined number of passengers on the car at a given time is shown by the totalizer. When the capacity of the car has been reached a "Car Full" sign on each dasher is illuminated and the turnstiles are locked so that no more passengers can enter the car. Furthermore, the electro-pneumatic door-operating equipment is so designed that the motorman cannot open the door to receive additional passengers and thus to overload the car. The depositing of a fare in the fare box or the ringing up of a transfer, however, releases the turnstile and provides for opening the door.

An emergency cord runs throughout the length of the car and has drops on each platform to provide for cutting off power and the emergency application of the brakes by passengers in case this is necessary. This equipment is the same as has been used on the pay-as-you-enter cars in New York for several years.

For the convenience of the operator in announcing stops and so that his voice may readily reach the rear platform, a speaking tube is provided so that he can talk into this and the sound will be readily heard at the rear.

Rather extended precautions have been taken to advise the traveling public as to the operation of this car and the method of entrance and exit. The exterior of the car is decorated with several large signs to explain that both ends can be used for entrance and that the fare is paid on leaving. Inside the car at the center is a sign which reads: "Passengers Are Requested to Deposit Fare in Slot When Leaving Car. Change Can Be Obtained from Motorman. Present Transfers to Motorman." At either end of the car, just inside the bulkhead, is a sign which reads: "Exit and Entrance at Both Ends of Car."

Officials of the railway have found that a considerable portion of the present car-operating schedule time is consumed in the loading and unloading of passengers, and it is expected that through the use of both ends of the car for both entrance and exit the time at stops can be materially reduced. The provision also for limiting the maximum number of passengers on the car at one time should provide for efficient and comfortable traveling.

Lubrication Requirements for Railway Gears and Pinions

IN A RECENT summary of the lubrication requirements of electric railway gears and pinions the Texas Company* gives the prime requisites of such a lubricant as:

1. It should not harden nor contain any residual matter that is of a non-lubricating character.
2. It should possess marked adhesive properties in order not to drip or flow excessively under abnormal temperature rise nor be thrown off by the action of centrifugal force, or rubbed off under operation.
3. It should be of sufficient body to withstand the excessively high pressure at the point of contact of the teeth, and thereby prevent actual metal to metal friction occurring, whatever the season of the year.
4. It should be entirely free from acids or alkalis which would have a tendency to cause a certain amount of pitting on the highly polished metallic surfaces.
5. It should not be abnormally affected by heat or reacted upon by water, acid or alkali.
6. It should not tend to hold in suspension dirt and particles of worn metal, to produce an abrasive effect.

Other factors that should be considered in making this selection of the lubricant are: Ease of application; the amount required for the initial lubrication and for subsequent applications and the length of time it will efficiently lubricate without renewal.

A lubricant that will meet all of the foregoing requirements will without a doubt increase the life of gearing to a considerable extent and reduce the labor charges and other costs incidental to the maintenance of this type of equipment.

It is very important to have the viscosity of the lubricant approximately the same throughout the year. To meet this requirement with widely differing temperatures it may be necessary to use special grades of lubricants in accordance with the season and the temperature of operation.

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*An extended article on this subject is published in the November issue of *Lubrication*.

4,000-Hp. Electric Locomotives for N. & W.

Four Double-Unit Locomotives Are Under Construction for the Norfolk & Western Railway's Elkhorn Grade and Electrified Extension — They Will Supplement Twelve Lighter Machines Commissioned in 1915

A BRIEF note in the issue of this paper for Oct. 28, 1922, page 732, directed attention to an order placed by the Norfolk & Western Railway with the Westinghouse Electric & Manufacturing Company and the American Locomotive Company for four double-unit electric locomotives to supplement the present equipment of twelve placed in service in 1915. The designs were prepared by the firm of Gibbs & Hill, consulting engineers, in collaboration with the engineers of the railway company. These machines will have a total weight of approximately 400 tons, the weight on drivers being about 71,000 lb. per axle. They will have about 30 per cent more capacity than the earlier locomotives; that is, 3,300 hp. continuous rating, or 4,000 hp. for one hour. They will be operable at 14 m.p.h. and 28 m.p.h., with a continuous tractive effort at the lower speed of 90,000 lb. With full line voltage and frequency, normal transformer connections and eight-pole motor connections, the one-hour rating will be 108,000 lb., the starting tractive effort for five minutes 168,000 lb. and the momentary starting tractive effort with the four-pole motor connection with 85 to 95 per cent trolley voltage 110,000 lb.

HANDLE FREIGHT TRAFFIC SATISFACTORILY

The twelve present Norfolk & Western electrics, in their nearly eight years of service, have shown their ability to handle satisfactorily an enormous freight traffic averaging 75,000 tons in twenty-four hours, which would have required thirty or more Mallet steam locomotives. The earlier machines and the other details of the electrification were covered at length in articles in this paper for March 20, 1915, page 581; June 5, 1915, page 1058; April 1, 1916, page 644; and Aug. 24, 1918, page 322.*

The new locomotives are for supplementary service to provide for the additional locomotive mileage which will be operated when the extension of the electric zone to Wilcoe and Farm and beyond to the westward are opened up.

Each complete locomotive will contain four 1,000-hp. motors of the three-phase induction type with wound rotors placed directly above a jackshaft to which they will be geared at a ratio of 21 to 100. The earlier machines, it will be remembered, had twin motors, geared to the same jackshaft. The driving wheels, of which there will be eight per half unit, will be 62 in. in diameter.

Each unit is of the Mikado 2-8-2 wheel arrangement, with 16½-ft. rigid wheelbase. Sufficient side swing is provided in the guiding trucks to permit operation around 20-deg. curves.

Power will be taken from the line at 25 cycles and 11,000 volts, through a pantograph and oil circuit breakers, to the main transformer, where it will be stepped down to a voltage suitable for the main motors.

A phase converter of the synchronous type will be used to transform the single-phase power from the line to two-phase power. The synchronous type, which was used on the large freight locomotive built for experimental purposes for the Pennsylvania Railroad, is used rather than the induction type, as on the present Norfolk & Western locomotives, in order to give better control of power factor.

As in the present locomotives, the three-phase main

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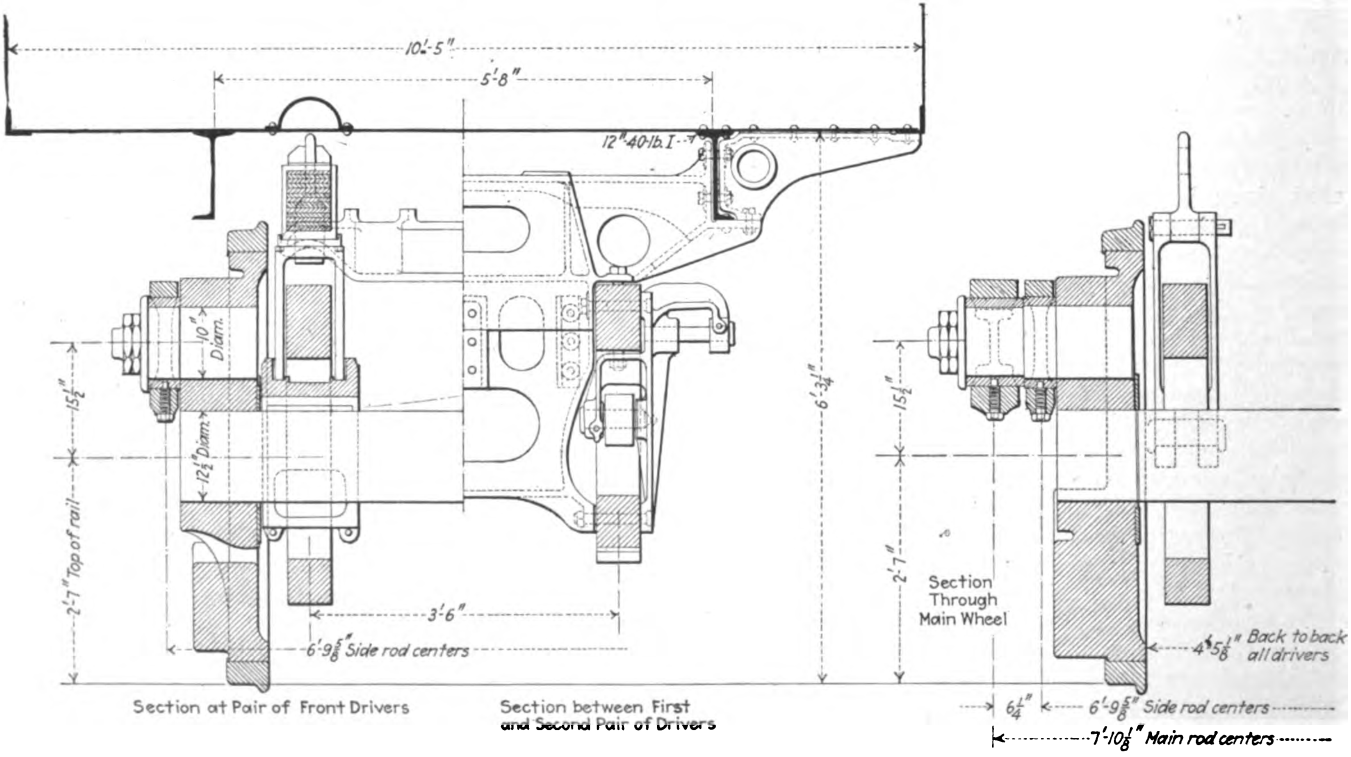
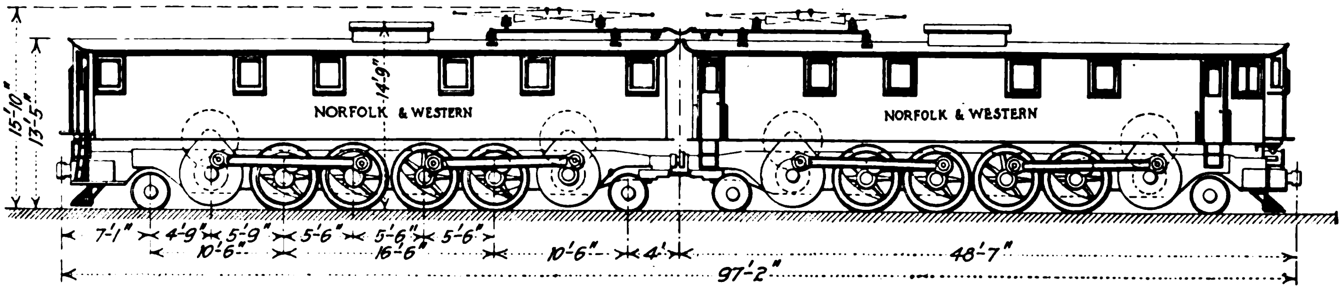
*See also the issues for June 5, 1915, page 1057; Feb. 12, 1916, page 311; March 16, 1919, page 522; and June 12, 1920, page 1202.



SECTIONS OF THE LOCOMOTIVE UNDERFRAME TAKEN AT TYPICAL



THE NEW N. & W. LOCOMOTIVES WILL COMPRISE FOUR MOTORS, EACH DRIVING TWO AXLES THROUGH A JACKSHAFT

motors will be connected to the main transformer and phase converter by the two-phase-three-phase system of connection.

A liquid rheostat connected to the rotors of the main motors will provide for accelerating the locomotive to 14 and 28 m.p.h.

EACH SIDE FRAME A MASSIVE STEEL CASTING

The mechanical parts are of considerable interest, having been designed in detail by the engineers of the railway to meet the exacting service conditions of the celebrated Elkhorn grade, which are unsurpassed in this country, if not in the world.

The construction of the new locomotives is fundamentally the same as the present ones, the system of drive being that of motors geared to jackshafts and connected to driving wheels by side rods. In the new locomotives, however, the four main driving axles form one rigid wheelbase, with continuous side frames from end to end of unit. The cab structure is carried on and rigidly connected to the side frames and cross-tie castings. This differs from the present locomotive, each unit of which has a cab structure supported on a number of springs and sliding bearings, carried on two main trucks, each having two main driving axles and one guiding truck axle, the two main trucks being connected by a Mallet hinge.

The new arrangement follows closely that of the Mikado type of steam locomotive, and also has a similar type of spring equalization.

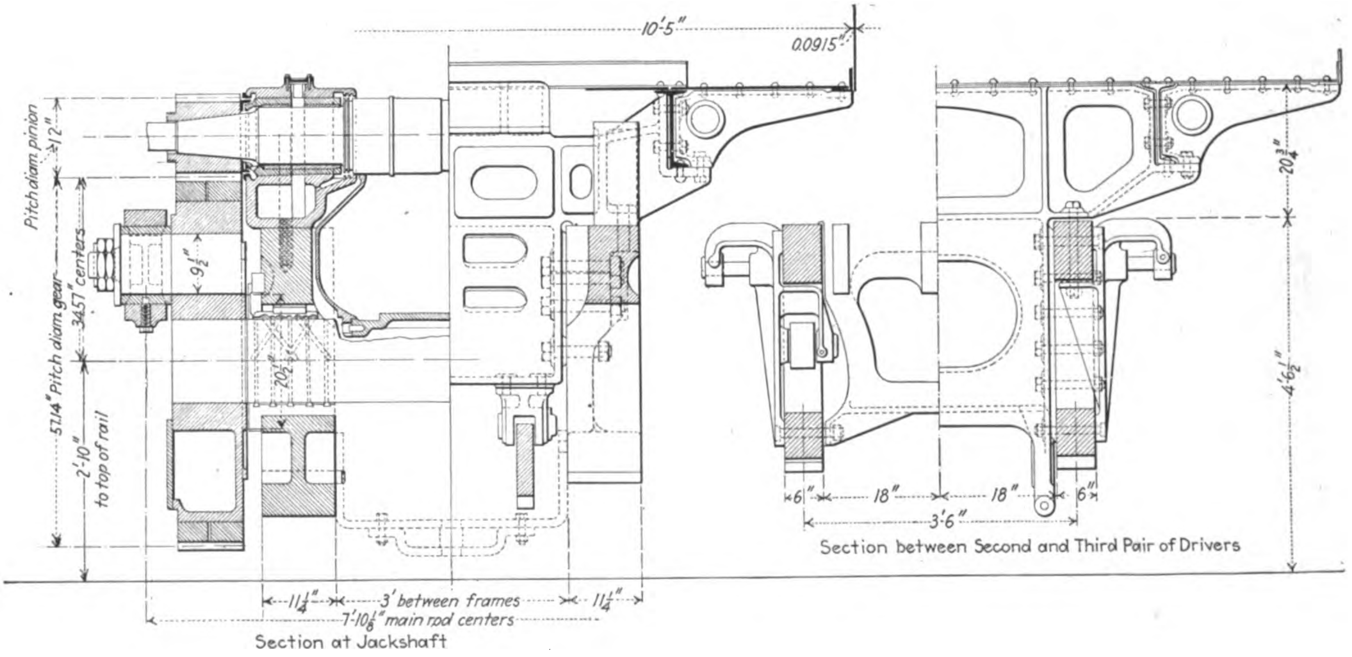
Side frames are to be vanadium steel castings connected by cross-tie castings which also serve to support the heavier parts of the electrical apparatus in the cab.

An interesting feature of the mechanical parts is the method employed for supporting the jackshafts. For ease in removal of jackshafts, which carry a gear at each end, these are carried on heavy bronze bearings, which are split vertically and rest in heavy steel castings known as "jackshaft cellars." These cellars are set in pedestal ways in the side frames and are inserted from below, in similar fashion to a journal box in its pedestal ways, except that the jackshaft cellar and the pedestals are very accurately fitted and the cellar is built with extensions at the bottom which act as a tie bar, being bolted to the side frames. This makes the cellar practically an integral part of the side frame, and at the same time provides a ready means of removal of the jackshaft. It is the same arrangement that has proved very satisfactory on the present locomotives.

The spring suspension system is the same as that in successful use on steam Mikado steam locomotives, the front guiding truck being side equalized with the two adjacent drivers and the rear truck cross equalized with the other two drivers, thus forming a three-point suspension.

The 1,000-hp. motors will, as suggested above, be arranged either for a four-pole connection, corresponding to a speed of 14 m.p.h., or an eight-pole connection, corresponding to a speed of 28 m.p.h. Each motor will have forced ventilation supplied through air ducts from individual motor-driven blower sets.

The motors are mounted on the locomotive framing in an interesting manner. The stator frame is cast with horizontal brackets running the full width of the motor.



Section at Jackshaft

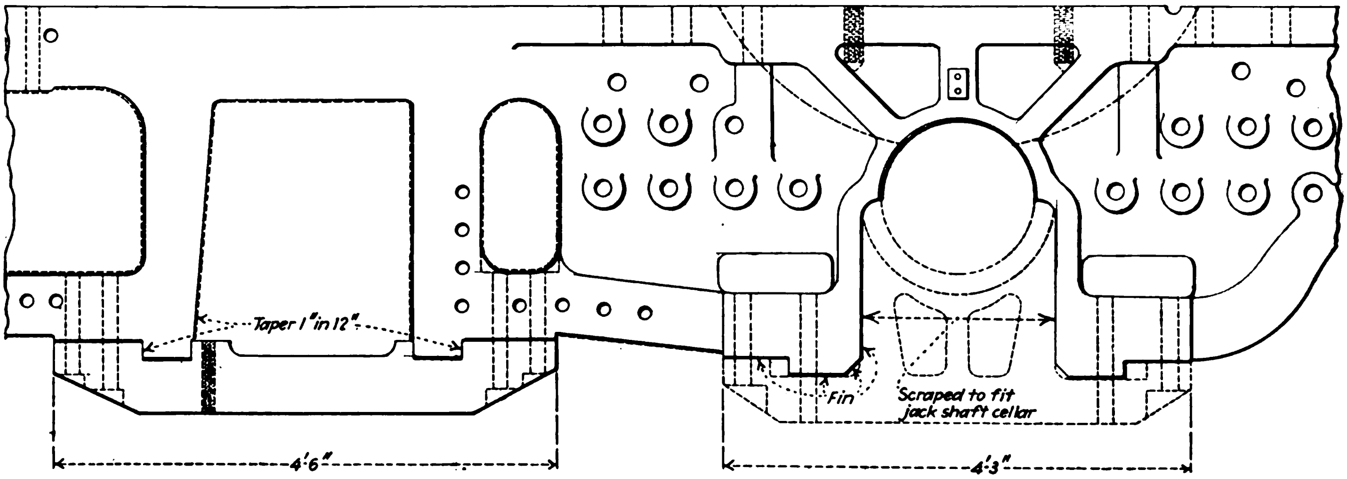
Section between Second and Third Pair of Drivers

POINTS. THESE ILLUSTRATE THE RUGGEDNESS OF THE CONSTRUCTION

These rest on heavy steel cross-tie castings connected to the main side frames. The weight of the stator is thus carried on horizontal planed surfaces which can readily be trued up in relation to the centers of jackshaft, rotor shaft and driving axles. The rotor is carried independently of the stator on bearings which rest in separate housings mounted on and secured to the main side frames, the proper relation of the stator and the rotor being maintained by accurate fitting of the bearing surfaces.

The collectors of the rotor motor will be mounted on the motor shaft outside the pinions, one three-ring collector at each end of the shaft. The leads from the collector to the rotor winding will be carried through the hollow motor shaft, well insulated and protected from abrasion. Means will be provided for removing the collectors without disturbing the leads in the shaft. This construction differs from the earlier machines, but it was used in the Pennsylvania locomotive already referred to.

The pinions will be made from individually forged steel blanks with twenty-eight machine-cut spur teeth, 1¾ diametrical pitch, 20 in. total face per jackshaft. The rims of the flexible gears will be made from individually forged steel blanks with 100 machine-cut spur teeth. These will be mounted on cast-steel centers with flexible elements interposed between the rims and the centers. The center will carry a wristpin and the necessary amount of counterbalance weight. The pinions and gear rims will be heat-treated.



THIS "JACKSHAFT-BEARING CELLAR" IN NO WAY WEAKENS THE SIDE FRAME

CONVERTER STARTING MOTOR WILL ALSO DO DUTY AS EXCITER

The phase converter will be a rotating machine with a two-phase wound stator and a wound rotor. One stator phase will be fed from the transformer and a proportional voltage will be generated in the other stator phase approximately 90 deg. electrically displaced from the transformer voltage. One terminal of this generating phase will be connected to a mid-point of the transformer and the other end to the one phase of the main rotor circuit. The other two motor leads will be connected to loads at the two ends of the main transformer secondary, resulting in a Scott connection to give three-phase power to the main motors.

This phase converter will be of the synchronous type, as already stated, which permits the transformation of power at high power factor. This means that the converter will be separately excited, the exciter being the same machine which serves as a starting motor for the converter.

This auxiliary machine will be a single-phase series-type commutator motor, mounted on the phase-converter shaft to bring the phase-converter rotor up to synchronous speed, after which this commutator machine will be reconnected as a direct-current exciter, separately excited from the motor-generator set to excite the rotor windings of the phase converter. The rotor, of course, will have two slip rings for supplying a starting current to the rotor windings.

OIL-COOLED TRANSFORMERS ADOPTED TO SECURE EXCELLENCE OF INSULATION

The transformer for each half unit will be of the shell type, oil insulated, forced cooled, built for mounting in the cab of the locomotive. This differs from the earlier machines, which had air-blast transformers. The extra weight was considered offset in the new units in view of the better insulation. An air-blast type transformer preventive coil will be provided to compensate for 15 per cent drop in voltage during acceleration and to minimize voltage unbalance during acceleration and regeneration. This will be of the same general construction as the main transformer.

A centrifugal pump will be used to circulate the transformer oil through an external radiator, and a blower will force air through the radiator in sufficient quantity to enable the transformer to perform its specified service. The pump and blower will be driven by a common motor, which will be forced ventilated by air taken from the blower.

A steel-plate electrode will be provided in the liquid rheostat for each phase of each motor. The electrodes will be rigidly supported through porcelain insulators and separated at the lower end by slate barriers. Steel ground plates will be interposed between the electrodes above the slate barriers, and in effect will form a separate compartment for each electrode. The electrodes for one motor will be removable as a unit. The electrolyte will be circulated by a motor-driven centrifugal pump, the motor being of the ball-bearing squirrel-cage induction type, arranged to start polyphase and run single-phase. In the cab the pump will supply electrolyte from a common storage tank, insuring that all electrodes of that cab are immersed in electrolyte of the same temperature and density.

A cooling tower for the electrolyte will be provided, consisting of a series of trays over which the electrolyte will flow in a thin sheet, while cooling air is circulated over the surface. The height of electrolyte around the electrodes will be controlled by a motor-operated overflow valve.

The control will involve the use of two types of switches, one with its individual piston and cylinder for each switch, the other in which several switches are operated collectively through cams mounted on a common shaft.

Each master controller will be provided with a speed lever, an accelerating lever and a reverse lever, with the usual mechanical interlocking to prevent false operation. The accelerating lever will be used to raise and lower the overflow valves in the liquid rheostat and thus control the speed and tractive effort.

Unit-type electrically controlled and pneumatically operated switches will be used for transformer-secondary switches, phase-converter switches and motor-overload and reversing switches, while the switch group for pole changeovers and motor-secondary short-circuiting switches will be of the cam type, electrically controlled and pneumatically operated.

An auxiliary controller will be provided with levers to control the phase converter and to set the transformer switches for running or regenerating. It will also include means for raising and lowering the pantographs; and for controlling the operation of the liquid rheostat.

HOW OPERATING RELIABILITY WILL BE SAFEGUARDED

Protective features furnished will include a time-element overload relay, arranged to trip the oil circuit breaker in case of sustained short circuit on the locomotive. Overload relays connected in two of the phases of each motor will be arranged to open the main motor switches on overload. Maximum-level relays, operated by electrolytic interlocks, to limit the height of liquid in the rheostat tanks to the proper points will prevent the motor secondary from short-circuiting switches from closing except when the liquid is at the maximum level. Contact on a drum mechanically connected to the overflow valve will prevent the motor line switches from closing on either the 14-m.p.h. or the 28-m.p.h. connection unless the overflow valves are at the desired height. A no-voltage line relay will be provided to open up circuits necessary for protection of the apparatus and interruption of power to the locomotive. The pole-changeover cam-type switches will be interlocked with the main motor switches so that the circuits will be always made or broken by the main motor switches.

Swedish Electrification Deferred

In its "Trade and Economic Review" for 1921, just published, the United States Department of Commerce analyzes the condition of the Swedish railways, stating that the financial depression was too serious to permit the completing of the electrification of the main line from Goteborg to Stockholm, the expense of which would have meant a deficit. The electrification of the Kiruna-Svarton line, however, is being carried on, its completion being expected during the present year. As a whole the State Railways were prosperous in 1921, a profit of more than $6,000,000 having been made, as compared with somewhat over $1,620,000 the year before. The private railways ran at a loss.

Letters to the Editors

Noiselessness in Special Trackwork

WILLIAM WHARTON JR., & CO., INC.

NEW YORK, N. Y., Dec. 26, 1922.

To the Editors:

In the issue of the *Electric Railway Journal* for Dec. 16, pages 944 and 945, appears an article describing two Balkwill track crossings furnished by this company to the Cleveland Railway. In the article the following statement is made: "The Balkwill crossing, of which noiselessness is but one feature . . ."

From the way in which this statement is worded it might be inferred that the noiseless feature can be secured only in the Balkwill crossing. The fact is, of course, that the flange-bearing throughout the crossing which constitutes the noiseless feature can be incorporated in practically any type of crossing, whether solid manganese steel or other steel, or T-rail built-up-type with filler or girder-rail crossing. The noiseless feature was incorporated in crossings and other special parts of layouts made by this company for a number of years, particularly in work made for the Kansas City Railways.

GEORGE R. LYMAN.

[NOTE—The sentence quoted by Mr. Lyman was inserted to point out that, while the Balkwill crossing, with the flange-bearing feature, was selected for the particular locations in Cleveland mentioned on account of their noiselessness, after all the unique feature of this type of crossing is its articulation. It was not intended to imply that the flange-bearing feature was unique, as flange-bearing special trackwork is well established in general practice.—EDITORS.]

Thinks Fault Lies Rather with High Supertaxes

NEW YORK, Dec. 27, 1922.

To the Editors:

I note with interest the editorial in your issue of Dec. 23 with the caption "Discontinuance of Tax-Exempt Issues a Benefit to All." The views expressed in your editorial support the recent resolution of the American Electric Railway Association and coincide with those reported as the views of the present Federal administration, but there are always two sides to every question, and with all respect to your own attitude and to the prominence of those who hold the same views, it seems to me such views are based on a superficial consideration of the subject.

We have always had tax-exempt issues and until a comparatively recent date they have never come in for much adverse criticism. They have always commanded a market at a materially lower rate of interest than competing non-exempt securities, yet there has always been a sufficient demand for the latter to furnish industry as much capital as it needed. There is no substantial, if any, difference between the tax-exempt securities of today which came in for so much criticism and those of former days which were free from such criticism, and therefore it seems to me to be jumping at a conclusion to lay the blame for the existing condition on the tax-exempt securities and to claim that they are put out on basically wrong principles. Rather let us inquire what has happened in other directions to give rise to the difficulties which now exist and see if we are not shooting at the wrong target in condemning the tax exempts.

To my mind the facts are fairly obvious, i.e., with mistaken zeal to extract an unfair, unjust and a wholly unreasonable income tax from men of large means, our legislators have enacted into law a super-tax schedule which puts such heavy taxes on this class of citizens as to be nothing short of ridiculous. The fact that this schedule is so manifestly unjust has had no effect on Congress because the number of very wealthy men is comparatively small. They cannot, therefore, deposit many votes, and owing to the fact that all of us are more or less jealous of those who are better off than we are these same wealthy citizens get very little sympathy from any one else. If press reports are to be credited, the income taxes received by the United States from this very wealthy class are diminishing from year to year, a condition doubtless brought about because our wealthy men are rapidly learning how to deal with the situation so as to comply with the law and escape being robbed. Of course one means to do this is to invest in tax-exempt securities, and the American Electric Railway Association has pointed out that this tendency has reached such proportions as to withdraw large amounts of capital otherwise available for industry and to bury it in comparatively dead projects; that is to say, dead in so far as they contribute to the progressive, constructive up-building of our industries. It would seem to me clear that the natural cure for this condition is not to do away with tax-exempt securities, which serve a very useful purpose, but to correct the obviously unwise and unjust schedule of super taxes, which, as is reported, are yielding the government a steadily decreasing revenue, and by so doing remove the cause of the trouble instead of trying to stop the effect.

It has been frequently claimed that the great mass of the people are suffering by having to pay taxes to take the place of those which ought to be collected from the wealthy class were they not permitted to invest their money in tax-exempt securities. But I have never yet seen attention called to the fact that if tax exempts were prohibited every bond hereafter issued by a municipality or state or the nation would have to pay a considerably higher rate of interest and therefore that the so-called common people would likewise have to pay a correspondingly greater amount in taxes to cover such greater interest, and to pay it not only on the securities now bought by the wealthy people but also on the very large volume of the same securities which are bought by those who do not purchase them for the sake of saving income tax payments but on account of their safety as an investment.

I do not own one dollar's worth of tax-exempt securities and therefore am not personally interested in saving myself taxes by having them retained, but I would like for once to see the American people courageous enough to face the facts and to apply a remedy where a remedy belongs, and I would like to see a full and free statement in the public prints, not a continued harping on one side and ignoring of an obvious weight of evidence on the other. CALVERT TOWNLEY.

News of the Associations

The Pass in Tacoma*

After Only Fifteen Weeks the Tacoma Railway & Power Company Is Selling 11,000 Passes Weekly in a City of 100,000 Population—Riding Up 20 per Cent and Car-Hours 2.7 per Cent

BY C. V. ALLEN
Publicity Manager Tacoma Railway & Power Company

STREET RAILWAYS all over the United States have been in a serious financial predicament in the last ten years for well recognized reasons. The Tacoma Railway & Power Company, while more fortunate than some other companies in that it had a 10-cent fare, nevertheless was faced with serious financial difficulties. Heavy pressure was being brought to force our fares to 5 cents, jitneys were to be started in competition with us, and the privately owned automobile was cutting into our earnings deeply. The street railway pass seems to us to be a ray of light at this time. While it has been in effect here but fifteen weeks, and we are really novices in the game, we think that it has given us the first assurance we have had in many years of financial success.

A large part of the credit for revising this pass from European models and making it workable in the United States is due to Walter Jackson, an independent traction engineer of Mount Vernon, N. Y.

Tacoma is the sixth city in the United States to install the pass and is really the second large city to do so. Tacoma's population today is about an even 100,000. The form of pass used on our lines here follows closely that used in other cities where it is used. The face of the pass carries the following wording:

> Pass bearer on cars of these companies within the one-fare limits of the city of Tacoma within the days shown on the face of this pass. Pass is to be shown car operator or conductor and is good for only one passenger and shall be in passenger's possession while on car.

This pass is absolutely transferable. The holder can loan the pass to his wife, children, or to anyone he may desire and there is absolutely no question asked as to his right to use the same. The pass entitles the holder to ride upon any cars operating within the city limits, at any time, for any distance, for a block or for a mile. The pass is good from the first car Monday morning to the last car on Sunday night.

The convenience and economy of the pass can be shown by the uses to which it is put in Tacoma. The wholesale dealers who have in the past paid the street car fares of their city salesmen at a cost to them of 50 cents to $2 a day, now furnish them with the $1 pass, which is good for all riding they can possibly do during the entire week. Banks buy a number of them and the messengers use them as they go on their errands and return them to the office when they are through. Men and women working downtown who formerly paid 35 to 50 cents for their lunches now use the pass to go home and are able to save the price of it in approximately three days. This transferable quality of the pass has made it most popular.

TRANSFERS CUT IN HALF

Another advantage of the pass is the doing away with transfers. We issued weekly between 110,000 and 120,000 transfers. Every one of those transfers represents a potential row. Our trainmen have more arguments over transfers than anything else in connection with our business. The pass to date has practically cut the number of transfers issued in half.

The pass is really the first opportunity street railways have had to merchandise their transportation. Under the old fare system, a patron approaching a car was greeted with this little sign on the side of the entrance, "Have your exact fare ready." Here is a command. There is nothing pleasant about that little order. As he steps on the platform he glances up and sees the sign, "Ask for your transfer when you pay your fare." If he omits to do so, he will either have to go back and plead with the conductor to give him a transfer, in violation of orders, or else pay another fare on the next car. As the passenger takes his seat, he is greeted with the sign on the end of the car, "Warning! Not more than thirty days and not more than $100 fine for the abuse of the transfer." That little sign isn't particularly encouraging or pleasing to the patron. He looks at his transfer, and on it is the statement that it must be used for the next connecting car. If he fails to do so, the inference is that he will have to pay another fare. It also states that the transfer must be made at a certain definite point. If he moves one block either way from the point of transfer, his transfer is rendered invalid.

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*Abstract of paper read before Building Owners and Managers' Convention at Tacoma, November, 1922.

All of these things make riding unpleasant and discourage it in every way. The pass absolutely eliminates all these annoying regulations. The passenger is free to get on or off without any question of any kind.

MORE PASSES—FEWER JITNEYS

The people of Tacoma have shown every evidence of liking the pass. The first week we sold 7,000 passes. Today, we are selling 11,000, which shows an average increase of approximately 250 per week over each preceding week. In order to do this, we have had not only to resell every purchaser that bought one the previous week, but we had to sell 250 additional. The fact that the sales have fallen off only in one week, and that the week of Labor Day when Monday was a holiday, speaks well for the popularity of the pass in Tacoma.

Just prior to the installation of the pass system there were some forty-eight jitney buses licensed to operate in Tacoma. Today, the latest reports we have show about fifteen operating and the number gradually falling off each week.

THEATERS BOOST NOW—ALSO THE MERCHANTS

Just prior to the installation of the pass the leading theaters in the city carried slides urging the public to support the demand for 5-cent fare. The slides had statements something like this:

> Let's all pull together for a 5-cent fare. A 5-cent fare will help business. Get behind the 5-cent fare movement.

We approached the theaters and explained to them our plan to put in the pass system. The idea of the pass appealed to the theaters. They advised us that they would drop the slides urging the 5-cent fare and would advertise our pass system. This they have done ever since.

The leading retail stores in the city have seen the beneficial effect of the pass in getting people to move and have joined with us in our advertising campaign. They have put on special Monday sales, using much space in the Sunday papers, and have suggested at the top of the "ad" the use of the pass, or recommended the purchase of one. The idea back of it is this: With an attractive Monday sale they could probably draw the women downtown for those sales. We are interested in their coming down on Monday for we have a much better chance to sell them a pass if they come downtown on Monday for they would have the rest of the week to use it. The stores also would be benefited, because after the women have purchased the pass, they would probably go down to any other sale the stores might have during the rest of the week.

One of the leading banks in the city is now planning to put out a passholder which is to be given away without charge—a small leather case bearing the name of the bank.

NIGHT SCHOOL ATTENDANCE UP 50 PER CENT—ADVERTISING METHODS

The night schools in Tacoma have advised us that their business has increased nearly 50 per cent since the pass was put in. They, too, have given us considerable publicity in their advertising. We are able to reciprocate in our advertising, and this in itself creates good will.

We are using posters in the windows of our cars. These posters and their color are changed every week, and may be read from the street or from the inside of the car. On the outside is a short, snappy statement like this, "Save Gas and Shoe Leather with a $1 Weekly Pass." We elaborate a little on this same idea on the side of the card to be read by the passenger in the car. In our opinion this form of advertising is the most effective we've done.

We have placed billboards at the most important automobile and street car traffic arteries with the wording, "Just Park Your Pass in Your Pocket." This has been very striking advertising and very effective as well.

CHEATING ON THE PASS IS INCONSIDERABLE

An interesting feature of the pass about which we are often asked is the possibility of beating the company—cheating on the pass. Youngstown found some buyers were splitting their pass with a sharp instrument—one man taking half of the pass and one the other. This difficulty was easily eliminated by printing the pass on but one side. Another trick is that of cutting the pass in two pieces—the man getting on the car reaching in his vest pocket and pulling the pass out part way, the conductor taking it for granted that he has the whole pass. This is being eliminated by instructing our men to have the passholder show his complete pass. It is done by a card in the vestibule with the wording "The Best Way," a hand being shown holding the pass to display it fully. You will notice there is no command or order in the thing, merely a suggestion.

Another trick worked is that of passing the pass out the window where a considerable number of people get on the car—take for instance at heavy loading places—one man can board the car, go through and take a seat and pass the card out the window to a friend, who in turn boards the car.

We feel, however, that the loss through these dishonest channels is practically negligible; and rather than cause any unpleasantness or arguments with anyone over the pass, no regulation of any kind will be made as to this practice.

INDUSTRIAL CONDITIONS STILL BELOW PAR

Most street railway men will probably be interested in the financial working out of the pass. Our report issued for the fourteenth consecutive week shows that the average rides taken by passholders per week is nearly twenty-seven. This is an average of nearly four car rides per day, which gives the holder of the pass his car rides at approximately 3.75 cents each.

The pass is, of course, an equivalent to a lower fare, and it is expected that our earnings will be somewhat under normal. The first few weeks of the pass worried us—our gross earnings dropped to approximately 20 per cent below the normal earnings of a year ago at this time. However, as the pass sales increased this drop in earnings became less and less until under this report (fourteenth week) our earnings have reached within 7.7 per cent of normal. In other words, the curve of our earnings is gradually drawing toward the line of normal earnings. We anticipate that with the entire elimination of the jitney bus, and the resumption of full working crews at the Milwaukee and Northern Pacific shops, our gross earnings will reach normal and undoubtedly go above our normal earnings line.

THEY DO COME BACK TO THE TROLLEY LINES

I think the must interesting point about the pass is the increase in riding. We carry normally at this time of year about 480,000 passengers per week. The pass has brought up our riding nearly 20 per cent, the week of this report showing 565,413 passengers carried. This increase in riding is one of the most healthful features inherent in the pass.

Also, it is shown by the report that the riding is not during peak loads. The total increase in car-hours to carry this 100,000 additional people was but 2.7 per cent. In other words, the most of the increased riding is during periods when our cars would be running empty, and this increase in traffic is costing us practically no more in additional service.

Therefore, taking every phase of the pass, we feel more pleased with it each week. We think the pass is going to be a permanent institution and that it has put us around the corner.

Annual Meeting of American Engineering Council

THE American Engineering Council of the Federated American Engineering Societies will hold its annual meeting in Washington, D. C., on Jan. 11 and 12. The meeting will consider problems of national interest, including the report of the committee on work periods in continuous industries, of which the electric railway industry is one. Dean Mortimer E. Cooley, University of Michigan, president of the federation, will preside.

The climax of the meeting will be a reception to Prince Gelasio Gaetani, Italian Ambassador to Washington, who recently arrived in this country. The new diplomat is an engineer by profession.

Rousing Meeting of Tennessee Utility Men

THE establishment of good public relations, the significance and importance of regulation by utility commissions and the value to the utility industry of the Tenessee Public Service Information Bureau were the principal themes occupying the attention of the first public utility conference held in Tennessee, when more than one hundred operators gathered at the State University in Knoxville on Dec. 14. The meeting was called by Percy Warner, chairman of the Tennessee Public Service Association.

One of the principal addresses of the day was by Julian H. Campbell, chairman Tennessee Railroad and Public Utilities Commission. In speaking on "The Public's Interest in the Public Utilities Commission" Chairman Campbell defined the duties of the commission by telling the utility men that the orders of the regulating body must inspire the confidence of the public and still provide an incentive to the utility so that the utility may better its conditions and cheapen its costs.

Another address of great importance to the utility men was that by Lovick P. Miles of Memphis, general counsel Memphis Street Railway. He declared that the average street car rider or water, gas or electric customer seldom pauses to reflect on the great value of these services. He related the history of the regulation of utilities and emphasized the fact that the plan for a state tribunal with complete jurisdiction is now generally regarded as the best means to compel the utilities and the public to discharge their obligations to each other.

In welcoming the utility men to the University of Tennessee, President H. A. Morgan said: "It is a fact that must be admitted that people are not fair. They do not appreciate the various problems you confront and we of the university are happy to have you here as a move to bring about a better understanding."

The work of the Tennessee Public Service Information Bureau, founded six months ago by the utilities of the State, was explained by Ross Murphy, the director, who reviewed the conduct of the bureau and expressed appreciation of the welcome it had received throughout the State.

Engineers Draw Up Code of Ethics

A JOINT committee representing several national engineering societies has prepared a code of ethics which has been adopted by the A.S.M.E. and will presumably be adopted shortly by other leading societies. The text of the code is as follows:

Engineering work has become an increasingly important factor in the progress of civilization and in the welfare of the community. The engineering profession is held responsible for the planning, construction and operation of such work, and is entitled to the position and authority which will enable it to discharge this responsibility and to render effective service to humanity.

That the dignity of their chosen profession may be maintained, it is the duty of all engineers to conduct themselves according to the principles of the following Code of Ethics:

1. The engineer will carry on his professional work in a spirit of fairness to employees and contractors, fidelity to clients and employers, loyalty to his country and devotion to high ideals of courtesy and personal honor.
2. He will refrain from associating himself with, or allowing the use of his name by, an enterprise of questionable character.
3. He will advertise only in a dignified manner, being careful to avoid misleading statements.
4. He will regard as confidential any information obtained by him as to the business affairs and technical methods or processes of a client or employer.
5. He will inform a client or employer of any business connections, interest or affiliations which might influence his judgment or impair the disinterested quality of his services.
6. He will refrain from using any improper or questionable methods of soliciting professional work and will decline to pay or to accept commissions for securing such work.
7. He will accept compensation, financial or otherwise, for a particular service, from one source only, except with the full knowledge and consent of all interested parties.
8. He will not use unfair means to win professional advancement or to injure the chances of another engineer to secure and hold employment.
9. He will co-operate in upbuilding the engineering profession by exchanging general information and experience with his fellow engineers and students of engineering, and also by contributing to work of engineering societies, schools of applied science and the technical press.
10. He will interest himself in the public welfare, in behalf of which he will be ready to apply his special knowledge, skill and training for the use and benefit of mankind.

New York Association's Midwinter Meeting

THE executive committee of the New York Electric Railway Association has selected Thursday, Jan. 25, for the twenty-sixth midwinter meeting. This will be held in New York City at the Hotel Commodore.

Already the acceptances to invitations to address the gathering which have been received by the executive committee are sufficient to insure a valuable and interesting program, the details of which will be announced in a few days.

American Association News

Construction and Maintenance of Highways

A MEETING was held at the association headquarters in New York on Dec. 15 of the committee of the American Association on construction and maintenance of highways for motor vehicles. This committee was appointed last summer to collect data on this subject because of the seeming lack of authoritative information. There was not sufficient time to prepare a report for submission at the Chicago convention, but the committee sent out a questionnaire and is collecting records from various sources. The meeting on Dec. 15 was to go over the material received. Replies to the questionnaire were considered satisfactory, but those replies lacking in essential data will be followed up by correspondence and other sources of information on the subject will be followed up. Those in attendance were W. J. Harvie (chairman), Syracuse, N. Y.; C. F. Cheney, Des Moines, Iowa, and E. P. Roundey, Utica, N. Y.

"One-Man Cars Decrease Accidents"

THE Information Bureau of the association has sent out some information in "blanket" form giving a list of some of the electric railways using one-man cars, opinions and statistics in regard to the accident record of these cars as compared with two-men cars, and some typical safety "ads," usable in a one-man car campaign.

Connecticut Company Section Elects Officers

AT THE ANNUAL and forty-fourth monthly meeting of the Connecticut Company section, held in Waterbury on Dec. 13, the following were elected to the positions named: President, S. W. Baldwin; vice-president, E. T. Chapman; secretary, C. K. Savery; treasurer, George H. Crosson; director for three years, J. B. Potter.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

May Offer Traffic Proposal

Companies Hold Conferences Which May Lead to Operation of Subway—Benefit to City and Railways

Tentative discussions which may lead to a proposition to the Rapid Transit Commission of Cincinnati, Ohio, from the Ohio Traction Company and the Cincinnati & Dayton Traction Company for the use of the rapid transit subway have been held recently between the interested persons, according to statements made by directors of the Cincinnati & Dayton Traction Company. The proposition involves bringing passengers from the Miami and Millcreek Valleys into the city by the subway.

Nothing definite has been done and nothing can be done until action is taken by the Ohio State Supreme Court regarding litigation over a bondholders' lien, in which decisions have been rendered by two lower courts in favor of the committee of bondholders of the two traction companies.

Leo J. Van Lahr, chairman of the bondholders' committee, said that the committee expects the decision of the Supreme Court to be handed down within a short time, and if the decision is favorable the committee will be in a position to make a proposition to the Rapid Transit Commission.

The Cincinnati & Dayton Traction Company would be a great feeder to the retail district of Cincinnati. Acquiring use of the subway, the traction company could bring into the city buyers from the Miami and Millcreek Valley sections up as far as Dayton who now do not patronize the Cincinnati market because of inadequate transportation facilities.

Mr. Van Lahr said that even if a transfer were necessary the traction company could do this at small cost, land its passengers at the junction of the rapid transit loop and Spring Grove Avenue and turn them over to shuttle train service to be taken into the heart of the shopping district. There would be a saving of at least ten minutes by this arrangement.

Martin Ackerman, general manager of the Cincinnati & Dayton Traction Company, said that the company is not trying to obtain the right to operate the Cincinnati subway, but merely trying to negotiate for authority to operate its cars through the underground railway from its present terminus at Spring Grove Avenue to the central section of the city.

Mr. Ackerman said that he had been in conference with the engineering department and expected to see the Rapid Transit Commissioners shortly. He said he believed that such an arrangement as is contemplated will be mutually beneficial to the railway company and the city of Cincinnati.

Recently Mr. Ackerman made inquiry at the City Hall as to whether or not the subway was to be abandoned. He was told unofficially at the time that the commission was not disposed to abandon the proposition even temporarily, but that construction would continue as long as a dollar of the $600,000 voted by the people for the purpose remains.

Mr. Ackerman also inquired as to whether the cars of his company would be permitted to operate in the loop. He was told that to do so would defeat rapid transit. Special cars will be operated in the loop and he was informed the passengers from the connecting lines would have to transfer to the loop. The subway likely will be completed to Spring Grove Avenue within a year.

The traction company operating the loop, he was told, would have to supply the current as well as lay the rails and contract for the rolling stock.

Utilities in Ohio Grow in 1922

The expansion of Ohio's utilities during 1922 is made the subject of an instructive article in the Dec. 16 issue of *Finance & Industry*. The writer, Benjamin E. Ling, director of the Ohio Commission on Public Utility Information, illustrates in tabular form the general business revival in Ohio. Referring to the securities authorized for issuance by the Public Utilities Commission, he shows that for refunding and reorganization purposes the electric railways were authorized by the commission to issue in securities $25,170,192 and for additions and betterments $8,758,650.

Will Consider Further Deferment of Tax

Mayor George P. Carrel of Cincinnati, Ohio, has appointed A. E. Anderson, vice-president of the Procter & Gamble Company; Vice-Mayor Freene Morris and Maurice J. Freiberg, Cincinnati financier, members of a sub-committee of the Citizens' Traction Committee to consider the advisability of recommending to the City Council a further deferment of the Cincinnati Traction Company's franchise tax. The limit set by the Council last year was Jan. 1, 1923. Unless the Council again defers the payment, an increase in fares soon after the first of the year is anticipated since the receipts of the company are not sufficient to pay all operating costs and the franchise tax as well. Another committee was named to consider the status of the franchise of the traction company to ascertain if any act has been committed that would justify forfeiture proceedings. Both sub-committees were suggested in resolutions adopted by the general committee at its meeting on Dec. 14.

Order Annulled

Court Over-rules Decision of Commission Ordering Construction of Joint Union Passenger Terminal

The California State Supreme Court on Dec. 19 annulled the order of the State Railroad Commission directing the steam road and interurban railway lines entering Los Angeles to join in the construction of a union passenger terminal on the old Plaza. The decision halts development under way in Los Angeles, a scheme whereby railroad passenger traffic would be concentrated for the public convenience, grade crossings eliminated and the city possess a terminal similar to those of large Eastern cities.

It was the opinion of the State Supreme Court that the Railroad Commission had exceeded its jurisdiction in ordering the project. This was the contention of railroad officials in Los Angeles when they appealed the commission's order in January, 1922. The commission issued its order on April 26, 1921.

The railroads insisted that the only governing body with authority to order the construction of a union passenger terminal depot was the Interstate Commerce Commission. The court upheld this view, ruling as follows:

> We arrive at the conclusion that full power and authority over the matter of union terminal depot facilities of the railroads largely engaged in interstate commerce have been vested in the Interstate Commerce Commission and that the State commission has been divested of this power.

The railroads affected by the order were the Southern Pacific Lines, Union Pacific System, Atchison, Topeka & Santa Fé Railway and the Pacific Electric Railway, each of which now has a separate station.

The Railroad Commission's order called for plans for the new union station to be filed with that body within six months; also, the plans called for a gradual elimination of grade crossings and other features of a comprehensive scheme for transportation development meeting present, as well as future, requirements. The commission laid out five years as the period needed to complete its plan. The supervision and direction of the construction of the union station were to have been done by a committee composed of two men appointed by the city of Los Angeles and two by each of the railroads, a disinterested party to be chosen as chairman.

The railways at once announced they would fight the commission's order, and soon after petitioned the Supreme Court to order the issuance of a writ of review of the case. The court on Jan. 5, 1922, ordered the Railroad Commission to make a return of all of its proceedings and the case since has been pending.

The campaign for a union passenger terminal in Los Angeles began in 1911, following a series of accidents which emphasized danger of grade crossings. Several associations petitioned the State Railroad Commission for relief by ordering the abolition of the grade crossings, but the commission feared that it lacked proper jurisdiction in this direction and ruled against itself. The matter was taken before the Supreme Court, which then held that the commission had full authority to cope with the situation.

The feature of the commission's order was made to include the elimination of grade crossings reaching as far inland as Pasadena and embraced upward of 150 grade crossings in and near Los Angeles. The railroads entered no objection to this feature of the order, but they did oppose an order to construct a union station.

Since the Supreme Court has now seen fit to reverse its former decision, the city of Los Angeles contemplates asking the court to grant a rehearing on the terminal case. Also, the commission will make similar appeal to the courts, and if it fails the commission will appeal at once to the Interstate Commerce Commission for an order directing the Southern Pacific, Santa Fé, Union Pacific and Pacific Electric Railway lines to join in a union terminal. The decision does not affect the commission's right to order the abolition of grade crossings. The Interstate Commerce Commission will be asked by the commission to place the case at the head of its 1923 calendar, if an appeal to that body is found necessary. The State Railroad Commission is ready to place before the Federal commission a complete record of the case, including elaborate traffic studies made by the commission's engineers.

The Supreme Court's decision did not condemn the Plaza site for the proposed union terminal, but the decision was one that simply decided the State Railroad Commission had undertaken to avail itself of the Interstate Commerce Commission authority.

Agree on Scale of Sixty Cents

The long-threatened strike of the employees of the Gary & Southern traction line, running from Crown Point to Gary, Ind., was averted recently when the company heads and the unions reached a compromise agreement.

Several months ago when the company declared a reduction in wages, the men threatened to walk out. By an arrangement with the company officials and the Chambers of Commerce of the terminating cities the strike was averted through the three organizations agreeing to pay the scale in force until a wage agreement could be reached.

At the recent meeting of the officials of the traction line and the employees, the latter agreed to accept a wage scale of 60 cents an hour—a reduction of 6 cents an hour from the former scale.

An Attempt Made to Throw Out Brooks-Coleman Act

Agitation has been started to secure the abrogation of the Brooks-Coleman act passed at the 1921 legislative session in Minnesota. This act put street railways under control of the State Railroad & Warehouse Commission as to rates. While it has been defended as an able law, some radical elements are opposed to it. It is said that the abrogation of the law would probably nullify all the preliminary work that has been done to establish property valuations of the railways in Duluth, Minneapolis and St. Paul.

Business men in the Midway district of St. Paul, from which formerly there was a one-fare rate to the centers of either city, subject to transfer also, seek an amendment at the legislative session which opens in January to unify the trolley systems of the Twin Cities. Minneapolis aldermen will opose this change on the theory that the St. Paul system is kept up financially by the Minneapolis receipts. They believe the St. Paul City Railway should take care of itself. The St. Paul Association of Public and Business Affairs will ask a conference with Minneapolis business men on the subject.

Meanwhile the valuation proceedings hinge upon the final outcome of the suit by Minneapolis to get additional facts from the Twin City lines.

Wages Advanced in Louisville

The Louisville (Ky.) Railway has added $60,000 to its yearly wage outlay by announcing increases for 900 employees effective on Jan. 1. The new scale will be 34 cents for the first three months, 37 cents for the next nine months; after one year 40 cents and after two years 45 cents. The present rates are 33 cents for the first year, 35 cents for the second year, 37 cents the third, 39 cents the fourth, 41 cents the fifth and 43 cents after five years. The average pay of men for the new year will be $130 a month. Operators of safety cars will have a scale 3 cents higher than others. The announcement of the wage advance came from President Barnes in time to help make Christmas a "merry" one. Mr. Barnes said that the general committee of the Co-operative Welfare Association, representing employees, requested the increase in order to put wages on a basis with other crafts.

E. F. Kelley, secretary to President Barnes, in discussing the wage increase announced for the carmen, called attention to an editorial on the subject in the Louisville *Courier-Journal*. This editorial shows a real human understanding of things and the different feeling of the press today as regards the company and what it does. It read in part as follows:

> The New Year increase of wages is announced by the Louisville Railway early enough to make the carmen's Christmas brighter than it would have been in other circumstances.
>
> The public has an interest in the welfare of employees of a street railway system. Men sufficiently paid are in better humor than men poorly paid, and fit for better service than is rendered by employees who feel that they have ground for complaint.
>
> Sensible persons—and sensible persons are a majority—want to see the street railways that pass their doors do well enough to warrant their improvement and extension from time to time as the demands upon them increase, and they want to see the men on the cars, and the men employed elsewhere by the company, well provided and content.
>
> The advance of wages announced is not so large that every employee will feel that he is getting everything he deserves, but in no business would it be possible to draft the plan of an increase of pay that would meet every requirement of every employee.
>
> When the carmen received 16 cents an hour, or less, the fare was 5 cents. The single fare now is 7 cents, but checks are purchasable at 6 cents. The motorman whose pay is about three times what a motorman received in 1905 and more than twice what he received in 1912 cannot feel that he is left out of consideration by a soulless corporation which has procured an increase of fares.
>
> That this is true is pleasing to Louisvillians who make use of street cars, and who realize that greater efficiency, and more courtesy, may be expected of the carman who feels that he is making progress.

Employees Armed in Buffalo—Emergency for Bus Operation May Be Announced

Loyal employees of the International Railway who are now operating cars in Buffalo have been armed with revolvers because of the frequent attacks which are being made upon the cars and their crews by striking employees and their sympathizers. County Judge Thomas H. Noonan has issued permits to carry firearms to a large number of platform employees of the International.

In defending his own action, Judge Noonan said he believes the men are entitled to protection by firearms. He said that permits in each and every case are granted only when an official of the traction company vouches for the applicant.

Mayor Frank X. Schwab of Buffalo has threatened to declare the existence of an emergency authorizing the operation of buses in Buffalo on Jan. 1. Such a step was taken by the Mayor at the outset of the strike of the trainmen in the employ of the International Railway, July 1, when numbered permits were issued to bus drivers by officials of the city at the City Hall.

Notice has been served upon the International Railway that such a step will be taken unless street car service shows a material improvement before Jan. 1, 1923.

Five striking platform employees of the International are under arrest in Niagara Falls charged with interfering with the operation of railway lines by attacking local cars and their crews in Niagara Falls.

Apparently every effort is being made by the municipal authorities to harass the International Railway in its fight against union domination. It is announced by Mitten Management, Inc., which operates the local and interurban lines of the International, that the company now employs more platform men and shop workers than before the strike and that the strike for union recognition is now regarded as a dead issue by it.

Pass Abandonment Recommended in Youngstown

The street railway committee of City Council has recommended to Council and to the Youngstown Municipal Railway a rearrangement of rates of fare which would involve the discontinuance of the weekly pass, which has been used on the city lines since October, 1921.

The proposed rate of fare which has been referred to the company for consideration is 10 cents cash, eight tickets for 50 cents and free transfers.

The present rate of fare is 9 cents cash, six tickets for 50 cents, 1-cent charge for a transfer and the unlimited ride weekly pass, which sells for $1.25.

The company has not yet replied to the committee in regard to the proposal.

Improvements Depend Upon Outcome of Franchise

A. W. Harris and M. H. McLean of the Harris Trust & Savings Bank, Chicago, owners of the Des Moines (Ia.) City Railway, were in Des Moines recently inspecting the plant and in a public interview Mr. Harris announced that future extensions and improvements of the Des Moines plant were dependent very largely upon the outcome of the franchise suit which at that time was before the Iowa Supreme Court for consideration but has since been decided in favor of the company.

If the franchise is held valid by the high court Mr. Harris declared that the company would make extensive improvements. He directed attention to improvements now under way and which have been completed during the past few months. A number of lines have undergone extensive replacements, and service at the present time is the best that the city has ever known.

Public feeling toward the company has changed greatly in the last fourteen months. Now aside from the little "band of irreconcilables" in the praise of the service of the Des Moines City Railway and of its treatment of patrons.

General Manufacturing Department of G. E. Reorganized

In several announcements issued on Dec. 29 by Vice-President G. E. Emmons a reorganization of the general manufacturing department of the General Electric Company is proclaimed. This reorganization, which is effective on Jan. 1, 1923, includes the appointment of H. F. T. Erben, heretofore manager of the Schenectady Works, as vice chairman of the manufacturing committee and ranking a member of the general manufacturing staff.

The vacancy thus created in the position of manager of the Schenectady plant is to be filled by the advancement of Charles E. Eveleth, who has been serving since Sept. 1 as assistant works manager under Mr. Erben. Mr. Eveleth will become works manager. J. A. Smith will continue as general superintendent and in the absence of Mr. Eveleth will be in charge of the works.

The membership of the manufacturing committee and the appointment of a sub-committee, to be known as a committee on appropriations, is also announced. The general manufacturing department, of which Vice-President Emmons is in charge, will be as follows: H. F. T. Erben, vice-chairman of manufacturing committee and ranking member of the staff; J. T. Broderick, secretary of the manufacturing committee; L. G. Banker, general purchasing agent; M. C. Fitzgerald, manager of transportation department; W. C. Fish, manufacturing engineer; W. B. Curtiss, supervisor of production; G. S. Maxwell, supervisor of costs; E. Z. Steezer, supervisor of industrial relations.

Interurban Line Favors Substitution of Buses Under Present Conditions

If bus transportation can be provided at lower cost with equal advantages of traction car service, the Indiana, Columbus & Eastern Traction line will abandon its electric traction service and enter the motor bus field. This was the gist of a statement issued on Dec. 27 from the local headquarters of the company in Springfield, Ohio.

The traction company is one of the largest in the state and is a pioneer in electric railway development in Ohio. It was a part of the Ohio Electric Railway system until the latter was dissolved some months ago by order of the federal court. The company has established a bureau of motor transport which is now engaged in compiling statistical data on the operation of bus lines. This bureau is in charge of O. E. Minnick, assistant engineer.

In making public the company's statement of Dec. 27 Arthur V. Bland, head of the Department of Public Relations of the traction line, pointed out that bus lines fixed their own rates, that their roadbed was furnished without cost to them and that for this reason their expenses were lower than those of the railway. If this situation was to be continued, he added, the traction company desired to take advantage of it, "as it makes no difference to us whether we transport on rubber or steel."

$1,250,000 in Improvements

President B. J. Denman of the Tri-City Railway & Light Company has announced that improvements amounting to $1,250,000 would be made at the central station in Davenport, Iowa, operated by the People's Power Company and furnishing electrical energy for the tri-cities, Muscatine and scores of small towns and farms in that vicinity.

The installation of a triple generator and a 35,000-hp. steam trubine will constitute the major part of the improvement. The work will take eighteen months to complete. New boilers and auxiliary equipment, an addition to the present central station and other impovements will constitute part of the development.

This new equipment will increase the capacity of the plant approximately 40 per cent, Mr. Denman estimates. Plans for the installation are now being prepared by G. T. Shoemaker, engineer of the United Light & Railway Company.

The construction department of the United Light & Railways Company will have charge of the installation of the turbine and auxiliary equipment.

So rapidly has the demand for electrical power grown in the industries of the tri-cities during the past few years that the present plant will reach its capacity soon. In order to provide for the demands of the future the company has decided to increase its installation.

News Notes

Subway Plan Disapproved. — The Board of Estimate of New York City has rejected the plans of the Transit Commission for a $69,000,000 subway in Manhattan, which was to have been known as the Eighth Avenue-Amsterdam Avenue line. It was to extend from Chambers Street uptown to Overbrook Terrace and Fort Washington Avenue.

Notice Given of Indeterminate Permit.—The Winona Interurban Railway, Warsaw, Ind., has filed notice with the Indiana Public Service Commission of its intention to surrender local franchises and permits and operate under an indeterminate permit under the jurisdiction of the commission. The company holds franchises in four counties and six cities of Indiana.

Will Do Business in Texas.—Southwestern Gas & Electric Company, incorporated under the laws of Delaware, with home office in Texarkana, Ark., and headquarters at Texarkana, Tex., has been granted a permit to do business in Texas. The company is capitalized at $5,500,000 and W. L. Wood, Jr., Texarkana, Texas, is state agent. This company owns and operates the local railway lines in Texarkana.

Loop Plan Favored.—The City Plan Commission has made a report to the Camden, N. J., Common Council, favoring a loop plan of trolley service to be provided by the Public Service Railway in Camden and the Philadelphia Rapid Transit Company for the new Delaware River bridge. Cars from Philadelphia will cover the principal streets of Camden from the bridge plaza. The plans also touch transfer points.

Financial and Corporate

Arguments Rendered on Disclosing Disposition of Funds

The Minnesota State Supreme Court has under advisement the case of the appeal by the Twin City Rapid Transit Company from an order of the Hennepin County District Court for the company to disclose disposition of $227,000 deposited in Eastern banks. The city had obtained a writ of mandamus for the disclosure.

In arguments before the high court attorneys for the company and the city differed widely as to the scope of the new Brooks-Coleman act under which determination of street car rates is placed in the jurisdiction of the State Railroad & Warehouse Commission, based on valuations. Judge David Simpson, of counsel for the company, says the law does not give the city officials power to compel corporations to disclose business transactions not germane to valuation hearings. City Attorney Neil M. Cronin argued if the company can refuse to submit to particular transactions it can refuse to explain any expenditure, having designated that it is immaterial, and he held without this information the accurate cost of operation cannot be reached.

The city had also required a list of stockholders of the Twin City Lines, which also was refused. Judge Simpson said that it was not within the province of the city attorney to examine personal records of the company which have no material and relative effect on rate valuation proceedings, and that the matter of names and addresses of stockholders is not relative to the subject. The city attorney read extracts tending to show that a commission or Council can order submission of all records, books and accounts of the company.

Line Purchased

The Maumee Valley Railway of Perrysburg, Ohio, has been purchased by Lawrence G. Van Ness and B. A. Webster, general manager and auditor respectively of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad. Messrs. Van Ness and Webster purchased the traction line from the bondholders who recently acquired it at receivership sale. Perrysburg is a small municipality located on the outskirts of Toledo. The Maumee Valley Railway covers an area of 24 square miles. The traction company operates on 12 miles of its own tracks and 12 miles on the roadway of the Community Traction Company of Toledo.

Mr. Van Ness said that several northern Ohioans also are interested in the proposition with him and Mr. Webster. The new owners will begin at once to rehabilitate the line. Seven one-man type cars already have been ordered from the Cincinnati Car Company. They will replace a like number of old-style heavy-truck cars.

Mr. Webster will be in charge of the traction line under the direction of Mr. Van Ness, who has been elected president of the company. S. E. Howard, for many years connected with the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, will succeed Mr. Webster as auditor of that railway.

Income of $4,261 for Chicago Elevated

The collateral trust report of the Chicago Elevated Railways for the year ended Dec. 31, 1921, shows a deficit after deductions of $1,149,215. The gross income amounted to $199,007.

The combined income account of the Metropolitan West Side Elevated Railway, Northwestern Elevated Railroad, South Side Elevated Railroad and Chicago & Oak Park Elevated Railroad for the year ended June 30, 1922, is as follows:

Gross operating revenue		$17,629,020
Operating expenses:		
Maintenance of way and structures	$2,128,879	
Maintenance of car equipment	1,625,728	
Power	1,669,920	
Conducting transportation	7,173,322	
Traffic	21,811	
General and miscellaneous	926,353	
Total operating expenses		13,546,015
Net operating revenue		$4,083,005
Taxes, city comp. and other items		1,316,707
Operating income		$2,766,298
Non-operating income		147,321
Gross income		$2,913,619
Deductions:		
Rentals	$412,949	
Interest	2,475,591	
Miscel. debits	20,816	
Total interest and rentals		2,909,358
Net income		$4,261

The net income of $4,261 is considerably smaller than it was for the year ended June 30, 1921, when $102,016 was realized, and for the year ended June, 1920, when there was a surplus of $97,817.

Former Order Set Aside

Judge Killits in the Federal Court at Toledo has set aside a former order entered Oct. 18, 1921, under which the Indiana, Columbus & Eastern Traction Company was authorized to abandon its line between Lima and Defiance.

The city of Lima recently asked to be made a party to the suit and pleaded that the order would relieve the company of obligations it assumed when it was granted a franchise some years ago and which has several years yet to run. The order had been concurred in by the Ohio Public Utilities Commission. Service was to have been discontinued on Dec. 31, 1922.

November Shows Deficit in Toledo

Notwithstanding that the average number of passengers carried daily increased during the month of November the Community Traction Company, Toledo, Ohio, showed a deficit from operations amounting to $2,602, being the first time a draft has been made upon the stabilizing fund since August, 1921.

Commissioner Wilfred E. Cann told the members of the board of control at their meeting on Dec. 15 that it would be his policy to build up the lines and service rather than attempt to arrive at any lower fares. His efforts to cut fares through the adoption of one-man car operations and other economies were flatly nullified by the City Council, which controls service.

Lee Camp, business agent of the street railway men, in letters to other cities has taken full credit to his organization for introducing in the Council the legislation which knocked out the one-man cars.

In line with the new policy, Mr. Cann has permitted the company to increase allowances for depreciation and to build up the maintenance and repair fund in an effort to decrease failures from mechanical and track defects. The larger depreciation fund next summer will permit considerable work to be done in rehabilitating the property, securing extensions, and rerouting lines.

The net result in November was largely influenced by heavy drafts made for accidents, extra maintenance and the winter fuel bill. In anticipation of winter weather track maintenance expenditures were increased 0.65 cent per car-mile. There was an increase of 0.628 cent per car-mile in the cost of transportation, which is due to heavy payments made for coal for heating the cars. Increased expenditures for injuries and damages of 0.469 cent per car-mile reflect the clearing of many old claims and an abnormal increase in the claims from automobile collisions.

Of all claims paid 41.4 per cent of the money went for automobile accidents, for which the commissioner thinks a new traffic ordinance will provide some remedy.

The sinking fund now totals $391,299.

Mr. Cann plans to have a maintenance fund of $640,000 for the coming year to keep the tracks and cars in excellent operating condition.

Operations for the first half of December have shown the best patronage since the cost-of-service plan was put into effect nearly two years ago. One week day in that period showed more than 200,000 revenue passengers compared with the average of 165,000 throughout the month of November. December is running about $25,000 in gross revenue ahead of November based upon present returns.

Expresses Hope for Future of Property

At the recent annual meeting of the Duluth-Superior Traction Company, Duluth, Minn., President Robertson expressed the hope that the affairs of the company had passed the critical stage and that when the investigation now under way had ended the company would be permitted to earn a reasonable return and render the kind of service the people were entitled to.

It was brought out that the increased fare in the city of Duluth had improved the company's revenue since Aug. 1. Cumulative preferred stock dividends at the rate of 4 per cent per annum for the quarters ending June 30 and Sept. 30, 1921, were paid Oct. 2, 1922, and at a meeting of the directors held on Nov. 20 preferred stock dividends of 1 per cent for each of the quarters ending Dec. 31, 1921; March 31, 1922, and June 30, 1922, were declared payable Jan. 2, 1923, to stockholders of record Dec. 15, 1922.

Surplus of $1,355,303 in Eleven Months

During the first eleven months of 1922 the Virginia Railway & Power Company, operating in Richmond, Petersburg, Portsmouth and Norfolk, lost in gross earnings 7.75 per cent in comparison with the same period in 1921. During the same period the company cut operating expenses 19.06 per cent under the figures of 1921 for the first eleven months, and recorded increases in net earnings, and surplus of 18.71 and 64.14 per cent, respectively.

During the above-mentioned period the gross earnings of the system were $8,576,642 compared with $9,296,909. Operating expenses were $5,271,814 for this period in 1922, and $6,512,916 in 1921.

Net earnings from operation are listed at $3,304,832 compared with $2,783,993, an increase of $520,839 during this period. The company's other income, derived from rents, etc., is listed at $123,811. Taxes were $2,073,340, a slight decrease. The surplus listed by the company in its eleven months statement is $1,355,303 compared with $825,674 for eleven months last year, an increase of $529,629.

These figures are for the entire system. The company operates besides its electric railroads in these four cities the lighting plants in Richmond and Petersburg.

New England Investment Declares Dividend

The New England Investment & Security Company, Springfield, Mass., has announced a dividend of $2 a share payable on Jan. 2, 1923, to holders of the preferred shares of record on Dec. 20, 1922. Other properties of the New England Investment & Security Company declaring dividends include the Springfield Railway Companies, the Springfield Street Railway Company and the Worcester Consolidated Street Railway. The Springfield Railway Companies have declared a dividend of $2 per share payable on Jan. 2, 1923, to preferred shareholders of record on Dec. 20, 1922. A 3 per cent dividend on the capital stock of the Springfield Street Railway is payable on Jan. 2 to stockholders of record on Dec. 20, 1922. A $2.50 dividend per share on the first preferred stock of the Worcester Consolidated Street Railway is declared payable on Dec. 30 to stockholders of record on Dec. 20, 1922.

November Net Income Decreases

The Department of Street Railways, Detroit, Mich., for the thirty days ended November, 1922, realized a total operating revenue of $1,593,120. Of this amount $1,499,984 was revenue from transportation. The total revenue is less than it was for the thirty-one days in October, when it amounted to $1,614,010. Total operating expenses decreased from $1,127,370 for the October period to $1,107,092 in November. There was a decrease in the net income of $5,291 under the October figure. Traffic showed a considerable falling off in the month of November. During October there were 37,752,445 passengers carried against 37,103,301 passengers in November, 1922. November, 1922, car-miles operated totaled 3,799,880, against 3,890,517 in October, 1922.

$64,857 in Excess Over Operation Cost

A decrease of $24,267 is noted in the total receipts of the Boston (Mass.) Elevated Railway for the five months ended Nov. 30, 1922, compared with the five months period of 1921. The figures are $13,158,502 and $13,182,769 respectively. However, the total cost of service for the 1922 period was $162,738 less than it was for the five months period of 1921. This produced an excess of receipts over cost of service for the 1922 period of $64,857. For the same period in 1921 the result was an excess of cost of service over receipts amounting to $73,613. There was an increase in the total number of revenue passengers, 135,918,976 being transported during the five months ended Nov. 30, 1921, and 145,166,757 for the same period this year.

Automobile Equipment of Public Service to Be Taken Over by Production Company

The Public Service Production Company on Jan. 1, 1923, will take over the maintenance of the automobile equipment of the Public Service Corporation of New Jersey and its subsidiaries and this will include the construction of automobile bodies.

The Public Service Production Company was incorporated in the interests of the Public Service Corporation of New Jersey in February, 1922. It was explained at that time that the purpose of the Public Service Corporation was to broaden its field of usefulness and that the new company would be an engineering organization. It is separate from the so-called operating companies, the Public Service Electric Company, the Public Service Railway and the Public Service Gas Company, which confine their work to operation.

The charter of the production company is extremely broad with respect to the activities in which the company may engage. It has its office at the Public Service Terminal, 80 Park Place, Newark, N. J. N. A. Carle is vice-president and general manager and E. B. Meyer is chief engineer of the company.

Conspectus of Indexes for Dec., 1922

Compiled for Publication in this Paper by

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Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	Dec. 1922 **6.96**	Nov. 1922 **6.98**	Dec. 1921 **7.20**	May 1921 **7.24**	**4.84**
Street Railway Materials*	Nov. 1922 **174**	Oct. 1922 **177**	Nov. 1921 **158**	Sept. 1920 **247**	**100**
Street Railway Wages*	Dec. 1922 **208**	Nov. 1922 **208**	Dec. 1921 **214**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	Nov. 30 1922 **6.84**	Oct. 31 1922 **6.90**	Nov. 30 1921 **4 25**	Apr. 30 1917 **12.18**	**5.91**
U.S. Bank Clearings Outside N. Y. City (Billions)	Nov. 1922 **13.56**	Oct. 1922 **14.69**	Nov. 1921 **11.77**	March 1920 **18.54**	Av. Mo. 1913 **6.12**
Business Failures	Nov. 1922	Oct. 1922	Nov. 1921	Jan. 1922	Av. Mo. 1913
Number	**1,758**	**1,600**	**1,970**	**2,722**	**1,213**
Liabilities (millions)	**54.08**	**36.94**	**72.78**	**105.7**	**24.64**

	Latest	Month Ago	Year Ago	Peak	1913
Eng. News-Record Construction costs	Dec. 1922 **192.6**	Nov. 1922 **188.6**	Dec. 1921 **167.8**	June 1920 **273.8**	**100**
U.S. Bur. Lab. Stat. Wholesale Commodities	Nov. 1922 **156**	Oct. 1922 **154**	Nov. 1921 **141**	May 1920 **247**	**100**
Bradstreet's Wholesale Commodities	Dec 1 1922 **13.78**	Nov. 1 1922 **13.35**	Dec. 1 1921 **11.31**	Feb. 1 1920 **20.87**	**9.21**
Dun's Wholesale Commodities	Dec. 1 1922 **185.5**	Nov. 1 1922 **182.3**	Dec. 1 1921 **164.5**	May 1 1920 **263.3**	**120.9**
U.S. Bur. Lab. Stat. Retail food	Nov. 1922 **145**	Oct. 1922 **143**	Nov. 1921 **152**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	Nov. 1922 **158.4**	Oct. 1922 **157.1**	Nov. 1921 **163.0**	July 1920 **204.5**	(1914) **100**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Seeks to Purchase Electric Properties

The Cumberland County Power & Light Company, Portland, Me., has filed a petition with the Public Utilities Commission seeking permission to buy the properties of the York County Power Company and the Westbrook Electric Company.

For the past ten years both companies have been operated by the Cumberland County Power & Light Company, which owns the common stock of both. With but slight changes in the boards of directors the officers of all three companies are the same, and the territory controlled by them represents a continuous lighting and power system all operated under the direction of the Cumberland County Power & Light Company.

The three companies have an aggregate capitalization of $10,700,000, and this will be in no way affected by the sale.

Coincidentally with the filing of the petition by the Cumberland County Power & Light Company, a petition was filed by each company to sell to the Cumberland County Power & Light Company.

The capital stock of the Cumberland County Power & Light Company is given in its petition as $10,000,000 with a bonded indebtedness of $4,218,000, and net earnings for the past year of $621,367.

Securities Sold at Auction

Electric railway securities sold by Adrian H. Muller & Company on Dec. 6 at the Public Auction Room, 14 Vesey Street, New York, were as follows:

Fifty shares Louisville & Southern Indiana Traction Company, $25 lot.

One hundred and twenty-five shares Indianapolis & Louisville Traction Company, $50 lot.

Three shares Milford & Uxbridge Street Railway Company common, $2 per share.

$55,000 Boise & Interurban Railway first mortgage 5 per cent gold bonds, due April 4, 1946, 45 per cent and interest.

$11,000 Ohio River Electric Railway & Power Company first 5 per cent, July, 1924, January, 1919, coupons on, 10 per cent

$17,000 New York & North Shore Traction Company first mortgage 40-year 5 per cent bonds, certificate of deposit, $40 lot.

Three hundred and ninety shares New York & North Shore Traction Company, $4 lot.

New Companies to Seek Shore Line Rights

Three petitions for consideration of the General Assembly were received on Dec. 14 at the office of the Secretary of State to do with the efforts of trolley interests to acquire the right to again operate the defunct Shore Line Electric Railway from New London, Conn., to New Haven, Conn.

The East Lyme Traction Company, East Lyme, and the Eastern Connecticut Railway, Norwich, seek authority to buy sections of the present lines of the company. The East Lyme Traction Company wants to secure control of the Shore Line road from its junction with the tracks of the Connecticut Company, at Montauk Avenue and Bank Street, in New London, through the towns of New London and Waterford to Keeney's corner.

The Eastern Connecticut Railway seeks permission to change its name to the Norwich & Hallville Railway and to purchase that section of the Shore Line road from Norwich to Preston, Conn. In another petition, Robert W. Perkins, Charles B. Whittlesey and Edward M. Day, who are the petitioners representing the two mentioned companies, also seek a charter and franchise to operate the Shore Line road from New Haven to Old Saybrook, Conn.

Cash Dividends to Be Paid

A dividend of 6 per cent on the outstanding preferred stock of the Virginia Railway & Power Company, Richmond, Va., was recently declared by the directors, 3 per cent of which is payable on Jan. 20 and 3 per cent on July 20, both to stock of record on Dec. 31. The company declared dividends payable in preferred stock in January of this year and last year. This is the first cash dividend paid on these shares since the middle of 1919. No dividends have been paid on the common stock since 1918.

Financial News Notes

Net Income Increases.—The report of Beaver Valley Traction Company, New Brighton, Pa., shows gross of $525,867 for ten months ended Oct. 31, 1922, a decrease of $31,359. The net after taxes was $132,565, which is an increase of $74,646.

Valuation Reduced.—There has been a reduction of more than $1,000,000 in the valuation of the St. Joseph (Mo.) Railway, Light, Heat & Power Company by the state board of equalization. An announcement to this effect was recently made at St. Joseph.

Preferred Stock for Sale.—A syndicate headed by Stone & Webster is offering $3,800,000 of 7 per cent preferred stock of the Central Indiana Power Company. The price is 90 and accrued dividends to yield about 7.78 per cent. The proceeds will be used for extensions and improvements.

Wants to Sell Stock.—The recently incorporated Alabama Traction Company, which is now operating the old North Alabama company's lines in Albany and Decatur, has applied to the Public Service Commission for permission to sell stock. The sale of the Alabama Traction Company was referred to in the *Electric Railway Journal*, issue of Dec. 2.

Authorizes Purchase.—The Missouri Public Service Commission at Jefferson City, Mo., has granted permission to the St. Joseph Electric Railway, Light, Heat & Power Company to purchase all of the property of the Savannah (Mo.) Electric Light & Power Company. It includes all the distributing system and lines of the Savannah company. The price was reported as $40,000.

Balance of Bonds Offered. — The $250,000 balance of an authorized issue of $1,500,000 of 7 per cent general mortgage bonds of Nova Scotia Tramways & Power Company, due in thirty years, is now being offered by J. C. Mackintosh & Company of Halifax. They are for sale at par to yield 7 per cent. The major portion of the issue was offered last spring. The bonds constitute a specific charge on all the assets of the company subject to the first mortgage issue of $2,250,000 now outstanding and due in 1946. Management of the company is in the hands of Stone & Webster, of Boston.

Will Pay Dividend.—For the first time since 1917, the New York State Railways, operating lines in Rochester, Syracuse, Utica, Rome and interurban lines, will pay a dividend on Jan. 2 of 1½ per cent on the common stock, 10 per cent on account of accumulated dividends on the preferred stock and 1¾ per cent on preferred stock to holders of record on Dec. 22. The New York State Railway has $19,952,000 in common stock outstanding, of which $13,604,300 is owned by the New York Central Railroad. The outstanding 5 per cent cumulative preferred stock amounts to $3,862,500. The dividend will mean a distribution of $733,817.

November Receipts Show Increase.—Receipts of the Cincinnati (Ohio) Traction Company for the month of November show an increase of $24,646 over the same month last year. The November receipts this year were $671,813. Last year in November the fare dropped from 8 to 7½ cents and this monthly report offered the first opportunity for comparison between 1922 and 1921. The showing of the traction company during November is regarded as particularly good in view of the fact that motor buses, which have developed their business during the past six or seven months, have cut the traction company receipts by about $500 a day, according to William J. Kuertz, Director of Street Railways.

Eleven Months Net Equals $1,850,259.—The net income of the Philadelphia (Pa.) Rapid Transit Company for the eleven months ended Nov. 30, 1922, was $1,850,259, against $1,447,394 for the same period in 1921. There was an increase in the number of passengers carried and in the passenger revenue. From January-November, 1922, 772,975,336 passengers were carried, compared with 763,216,214 for the same period in 1921. The passenger revenue increased from $37,786,322 for the eleven months ended November, 1921, to $37,937,833 for the eleven months ended November, 1922. Capital betterments and extensions for 1922 will approximate $2,000,000. As in former years, it is said that they will be financed largely from the renewal reserve.

Traffic and Transportation

Ordinance Passed

City Council of Seattle Approves Five-Cent Fare Bill—Increased Patronage Essential for Permanency

Five-cent carfare on the Seattle (Wash.) Municipal Railway lines, with a charge of 1¼ cents for transfers, effective March 1, has been assured by the passage of a fare reduction ordinance by unanimous vote of the City Council and signature of Mayor E. J. Brown. The ordinance represents the views of Mayor Brown in every particular, who urged that the reduction be postponed until March 1 of next year. The measure as passed did not meet with the approval of all members of the City Council, several of whom favored free transfers, but the vote was unanimous nevertheless. Street car fare reduction in Seattle has been a public issue for more than a year, and the bill just passed is an amended form of a measure introduced last June in the Council.

The new fare provides the following: Fare for single continuous ride, without transfer privilege, 5 cents; for single continuous ride with transfer privilege, 7 cents cash, or 5 cents cash and one 1¼-cent token; children going to or from school, cash fare, 3 cents; for two children, 5 cents; children under 15 years of age, going to or from Sunday school, same rates as for week day school; children under 5 years of age, accompanied by parent or guardian, free; passengers whose ride originates on following "feeder lines" will be furnished a transfer to or from a connecting main line on the payment of 5 cents cash: North Fortieth Street, Youngstown shuttle, Madison and James Street cables, and Ray Street line; transfer to the Seattle & Rainier Valley line will be issued only on payment of 10-cent cash fare; rate of fare upon that portion of the Highland Park and Lake Burien Railway line operated by the city outside the city limits will be 10 cents, in addition to the fare charged on said line within the city limits; metal tokens will sell at the rate of four for 5 cents, each token being good for transfer to intercity lines in connection with a 5-cent cash fare; the 8⅓-cent tokens now in use will be redeemed in cash or accepted for fare with transfer privileges.

When the new low fare goes into effect, city officials state that increased patronage will be absolutely essential if the system is to be operated permanently under such a fare. George F. Russell, superintendent of public utilities, has officially reported to Mayor Brown that there must be an increase of 46 per cent in car riding to make the railway pay with a 5-cent fare. Figures compiled by Supt. Russell show that during the first ten months of the present year the average number of pay passengers carried monthly was 7,995,902. In order to make the system meet all rates, the average monthly pay rides must be increased to 11,746,465, the accountants report. The average monthly receipts for the first ten months of 1922, according to Supt. Russell, was $516,002. Figured on the basis of the present number of daily car rides, the new rates will provide $328,626 a month. Operating expenses, including the depreciation charge together with the monthly apportionment of bond interest and principal, averaged $528,103 a month for the first ten months of the year.

Weekly Pass to Supplement Zone Fares

San Diego Electric Railway Announces Welcome New Year's Gift to the Public

Following a survey made by Walter Jackson, the San Diego (Calif.) Electric Railway has decided to usher in the new year with the unlimited-ride, transferable weekly pass in five varieties.

The principal pass, sold at $1, will be good in both the inner and outer fare zones of San Diego. The basic fare in San Diego is 5 cents, while the two-zone rider has the privilege of buying a monthly, bearer type commutation book averaging a 6⅔-cent fare; a 7½-cent token, bought four for 30 cents, or 10 cents straight cash. The weekly pass is simply an additional, optional rate. It is expected to prove exceptionally popular with two-zone riders, as they are then likely to enjoy less than a 5-cent fare for wholesale use and also be freed of all change, token, receipt and transfer transactions.

Three other passes will be sold at $1.25 a week for the suburban routes to Coronado, Ocean Beach and National City. The Coronado pass covers a combination of San Diego car-ferry-Coronado car. Its use will relieve Coronado riders from the present practice of tendering three fare tickets in each direction. The fifth pass, to sell for $2, is for the more remote community of Chula Vista, in the heart of the lemon country. All these suburban passes are supplemental to existing cash, round-trip and commutation rates.

Mr. Jackson is now in San Diego to work up the necessary publicity in co-operation with Claus Spreckels, general manager, and E. J. Burns, assistant general manager of the San Diego Electric Railway. The installation of the passes was purposely delayed to Jan. 1, 1923, so that the publicity with press, business interests, theaters, platform men and general public could be carried out more effectively after the Christmas rush was over. It is an interesting coincidence that the San Diego zone system also went into effect on New Year's, namely, Jan. 1, 1920.

Conferences Next Step in Traffic Problem

Conferences between members of the special traffic committee that evolved the one-way traffic plan now under consideration and engineers and officials of the Portland Railway, Light & Power Company, Portland, Ore., will be the next step in the movement to solve the traffic problem in the congested district of Portland. This course was determined after I. F. Fuller, vice-president of the traction company, had pledged co-operation on the part of his company to the city in meeting the traffic problem. Mr. Fuller made it plain, however, that his company was not inclined to expend between $200,000 and $250,000 in rerouting of street cars, if relief could be gained without this outlay. He also informed the Council that one-way traffic for street cars was not practicable on north and south streets, but could be worked out on east and west streets.

Mr. Fuller, in a recent hearing on the subject, explained that his company carried about 250,000 passengers each day. He also called attention to the fact that the company was running about the same number of cars that were operated in 1913, and for that reason the street cars had not contributed materially to the traffic problem that now demands solution. He stated that one-half of the 60-ft. streets and one-third of the 80-ft. streets are lost to use of traffic because of the parking of automobiles on both sides of such streets.

Mr. Fuller stated that on east and west streets it would be mainly a question of how best to bring about one-way traffic. He recommended that establishment of non-parking zones during the rush hours, provision for loading zones and one-way traffic on all streets that are not double-tracked for street cars would solve the traffic congestion and at the same time mean no outlay of large sums of money. He expressed the company's entire willingness to co-operate with the city officials in the working out of a practical and economical plan for solving the congestion problem.

Hark to the Commandments of the Boston Elevated

The Boston Elevated Railway has recently published a safety bulletin for its employees. It contains various suggestions, and among others the following "ten commandments for railroad men."

> Carelessness often means death. Don't be careless.
> Look both ways.
> Don't just leave it to the other fellow.
> Know your brakes.
> Keep your mind on your work.
> Always be in position, for "death" attacks from all directions and angles.
> Keep your car under control at all times.
> Don't take chances. Always know.
> Never race with death; you can't beat him.
> Keep safety first in your mind at all times, and when in doubt say it to yourself.

The bulletin concludes with the slogan adopted for safety work by the company: "Any accident may be fatal."

Complains of High Charges

Upon petition filed by Hugo Kelley, secretary to Mayor E. J. Brown of Seattle, Wash., and forty-six others, the Department of Public Works at Olympia will immediately file a complaint challenging the reasonableness of the rates and tariffs of the Seattle & Rainier Valley Railway. The petition states that in view of the reduction in fares proposed on the Seattle Municipal Railway the fares of the Rainier Valley line will be exorbitant unless also reduced. The petition sets forth that the purchase price of the city lines is being paid out of fares, while the Rainier line, which runs from the center of the city to Renton, a suburb, has no such charge on its revenue. Hearing on the complaint will be held as soon as the department's engineering and accounting forces can prepare data and secure facts.

Bus Operation Decreases Railway Traffic

Decrease in traffic of the Columbus, Newark & Zanesville and the Indiana, Columbus & Eastern traction lines in 1922 over that of 1921 is ascribed to bus competition in a report filed Dec. 23 in the office of F. A. Healy, secretary-treasurer of the lines in Springfield, Ohio. The report showed a decrease of approximately 8.2 per cent for the Indiana, Columbus & Eastern and about 11.9 per cent for the Columbus, Newark & Zanesville lines.

Mr. Healy said that four bus lines, all of them operating since May 1, parallel the Columbus, Newark & Zanesville line, and it was to this fact that the company attributed the heavier decrease in traffic on that road. He estimated that by the first of the year the two roads would have lost $250,000, the greater portion because of bus competition, although automobile traffic in the summer season is another factor that serves to cut down revenue.

Buses to Accommodate West Springfield Residents

Owing to a protracted delay on the part of the Springfield, Mass., City Council in legislating in relation to a street car route leading to the new Hampden County Memorial Bridge, Clark V. Wood, president of the Springfield Street Railway, has consented to put on buses to run across the bridge for the accommodation of West Springfield residents. Negotiations between Mr. Wood and the respective municipal authorities on either side of the river are expected to be taken up within a few days in respect to the details of such an arrangement. It is not settled as to whether such a bus line would carry the free transfer provision. The Springfield City Council's transportation committee was favorable to granting an independent bus line a franchise to run over the bridge. The West Springfield selectmen were not disposed to accede to this arrangement, but it is understood that sentiment was shifting toward that solution in case no other means was open to establish an early service of some sort across the bridge and so shorten the distance from that involved by the present route over the North End Bridge. President Wood has signified his willingness to apply for a franchise to lay tracks through Vernon Street to the bridge immediately upon a vote of the City Council to widen Vernon Street.

Provincial Government Passes Regulatory Act on Fares

Provision for the appointment of temporary commissions to fix passenger fares of the British Columbia Electric Railway was made by the Legislature of British Columbia by an act passed on Dec. 15. The act was entitled the British Columbia Electric Railway passenger rates act.

This takes the place to some extent of the former public utilities act which was abolished two years ago, but is limited in its scope to the company mentioned and to railway service. One of the reasons why the former commission was discontinued was the cost to the government. The new scheme provides for the cost, including the remuneration of commissioners, secretaries and so forth, to be assessed upon one or other of the parties.

In fixing rates, the commissions are required to give the company a fair and reasonable return on the value of the property of the company. Appraisals of property may be made, the costs being imposed upon the company.

The commissions are to be appointed by orders-in-council on application either of some municipality traversed by the company's lines, the company itself or not less than 100 voters residing in a locality without municipal organization.

The company operates in nearly a score of cities and municipalities and fares have been charged on temporary agreements, modifying the existing franchises. The new act continues all existing fares until changed, but its powers are to be invoked, it is stated, only in case municipalities and the company cannot come to mutually satisfactory agreements. The city of Vancouver recently passed a new franchise by which both parties agreed not to use the provisions of the act.

Will Extend One-Man Car Service

The Morris County Traction Company, Morristown, N. J., will install an automatic block signal system on its lines which run from Lake Hopatcong to Maplewood and Elizabeth. The company will extend the use of one-man cars. They are now being run from Summit to Elizabeth, Wharton to Rockaway and Danville to Boonton. All two-men cars now in use will be remodeled. Employees of the company are protesting the installation of the one-man system and have appeared before the Board of Aldermen of the city of Denver.

Transportation News Notes

Seeks Fare Adjustment.—The Muskogee (Okla.) Traction Company has made application to the Oklahoma Corporation Commission for an adjustment of street car fares in that city. The company is now operating under an 8-cent fare, with two tickets for 15 cents. The company wants the 8-cent fare for single rides continued, but would sell tickets in blocks of five for 35 cents.

Buses Ordered.—A. N. Broadhead, president of the Jamestown, (N. Y.) Street Railway, has ordered three passenger motor buses to be placed in operation on the south side of the city. Some time ago the Jamestown Common Council granted the company's request for permission to try out motor bus service in that section of the city. The buses will be placed in operation early in January as a feeder for the Jamestown traction lines.

City Attorney Seeks Lower Fare.—The city attorney of Oklahoma City, Okla., has filed a petition with the commission requesting a decrease in fares on the lines of the Oklahoma Railways. John W. Shartel, president of the railway company, declined to give any comment other than that he considered the agitation over a 5-cent fare at this time unwise. He is expected to file his answer shortly with the State Corporation Commission.

Make Change in the Street.—In order to expedite the loading of cars in the evening rush hours, the Springfield (Mass.) Street Railway has adopted the system of making change in the street for passengers, uniformed employees being stationed for that purpose at busy corners between 4:30 and 6 o'clock in the afternoon. This was done at the suggestion of the Police Commission. Whether the arrangement will be permanent or not will depend on results. The object is more particularly to speed the departure of pay-as-you-enter cars, and passengers are said to have responded to it to a gratifying extent.

Second Class Rates Cut.—The Pacific Northwest Traction Company, Olympia, Wash., recently filed a tariff with the Department of Public Works establishing second class rates applicable to articles of food and drink and lowering first class rates on shipments of 50 lb. or more on its lines between Seattle and Bellingham, effective Dec. 15. The second class rates to be established are practically 20 per cent lower than the reduced first class rates announced. They apply between Bellingham and Everett, and all intermediate points, and between Seattle and all points north of Everett, including Maryhill, Silvana, Burlington, Sedro Woolley, Milltown and Conway.

Personal Mention

Mr. Murphy Manager

Engineer in Charge of Electrical, Mechanical and Roadway Departments Succeeds Mr. Reynolds

Ernest A. Murphy, assistant general manager of the United Traction Company, Albany, N. Y., in charge of electrical, mechanical and roadway departments, has been appointed general manager of the company to succeed Albert E. Reynolds, resigned. Mr. Murphy was formerly superintendent of equipment of the company. To this position he was appointed in 1917 and continued in it until Dec. 31, 1921, when he was made assistant general manager.

The story goes, if memory does not wander, that none other than Abraham Lincoln said he did little reading of biographies because biographies so seldom reflected the facts of the flesh and blood individual. Too often the biographer fits his subject to a preconceived picture instead of drawing the picture himself. As a matter of fact, critics of biographical volumes have in their reviews often done a better service to readers than the authors themselves have done to their subjects. Again, if memory does not play false, Macaulay's essay on the Earl of Chatham's biography was a notable example of the critic outwriting the creator. It would be interesting to tell the whole story about Mr. Murphy at this time, but here it is necessarily a case of *pars pro toto*, presenting a part of the whole.

E. A. MURPHY

Picture in your mind's eye, then, a young man graduating from the Manchester Institute in England with the degree of electrical and mechanical engineer, determined to succeed at his chosen profession and seeking America as the battle ground on which he would carve out his career. Then picture the same young man going from shop to shop and job to job and company to company ever learning, ever advancing, ever improving and you have a good portrait of young Murphy. He is an engineer with the instincts of a business man. There is a directness about him that to some might seem disconcerting, but it is merely the outward manifestation of the inward man. Mr. Murphy never hesitates. He is never likely to get lost. He is sure of himself but not satisfied with that individual. This is a distinction with a great difference.

Mr. Murphy has done some very big things up at Albany in the shops and at the same time has worked numerous small economies which in the aggregate are a startling total. It has been the good fortune of the *Electric Railway Journal* to describe some of this work in the past. But the fact must not be overlooked that biography, to many, is still a matter of dates and places and positoins. For them is the following:

Mr. Murphy began his railway career with the London Metropolitan Railway and figured prominently in the electrification of the London Tramways. His first position in this country was with the Chicago Elevated Railroad, where he specialized in automatic train control and installed that system on the elevated trains. This work completed, Mr. Murphy became a member of the engineering staff of the Illinois Traction System and later assisted in equipping the Pittsburgh, Harmony, Butler & Newcastle Railway, Pittsburgh, Pa. Mr. Murphy was appointed general superintendent of the electric department of the Interborough Rapid Transit Company, New York, in 1913, from which position he went to Albany as head of the equipment department of the United Traction Company.

Mr. Ham Elected President of Safety Council

William F. Ham, president of the Washington Railway & Electric Company, Washington, D. C., has been elected president of the Washington Safety Council, the permanent safety body of the District of Columbia. John J. Boobar has been elected vice-president, A. E. Seymour, secretary, and John Poole, treasurer. These officers will serve until the first annual meeting in February, when permanent officers will be elected and the organization perfected. Following his election. Mr. Ham said he would do his utmost to make the permanent safety drive a success. The safety instructions in the schools, Mr. Ham said, would be continued as they had proved valuable.

The council pledged itself to a continuous campaign for safety. One of the important features of the by-laws is the provision for a traffic committee which is to make a survey of all traffic conditions and submit reports proposing any changes deemed advisable.

Membership in the council will be open to any corporation, association, partnership or individual. These memberships will be divided into three classes, namely, individual, sustaining and contributing.

New Roadmaster in B.R.T. Track Division

Frederick L. Finch has been appointed roadmaster in the surface track division of the Brooklyn (N. Y.) Rapid Transit Company. He brings to his new position a broad experience gained in various track jobs he has held in both the East and West. In 1903 he became superintendent of track and roadway with the Mahoning & Shenango Railway & Light Company at Youngstown, Ohio. After serving for seven years in that capacity he went to Spokane, Wash., as superintendent of track with the Washington Water Power Company, which operates an electric railway. After three years he returned East to become general roadmaster for the International Railway with headquarters in Buffalo, N. Y. He resigned from this position to go to the Brooklyn Rapid Transit Company to work under P. Ney Wilson, the superintendent of surface roadway. Mr. Finch's father was a railroad contractor in Pittsburgh and built street railroads in various parts of the East. His father was his first employer.

F. L. FINCH

Mr. Jackson Joins N.E.L.A.

Carl D. Jackson, a member and former chairman of the Wisconsin Railroad Commission, has resigned from the commission, effective Dec. 31, 1922. Mr. Jackson will become an attorney for the National Electric Light Association and the American Gas Association. His position as commissioner pays $5,000 a year, and a number of the Wisconsin Railroad Brotherhood officials have been mentioned as possible successors. City Attorney Niven of Milwaukee has asked Gov. John J. Blaine to appoint to the position a Milwaukee man who could represent on the commission the interests of this, the largest city in Wisconsin. The term of Henry Trumbower, another railroad commissioner, will expire in February.

Another Important Post for Mr. Loring

Former Trustee of Eastern Massachusetts Street Railway Called to Office by Governor Cox

Homer Loring, former chairman of the trustees of the Eastern Massachusetts Street Railway, Boston, Mass., has been made chairman of the State Commission on Administration and Finance by Governor Cox of Massachusetts. This is one of the most responsible posts that the Governor has had to fill and the selection is another tribute to Mr. Loring's sterling worth as an administrator. By virtue of his position on the commission Mr. Loring will be the new budget commissioner for the state.

Mr. Loring goes about his work quietly. He had long been president of the Fort Dodge, Des Moines & Southern Railway and prominent as a director of a score of other corporations before anything was known about him publicly outside of the immediate circle in which he moved. But when the need arose Mr. Loring was found out in the open battling for the preservation of the things he was convinced were sound.

Perhaps the first thing that he did to attract the attention of the public to him was to foster in 1918 the campaign in behalf of the holders of the securities of Massachusetts electric railways. As chairman of the Association of Massachusetts Street Railway Security Owners he directed a successful educational campaign on behalf of the street railways of the state in 1918. In this connection it is generally conceded that the association's activities were chiefly responsible for securing the passage of remedial legislation during 1918.

Largely on account of his activities in this connection Mr. Loring was induced to address the members of the American Electric Railway Association in conference in New York on Nov. 1, 1918. Even then Homer Loring was merely a name among the rank and file of electric railway operators outside of New England. At that time he said that no one claimed the new legislation giving state aid to the railways was perfect, but that all agreed that it rescued the Boston Elevated from receivership and "that it will enable the Bay State Street Railway, with 900 miles of track, to be successfully. reorganized."

Perhaps the legislation passed by the state did enable the Bay State Street Railway to be successfully reorganized as the Eastern Massachusetts Street Railway, but the opinion prevails down Boston way that Mr. Loring as chairman of the public trustees had a great deal to do with making the reorganization successful and that he accelerated the process. At the petty salary of $5,000 a year Mr. Loring worked over the remains of this railway until he had revitalized them. Then Mr. Loring withdrew. His work as trustee of the Eastern Massachusetts Street Railway was in the nature of a public service, but he now enters upon an even larger public service.

It is a distinct loss that men like Homer Loring are so seldom elected to public office or accept appointment when urged to do so. In the light of events since Mr. Loring appeared before the members of the American Electric Railway Association as a speaker the advice he gave at that time appears now to have been prophetic, namely: (1) Be frank with the public; lay all the cards on the table. (2) Do not try to defend inflated capital; you cannot successfully do so in these modern days. (3) If public control is demanded, insist upon a definite guarantee of interest return. (4) Give special attention to systematic public education and if possible organize your security owners for this task.

Mr. Harrsen Joins Electric Bond & Share Forces

H. P. Harrsen has resigned as assistant general manager of the Michigan Railroad and the Michigan United Railway to join the staff of the Electric Bond & Share Company, New York, N. Y., attached to the foreign department. Here there will be a greater opportunity than has existed in Michigan for the application of the broad experience and the peculiar talents of Mr. Harrsen. Until he took up his present post with the companies in Michigan three years ago a great deal of Mr. Harrsen's time had been devoted to the management of public utility properties in foreign lands. He has had experience in all phases of public utility work, including operation, supervision of construction and the securing of franchises from municipal, state and federal authorities. In addition to English he is thoroughly conversant with Spanish and German and has a fair working knowledge of French.

Mr. Harrsen was born in St. Louis in 1876. He was graduated from St. Louis public schools and for two years was a student at the Undergraduate Department, Washington University, St. Louis. He then had two years shop practice with the Emerson Electric Manufacturing Company, St. Louis, and served two years as station operator of the Aguascalientes Electric Light Company at Aguascalientes, Mexico. Then for two years he was private secretary to the president and general manager of the Mexico Tramways. Next came a service of six years with the Toledo Railways & Light Company, then known as the Toledo Traction Company, in the following positions: carhouse inspector, dispatcher, chief dispatcher, division superintendent, then superintendent. For eight years Mr. Harrsen was associated with Dr. F. S. Pearson in Mexico, first as general superintendent of the Mexico Tramway Company, then general manager and finally managing director of the Mexico Tramway and the Mexican Light & Power Company. Then followed a service of four years as managing director of the Barcelona Traction Company at Barcelona, Spain, in charge of the operation of the interurban system out of that city as well as the power company. As assistant general manager of the Michigan Railroad for the last three and one-half years in charge of operating the system, the civil engineer, electrical engineer, traffic manager, superintendent of equipment, master mechanics and superintendents reported directly to Mr. Harrsen.

W. M. Vandersluis has been appointed electrical engineer for the Chicago electrification and terminal improvements of the Illinois Central Railroad, succeeding Hugh Pattison. Mr. Vandersluis was formerly signal engineer of the Illinois Central Railroad, and later secretary of the commission appointed by the railroad to decide upon the system of electrification.

Raymond A. Masters has been appointed division superintendent of the Halsey division of the Brooklyn (N. Y.) City Railroad effective Dec. 15. Mr. Masters has been in the schedule department of the company since January, 1920. Prior to that he was connected with the Michigan Railroad as train dispatcher on the Western division. He also served with the Union Traction Company of Indiana and with the so-called Ben Hur line.

L. J. Smith, assistant engineer of the Pacific Electric Railway, Los Angeles, Calif., and in charge of supervision of track bonding and welding since the year 1918, resigned on Nov. 1, 1922. He accepted the position of Western district sales manager in handling transformer sales and representative of the Packard Electric Company of Warren, Ohio. Mr. Smith in his new position also is Western representative for the Ideal Electric & Manufacturing Company of Mansfield, Ohio.

Raymond S. Price has been appointed assistant division superintendent of the central division of the Public Service Railway, Newark, N. J. Mr. Price started with the Public Service as conductor in New Brunswick in 1911. He then became chief dispatcher of the Public Service Railroad with headquarters at Port Reading. In 1919 he was made assistant superintendent of the railroad, which he held until his recent promotion. Mr. Price will be stationed at Elizabeth, where Philip F. Maguire is division superintendent.

John J. Hubbard, assistant secretary of the Public Service Commission of New York, has resigned and will engage in private practice as an expert accountant and financial adviser to public utilities. He will make his headquarters in New York City. Mr. Hubbard has been connected with the commission in various capacities for ten years. One of his important jobs was expert accountant and chief of the division of capitalization. During his service in this branch the commission approved the issuance of more than $800,000,000 of public utility securities.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES
BUSINESS ANNOUNCEMENTS

Business Review of 1922

Major Movements in Business Shown by Statistics Compiled by Department of Commerce — Some Surprising Changes Shown in Production and Consumption Figures

AT THIS time of the year it is customary for business to pause long enough to take account of the progress made during the twelve months just elapsed, and from this standpoint to make some conjectures as to the coming months of the new year. It is with a feeling of satisfaction that most industries can view the progress of the past year in spite of the many difficulties which have been experienced. At the close of 1922 there are no serious obstacles in sight which should hinder further advances during the early part of the new year. The unsettled conditions in foreign countries, particularly in Europe, are still depressing domestic trade, and to a certain extent have, no doubt, kept the prices of agricultural products below the level of other commodities. Within the past two months this latter condition has, in a measure, been relieved.

Production of manufactured commodities in 1922 was about 50 per cent greater than in 1921, according to figures compiled by the Department of Commerce from latest reports to the Bureau of the Census made in connection with the "Survey of Current Business." Textile mills were about 20 per cent more active than in 1921, the iron and steel industry increased its output from 60 to 70 per cent over 1921, nonferrous metals from 50 to 95 per cent, petroleum 15 per cent, coke 40 per cent, paper 20 to 30 per cent, rubber 40 per cent, automobiles 50 per cent, building construction 50 per cent, lumber 35 per cent, brick 50 per cent, cement 15 per cent, leather 20 per cent, sugar 45 per cent, and meats about 5 per cent. Agricultural receipts were in general higher than in 1921.

The increase in production and the reduction in immigration improved the labor situation from a large surplus of labor at the end of 1921 to a point where shortages occur, while unemployment has almost been eliminated.

Transportation conditions changed from a huge surplus of idle freight cars to a considerable shortage, while car loadings were 11 per cent greater than in 1921.

Prices to the farmer increased about 17 per cent during the year, wholesale prices advanced 10 per cent and retail food prices declined 5 per cent. This condition gives the farmer a greater purchasing power and narrows the margin between wholesaler and retailer.

The volume of trade was considerably heavier than in 1921. Sales of mail order houses increased 6 per cent and chain stores show a gain of 13 per cent. Debits and bank clearings also show about this same relation.

The iron and steel industry was from 60 to 70 per cent more active than in 1921 but about 25 per cent less active than in the boom year of 1920. Iron ore movement was 65 per cent greater than in 1921, pig iron production increased 60 per cent and steel ingot production 71 per cent. Unfilled orders of the United States Steel Corporation rose about 60 per cent during the year. Iron and steel prices rose from 15 to 50 per cent, with the highest relative increase in pig iron. Exports of iron and steel, based on ten months' figures, declined 26 per cent.

EQUIPMENT AND ALLIED INDUSTRIES DO LARGE BUSINESS

Locomotive shipments by manufacturers for the first eleven months of 1922 were 16 per cent less than in 1921, owing to the decline of shipments for foreign account of 56 per cent. Domestic shipments increased 8 per cent. Unfilled orders for foreign locomotives on Dec. 1 were less than a year ago, but domestic orders were over ten times as large. Orders for freight cars placed in eleven months of 1922 were over seven times as large as a year ago.

Production of steel sheets averaged about 75 per cent of capacity in 1922 as against 35 per cent in 1921. Sales of fabricated structural steel were about 88 per cent larger in 1922 than in 1921, based on eleven months' figures.

Copper production showed an increase of 36 per cent over eleven months of 1921, but was almost 30 per cent below the 1920 figures. Exports of copper were 29 per cent greater than in 1921, on the basis of ten months' figures. The price of copper advanced about 10 per cent during the year.

In spite of the strike, bituminous coal production was only 7 per cent less than in 1921 for the eleven months' period, a decrease of 26,000,000 tons. Anthracite coal, however, showed a decline of 47 per cent, with a loss of 40,000,000 tons. Production of beehive coke increased 32 per cent and by-product coke production increased 41 per cent. Public utility electric power showed an increase of 7 per cent on a ten months' basis.

The average surplus of 282,926 freight cars on Dec. 1, 1921, has almost disappeared, and in its place the average shortage has increased from almost nothing to 133,786 cars. The number of cars in bad order has been considerably reduced during the year. Total car loadings for 1922 increased about 11 per cent over 1921, in spite of the drop in car loadings, and were almost up to the high mark of 1920. Railroad revenues declined 2 per cent from 1921 on a ten months' basis, due to a decrease of 1 per cent in freight revenue and 9 per cent in passenger revenue. Operating expenses were reduced by 6 per cent, resulting in a gain of 23 per cent in net operating income.

Wholesale prices have made a gradual rise in 1922 and the index number of the Department of Labor is 10 per cent greater than a year ago. Farm products and metals had the greatest relative gains. The index numbers of *Dun's* and *Bradstreet's* showed larger increases during the year, the former rising 13 per cent and the latter 21 per cent.

The total United States interest-bearing debt was reduced by $667,000,000 during the twelve months ending Dec. 1, or about 3 per cent: Liberty and Victory loans were reduced by $2,153,000,000, or about 11 per cent. Customs receipts increased 46 per cent and were far greater than in any previous year. Total ordinary receipts of the government declined 24 per cent and disbursements were reduced by 30 per cent, with a balance of ordinary receipts of over $300,000,000 in eleven months. Per capita money circulation declined slightly during the year.

The number of business failures was 27 per cent larger than in 1921 and exceeds any previous year since 1915. The amount of defaulted liabilities exceeded the huge defaults in 1921 by 5 per cent.

Security prices rose considerably during the year, industrial stocks averaging an increase of about 34 per cent, railroad stocks about 17 per cent and bonds about 20 per cent. Stock sales were 55 per cent greater than in the 1921 period and bond sales increased 26 per cent; Liberty-Victory bond sales declined 18 per cent, but other bonds increased in volume by 92 per cent.

The general index of foreign exchange compiled by the Federal Reserve Board increased about 10 per cent during the year and now stands at 67 per cent of par. The principal changes during the year were the increases in the pound sterling, the Canadian dollar, and the Argentine, Dutch and Swedish exchanges, and the continued rapid fall in German marks.

Exports were about 16 per cent less than in the eleven months' period of 1921 and the lowest in value since 1915. Imports up to the time the new tariff law went into effect were above the 1921 corresponding period by approximately 16 per cent. Imports of gold declined 62 per cent and exports increased 57 per cent, but an export balance of $215,000,000 still remained for the eleven months of 1922.

Market for Steel Ties Unusually Brisk

Prospects as to the use of steel ties by the electric railways in 1923 are brighter than for several years past. While the largest bookings and orders have usually come in February, a large number of orders have already been placed during December for delivery before March 15. Early orders are said to be due to some extent to the fact that present prices are based on steel in stock and on order which was bought at $8 to $10 per ton under the present prices.

Manufacturers of steel ties are desirous of holding present prices, but will probably be forced to follow the steel market to its present level of $2 per 100 lb., Pittsburgh. It is hardly anticipated, however, that any advance beyond this is in immediate prospect because of the fact that the large production and bookings of the mills in December, which were at a 40,000,000 rate, caused no flurry in either corporation or independent prices.

Metal, Coal and Material Prices

Metals—New York	Dec. 26, 1922
Copper, electrolytic, cents per lb.	14.75
Copper wire base, cents per lb.	16.50
Lead, cents per lb.	7.25
Zinc, cents per lb.	7.27
Tin, Straits, cents per lb.	38.875
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.625
Somerset mine run, Boston, net tons	4.425
Pittsburgh mine run, Pittsburgh, net tons	3.125
Franklin, Ill., screenings, Chicago, net tons	3.125
Central, Ill., screenings, Chicago, net tons	2.20
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No 14, per 1,000 ft.	6.50
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	93.00
White lead, (100-lb. keg), N.Y., cents per lb.	12.375
Turpentine, (bbl. lots), N.Y., per gal.	$1.36

Rolling Stock

Sacramento (Calif.) Northern Railroad has recently closed a contract with the General Electric Company covering the purchase of two 60-ton steel locomotives. They are designed for both 600- and 1,500-volt operation and with arrangement for operation on either third rail or trolley. These locomotives are equipped with four General Electric 251-600/1,500-volt motors which have a nominal one-hour rating of 200 hp. each. At the hourly rating of the motors the locomotives will have a tractive effort of 21,000 lb. and a speed of 18.3 m.p.h. when operating on 1,500-volt trolley. General dimensions of the locomotives are as follows:

Length inside of knuckles	37 ft. 4 in.
Length of cab	32 ft. 7 in.
Height of cab	11 ft. 11⅝ in.
Height with trolley down	12 ft. 11 in.
Width over all	9 ft. 7⅛ in.
Total wheelbase	25 ft. 5 in.
Rigid wheelbase	7 ft. 2 in.
Track gage	4 ft. 8½ in.
Minimum radius of curvature	50 ft. locomotive alone

Weights are approximately as follows:

Electrical equipment	39,400 lb.
Air brake and compressor	4,600 lb.
Mechanical equipment	76,000 lb.
Total weight	120,000 lb.
Weight per driving axle	30,000 lb.

Chicago Surface Lines has just placed orders for 100 motor passenger cars of the same type as the sixty-nine that are now under construction in its shops for hauling trailers. J. G. Brill Company will furnish seventy bodies and all the trucks and the remaining thirty bodies will be built by the McGuire-Cummings Company. Each car will be equipped with four G. E. 275 motors.

Track and Roadway

Brooklyn (N. Y.) Rapid Transit Company has purchased 600 International steel ties for use in reconstructing track.

Gary (Ind.) Street Railway, in its improvements for 1923, plans the construction of 8 miles of additional track, an extension of the line east on Fifth Avenue to the new tube mills and a line to the new Gary-Miller Municipal bathing beach. Officials state that the cost of laying the stretch of track to the beach will cost in the neighborhood of $500,000. Construction for both tracks will be started in the spring and an effort will be made to have them completed by the middle of next summer.

Power Houses, Shops and Buildings

Concord (N. H.) Electric Railways plans the immediate rebuilding of its power plant in West Concord, recently damaged to a great extent by fire.

Oklahoma Union Railway, Tulsa, Okla., will erect a brick and tile freight building at Sapulpa, according to an announcement by officials of the road. A site for a future passenger station will be provided near the freight depot.

Cincinnati & Dayton Traction Company, Hamilton, Ohio, had its Cincinnati terminus damaged by fire recently to the extent of $3,000. The storeroom containing records of the traction company was destroyed. There were a score or more passengerrs in the station when the fire was discovered.

New York (N. Y.) Transit Commission has ordered the reconstruction of the local station of the Interborough Rapid Transit Company at Thirty-third Street and Fourth Avenue into an express station. The commission also authorized the lengthening of all platforms at the local stations on the east side subway between Brooklyn Bridge and Grand Central Station. It is estimated that these rebuilding and reconstructing jobs will cost $4,000,000.

Jamestown, Westfield & Northwestern Railroad, Jamestown, N. Y., one of the traction lines controlled by the Broadhead interests of Jamestown, will build a new freight terminal in Jamestown to handle more efficiently the rapidly increasing freight traffic throughout Chautauqua County and southwestern New York. Two acres of property have been purchased and it is proposed to construct two freight and express sheds, each 300 ft. long and 18 ft. wide.

Trade Notes

Chicago Surface Lines has ordered 250 Johnson hand-operated fare boxes. These are in addition to the 270 that are already installed.

United Electric Railways, Providence, R. I., has purchased 900 of a new type of Rooke register from the Rooke Automatic Register Company which will take nickels, dimes, quarters and metal tokens. The railway has standardized on this type of fare collecting device and is using it on all its cars, both pay-enter and pay-leave, as well as on the open summer cars. They are also used on one-man cars, on interurban cars where fairly sizable through fares are picked up on the first collection, and on motor buses. Delivery on the new registers will begin Jan. 2.

Johnson Fare Box Company, Chicago, Ill., has sold to Lloyd E. Work & Company of that city $250,000 of first mortgage 6½ per cent sinking fund gold bonds, secured by pledge of the Ravenswood plant. The proceeds of the issue will be used by the Johnson company to provide additional working capital needed in carrying out contracts into which it has recently entered and to retire an issue of serial bonds and take care of floating indebtedness. The company reports 32,000 of its boxes in use, with the demand constantly growing and the outlook bright for sales in the foreign fields. Among the prominent cities in which the Johnson box is now in use are New York, Brooklyn, Washington, Baltimore, St. Louis, Memphis, Grand Rapids, Minneapolis, St. Paul, Omaha, Denver, Los Angeles, San Diego and cities in which Stone & Webster operate.

New Advertising Literature

Elliott Service Company, New York, N. Y., through its public safety department, has recently issued four posters on safety. They are designed for display in street cars, garages and gasoline service stations and other suitable places and are intended particularly to caution automobilists against reckless driving. They show collisions between automobiles and trolley cars caused by the carelessness of the automobile driver.

International Steel Tie Company, Cleveland, Ohio, with an attractive Christmas greeting card, has issued a pamphlet entitled "Tracks Built on Concrete Base." This little book gives the message for better trade in 1923. The booklet contains some fourteen pages and is a reprint of an article which appeared in the *Electric Railway Journal* by A. E. Harvey, superintendent of way and structures of the Kansas City (Mo.) Railways. The article was entitled "Tracks Built on Concrete Base in Kansas City." Some general views of the work as it was carried on in Kansas City are shown in the pamphlet.

THIS BOOK IS DUE ON THE LAST DATE
STAMPED BELOW

AN INITIAL FINE OF 25 CENTS WILL BE ASSESSED FOR FAILURE TO RETURN THIS BOOK ON THE DATE DUE. THE PENALTY WILL INCREASE TO 50 CENTS ON THE FOURTH DAY AND TO $1.00 ON THE SEVENTH DAY OVERDUE.

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